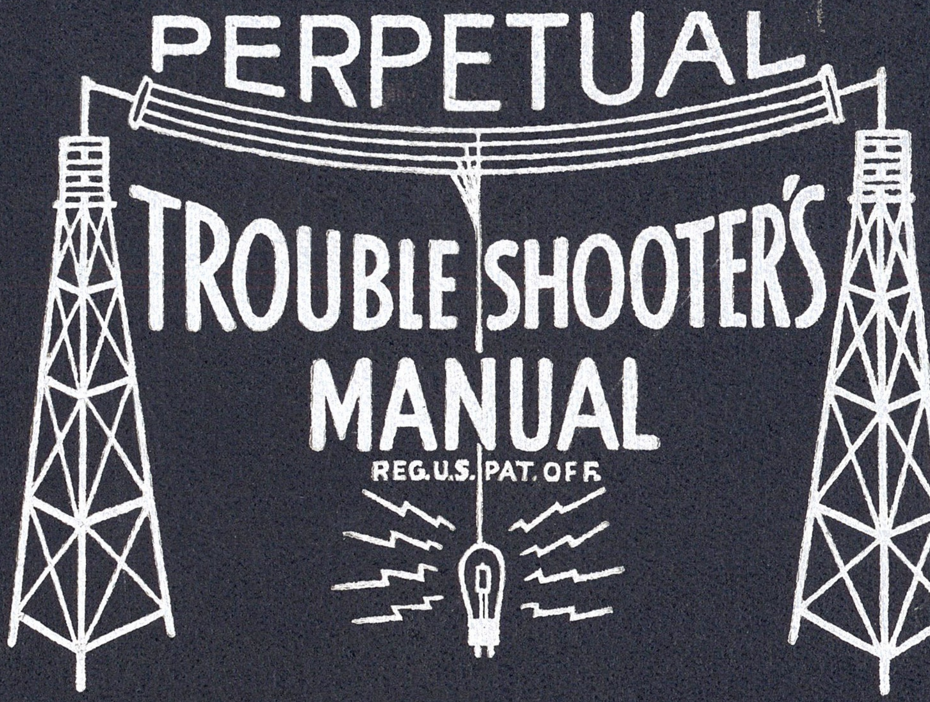
# VOLUME XVI



# PERPETUAL TROUBLE SHOOTER'S MANUAL

REG. U.S. PAT. OFF.

JOHN F. RIDER

*Perpetual*
TROUBLE
SHOOTER'S
MANUAL

RIDER

VOLUME XVI

# PERPETUAL

# TROUBLE SHOOTER'S MANUAL

Reg. U.S. Pat. Off.

## VOLUME XVI

**JOHN F. RIDER PUBLISHER, INC.**

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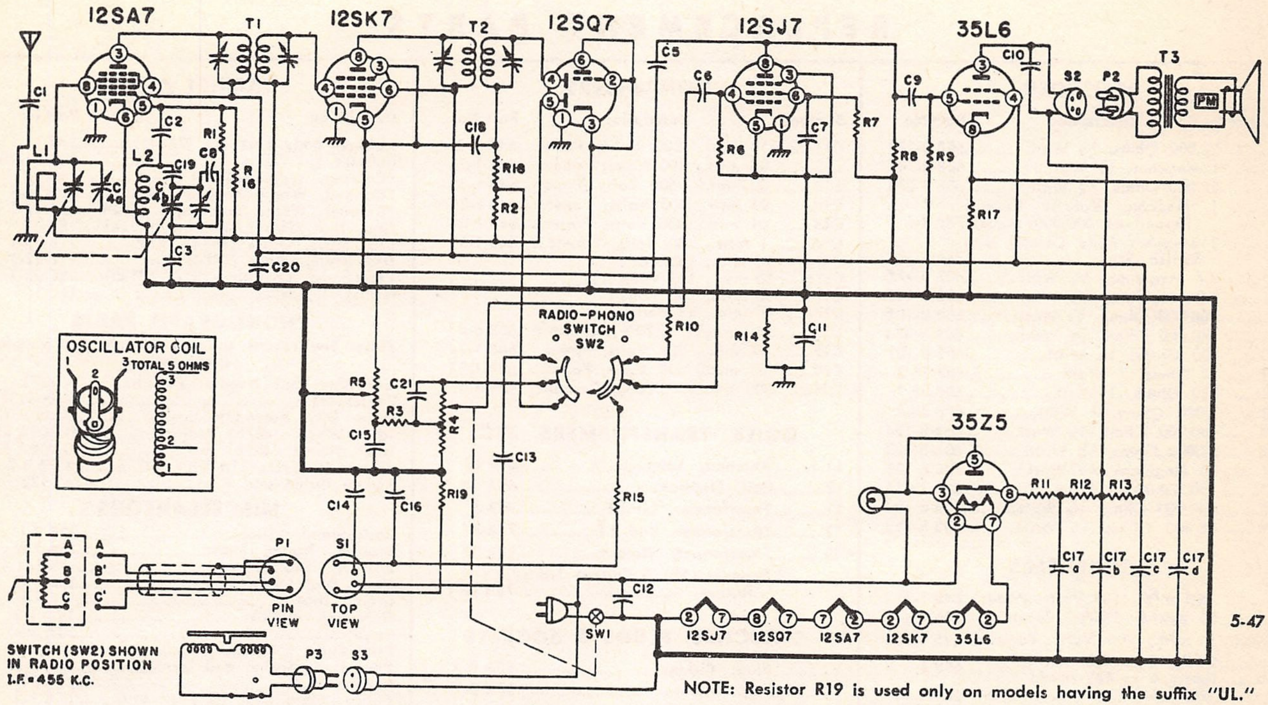
## ADMIRAL CORPORATION

**MODEL 7C62, Chassis 6M1**
**MODELS 7RT41, 7RT42, 7RT43**


12SA7
T1
12SK7
T2
12SQ7
12SJ7
35L6
T3
PM
C1
L1
L2
C2
R1
C8
R16
C19
C4a
C4b
C3
C20
C18
R18
R2
C5
C6
C7
R7
R6
C9
R8
R9
C10
S2
P2
R17
RADIO-PHONO SWITCH SW2
R10
R14
C11
OSCILLATOR COIL
TOTAL 5 OHMS
R5
C21
R3
R4
C15
C13
C14
C16
R19
R15
35Z5
R11
R12
R13
C17a
C17b
C17c
C17d
A
B
C
A'
B'
C'
P1
S1
PIN VIEW
TOP VIEW
C12
SW1
12SJ7
12SQ7
12SA7
12SK7
35L6
P3
S3
SWITCH (SW2) SHOWN IN RADIO POSITION
I.F. = 455 K.C.
5-47

NOTE: Resistor R19 is used only on models having the suffix "UL."

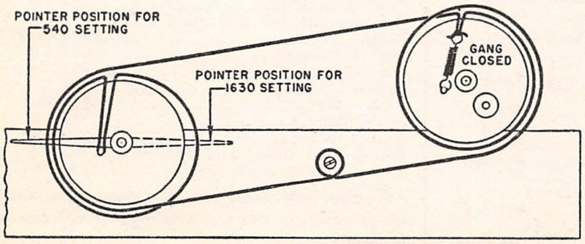
MODELS 7RT41, 7RT42, 7RT43 MODEL 7C62

## ALIGNMENT PROCEDURE

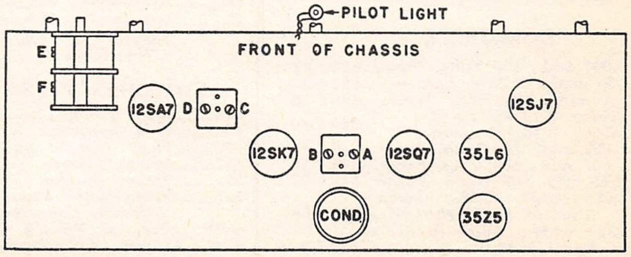
1. Connect Output Meter across Voice Coil.
2. Turn Receiver Volume Control—full on.
3. Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed in the following sequence.
4. Repeat adjustments to insure good results.

| Connect Signal Generator to— | Dummy Antenna Between Radio and Generator | Set Generator Frequency to— | Set Receiver Dial Frequency to— | Adjust Following Trimmers | Type of Adjustment |
|---|---|---|---|---|---|
| Tuning Condenser Antenna Stator | 250 mmfd. Condenser | 455 K.C. | High frequency end of Dial | A-B—2nd I. F.<br>C-D—1st I. F. | Adjust to maximum Output |
| Tuning Condenser Antenna Stator | 250 mmfd. Condenser | 1630 K.C. | High frequency end of Dial | E—Osc. | Adjust to maximum Output |
| Loop radiator (or place lead from generator close to loop of set to obtain adequate signal) | No actual connection between set and generator. | 1400 K.C. | Tune in generator signal | F—Ant. | Adjust to maximum Output |

### DIAL CORD STRINGING & POINTER SETTING


POINTER POSITION FOR 540 SETTING
POINTER POSITION FOR 1630 SETTING
GANG CLOSED

### TOP VIEW TUBE & TRIMMER LOCATION


PILOT LIGHT
FRONT OF CHASSIS
E
F
12SA7
D
C
12SJ7
12SK7
B
A
12SQ7
35L6
COND
35Z5

For Voltage, see P.16-11
Record Changer: Admiral P.RCD.CH.15-17

# ADMIRAL CORPORATION

## MODEL 7RT41, 7RT42, 7RT43

## REPLACEMENT PARTS

### RESISTORS

| Symbol | Description | Part No. |
|---|---|---|
| R1 | 22,000 Ohms, ½ Watt | 60B 8-223 |
| R2 | 1 Megohm, ½ Watt | 60B 8-105 |
| R3 | 27,000 Ohms, ½ Watt | 60B 8-273 |
| R4 | 1 Megohm Volume Control (Tapped at 500,000 ohms) | 75B 2-6 |
| R5 | 2 Megohm Tone Control and Switch SW1 | 75B 1-12 |
| R6 | 4.7 Megohms, ½ Watt | 60B 8-475 |
| R7 | 1.8 Megohms, ½ Watt | 60B 8-185 |
| R8 | 100,000 Ohms, ½ Watt | 60B 8-104 |
| R9 | 470,000 Ohms, ½ Watt | 60B 8-474 |
| R10 | 100 Ohms, ½ Watt | 60B 8-101 |
| R11 | 33 Ohms, 1 Watt | 60B 28-3 |
| R12 | 220 Ohms, 1 Watt | 60B 28-7 |
| R13 | 1,000 Ohms, 1 Watt | 60B 28-2 |
| R14 | 150,000 Ohms, ½ Watt | 60B 8-154 |
| R15 | 22,000 Ohms, ½ Watt | 60B 8-223 |
| R16 | 10 Megohms, ½ Watt | 60B 8-106 |
| R17 | 150 Ohms, 1 Watt | 60B 14-151 |
| R18 | 100,000 Ohms, ½ Watt | 60B 8-104 |
| R19 | 33,000 Ohms, ½ Watt | 60B 8-333 |

### CONDENSERS

| Symbol | Description | Part No. |
|---|---|---|
| C1 | .005 mfd., 600 Volts, Paper | 64B 1-12 |
| C2 | 50 mmfd. ±20%, Ceramic | 65B 6-4 |
| C3 | .1 mfd., 200 Volts, Paper | 64B 1-30 |
| C4a | Gang, 0 to 420 mmfd. | 68B 5 |
| C4b | Gang, 0 to 162 mmfd. | |
| C5 | .002 mfd., 600 Volts, Paper | 64B 1-14 |
| C6 | .01 mfd., 400 Volts, Paper | 64B 1-25 |
| C7 | .05 mfd., 400 Volts, Paper | 64B 1-22 |
| C8 | 15 mmfd. ±20%, Ceramic | 65B 6-18 |
| C9 | .01 mfd., 400 Volts, Paper | 64B 1-25 |
| C10 | .03 mfd., 400 Volts, Paper | 64B 1-23 |

### CONDENSERS

| Symbol | Description | Part No. |
|---|---|---|
| C11 | .18 mfd., 200 Volts, Paper | 64A 2-2 |
| C12 | .05 mfd., 400 Volts, Paper | 64B 1-22 |
| C13 | .001 mfd., 600 Volts, Paper | 64B 1-15 |
| C14 | .05 mfd., 400 Volts, Paper | 64B 1-25 |
| C15 | .01 mfd., 400 Volts, Paper | 64B 1-24 |
| C16 | .1 mfd., 200 Volts, Paper | 64B 1-30 |
| C17a | 30 mfd., 150 Volts | Elect. 67A 14-1 |
| C17b | 30 mfd., 150 Volts | |
| C17c | 20 mfd., 150 Volts | |
| C17d | 20 mfd., 25 Volts | |
| C18 | 250 mmfd. ±20%, Ceramic | 65B 6-5 |
| C19 | .02 mfd., 200 Volts, Paper | 64B 1-24 |
| C20 | .05 mfd., 400 Volts, Paper | 64B 1-22 |
| C21 | 500 mmfd. ±20%, Ceramic | 65B 6-6 |

### COILS, TRANSFORMERS, ETC.

| Symbol | Description | Part No. |
|---|---|---|
| L1 | Antenna, Loop | 69B 13 |
| L2 | Coil, Oscillator | 69A 14 |
| T1 | Transformer, 1st I.F. | 72B 3 |
| T2 | Transformer, 2nd I.F. | 72B 4 |
| T3 | Transformer, Output | 98A 17 |
| | Speaker (5") & Output Transformer | 78B 19-1 |

### SWITCHES, PLUGS & SOCKETS

| Symbol | Description | Part No. |
|---|---|---|
| P1 | Plug, Pickup | 88A 8-5 |
| P3 | Plug, Motor | 88A 8-1 |
| S1 | Socket, Phono | 88A 8-6 |
| S3 | Phono-Motor Socket & Leads (Female connector) | 89A 6-3 |
| SW1 | Part of Tone Control R5 | |
| SW2 | Switch, Radio-Phono | 77A 16-2 |

### CABINET PARTS

| Description | Part No. |
|---|---|
| Cabinet Body Less Lid (7RT41) | 34D 11-11 |
| Cabinet Lid (7RT41) | 34D 11-10 |
| *Cabinet, Wood (7RT42) | 35D 47 |
| *Cabinet, Wood, Walnut (7RT43) | 35D 48-1 |
| *Cabinet, Wood, Mahogany (7RT43) | 35D 48-2 |
| Clip, Dial Glass Mounting (7RT43) | 18A 12 |
| Dial Scale, Glass (7RT41-7RT42) | 21B 35-1 |
| Dial Scale, Glass (7RT43) | 21B 33-1 |
| Escutcheon, Overlay (7RT41-7RT42) | 23C 23-1 |
| Grille, Inside | 16C 1 |

### PHONOGRAPH PARTS

Note: See record changer manual for complete parts list.

| Description | Part No. |
|---|---|
| Cartridge and Needle, Pickup | A 1372 |
| Centerpost | G400B137-1 |
| Drive Disc Assembly | G 400A 179 |
| Idler Wheel (407B3 Motor) | G 400A 23 |
| Idler Wheel (407B1 Motor) | G 400A 57 |
| Motor, 60 Cycle 115 Volt A.C. | 407B 3-2 |
| Pickup Cable and Plug | A 1322 |

### MISCELLANEOUS

| Description | Part No. |
|---|---|
| Background, Dial | 22B 9-1 |
| Bracket, Tuning Shaft | 15A 152 |
| Bracket, Dial | 15B 151 |
| Cord, Dial (48") | 50A 1-3 |
| Drum, Dial | 17A 14 |
| Grommet, Rubber | 12A 1-2 |
| Knob | 33A 19-1 |
| Pilot Light #47 | 81A 1-8 |
| Pilot Light Socket and Leads | 82A 2-3 |
| Pointer | 25A 21 |
| Pulley, Fibre Dial ⅛"x½" O.D. | 17A 1-3 |
| Shaft, Tuning | 28A 11-4 |
| Spring, Dial Drum Cord Tension | 19B 1-7 |

*** Supplied only if old cabinet cannot be repaired. When ordering, describe condition of old cabinet in detail.**

## MODEL 7C62

## REPLACEMENT PARTS

### RESISTORS

| Symbol | Description | Part No. |
|---|---|---|
| R1 | 22,000 Ohms, ½ Watt | 60B 8-223 |
| R2 | 1 Megohm, ½ Watt | 60B 8-105 |
| R3 | 27,000 Ohm, ½ Watt | 60B 8-273 |
| R4 | 1 Megohm Volume Control and Switch SW1 (Tapped at 500,000 ohms) | 75B 2-2 |
| R5 | 2 Megohms, Tone Control | 75B 1-8 |
| R6 | 4.7 Megohms, ½ Watt | 60B 8-475 |
| R7 | 1.8 Megohms, ½ Watt | 60B 8-185 |
| R8 | 100,000 Ohms, ½ Watt | 60B 8-104 |
| R9 | 470,000 Ohms, ½ Watt | 60B 8-474 |
| R10 | 100 Ohms, ½ Watt | 60B 8-101 |
| R11 | 33 Ohms, 1 Watt | 60B 28-3 |
| R12 | 220 Ohms, 1 Watt | 60B 28-7 |
| R13 | 1,000 Ohms, 1 Watt | 60B 28-2 |
| R14 | 150,000 Ohms, ½ Watt | 60B 8-154 |
| R15 | 22,000 Ohms, ½ Watt | 60B 8-223 |
| R16 | 10 Megohms, ½ Watt | 60B 8-106 |
| R17 | 150 Ohms, 1 Watt | 60B 14-151 |
| R18 | 100,000 Ohms, ½ Watt | 60B 8-104 |
| R19 | 33,000 Ohms, ½ Watt | 60B 8-333 |

### CONDENSERS

| Symbol | Description | Part No. |
|---|---|---|
| C1 | .005 mfd., 600 Volts, Paper | 64B 1-12 |
| C2 | 50 mmfd. ±20%, Ceramic | 65B 6-4 |
| C3 | .1 mfd., 200 Volts, Paper | 64B 1-30 |
| C4a | Gang, 0 to 420 mmfd. | 68B 5 |
| C4b | Gang, 0 to 162 mmfd. | |
| C5 | .002 mfd., 600 Volts, Paper | 64B 1-14 |
| C6 | .002 mfd., 600 Volts, Paper | 64B 1-14 |
| C7 | .05 mfd., 400 Volts, Paper | 64B 1-22 |
| C8 | 15 mmfd. ±20%, Ceramic (Used on Model 7C62-N) | 65B 6-18 |
| C8 | 20 mmfd., Mica (Used on Model 7C62-UL) | 65B 7-5 |

### CONDENSERS

| Symbol | Description | Part No. |
|---|---|---|
| C9 | .01 mfd., 400 Volts, Paper | 64B 1-25 |
| C10 | .03 mfd., 400 Volts, Paper | 64B 1-23 |
| C11 | .1 mfd., 400 Volts, Paper | 64B 1-20 |
| C12 | .05 mfd., 400 Volts, Paper | 64B 1-22 |
| C13 | .001 mfd., 600 Volts, Paper | 64B 1-15 |
| C14 | .05 mfd., 400 Volts, Paper | 64B 1-22 |
| C15 | .02 mfd., 400 Volts, Paper | 64B 1-24 |
| C16 | .1 mfd., 200 Volts, Paper | 64B 1-30 |
| C17a | 30 mfd., 150 Volts | Elect. 67C 7-46 |
| C17b | 30 mfd., 150 Volts | |
| C17c | 20 mfd., 150 Volts | |
| C17d | 20 mfd., 25 Volts | |
| C18 | 250 mmfd. ±20%, Ceramic | 65B 6-5 |
| C19 | .02 mfd., 200 Volts, Paper | 64B 1-24 |
| C20 | .05 mfd., 400 Volts, Paper | 64B 1-22 |
| C21 | 500 mmfd. ±20%, Ceramic | 65B 6-6 |

### COILS, TRANSFORMERS, ETC.

| Symbol | Description | Part No. |
|---|---|---|
| L1 | Antenna, Loop | 69B 16 |
| L2 | Coil, Oscillator | 69A 14 |
| T1 | Transformer, 1st I.F. | 72B 3 |
| T2 | Transformer, 2nd I.F. | 72B 4 |
| T3 | Transformer, Output | 98A 18 |
| | Speaker (8" PM) & Output Transformer | 78C 20-1 |

### SWITCHES, PLUGS & SOCKETS

| Symbol | Description | Part No. |
|---|---|---|
| P1 | Plug, Pickup | 88A 8-5 |
| P2 | Plug, Speaker | 88A 4 |
| P3 | Plug, Motor | 88A 8-1 |
| S1 | Socket, Phono | 88A 8-6 |
| S2 | Socket, Speaker | 87A 6-1 |
| S3 | Phono-Motor Socket & Leads (Female connector) | 89A 6-6 |
| SW1 | Part of Volume Control R4 | |
| SW2 | Switch, Radio-Phono | 77A 16-2 |

### CABINET PARTS

| Description | Part No. |
|---|---|
| Screw, Chassis Mounting | 1A 67-17-2 |
| Tie Bar, Tilt Out | 15B 126 |
| Springs, Tilt Out | 19A 15-1 |
| Escutcheon, Plastic | 23C 22-2 |
| Dial Window, Plastic | 24B 1 |
| *Cabinet, Wood (7C62) | 35E 52 |
| Hinge Assembly, Record Support Side | AC 118-1 |
| Hinge Assembly, Pickup Arm Side | AC 118-2 |

### PHONOGRAPH PARTS

Note: See record changer manual for complete parts list.

| Description | Part No. |
|---|---|
| Cartridge and Needle, Pickup | A 1372 |
| Centerpost | G400B137-1 |
| Drive Disc Assembly | G 400A 179 |
| Idler Wheel (407B3 Motor) | G 400A 23 |
| Idler Wheel (407B1 Motor) | G 400A 57 |
| Motor, 60 Cycle 115 Volt, A. C. | 407B 3-2 |
| Pickup Cable and Plug | A 1304 |

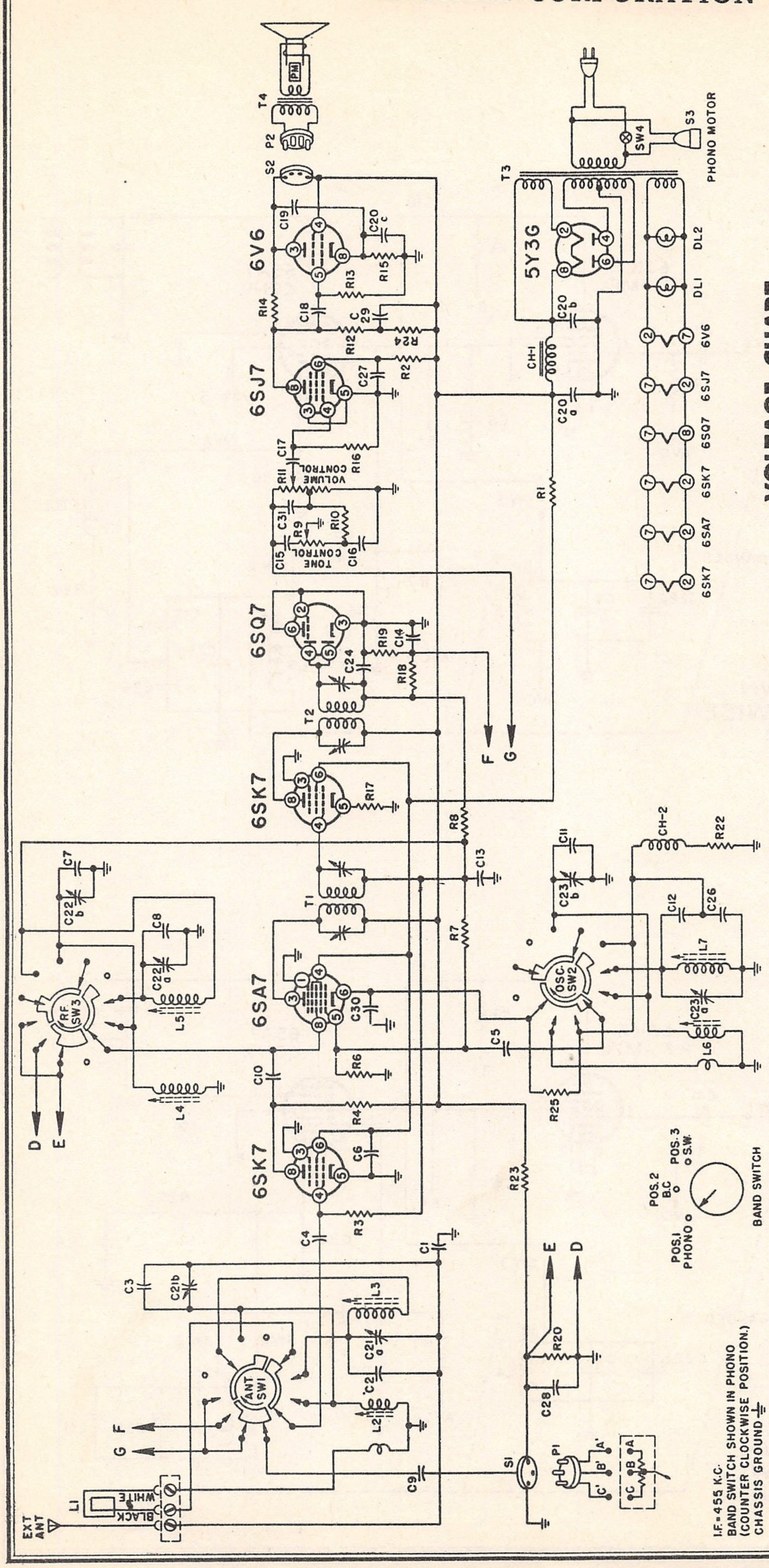
### MISCELLANEOUS

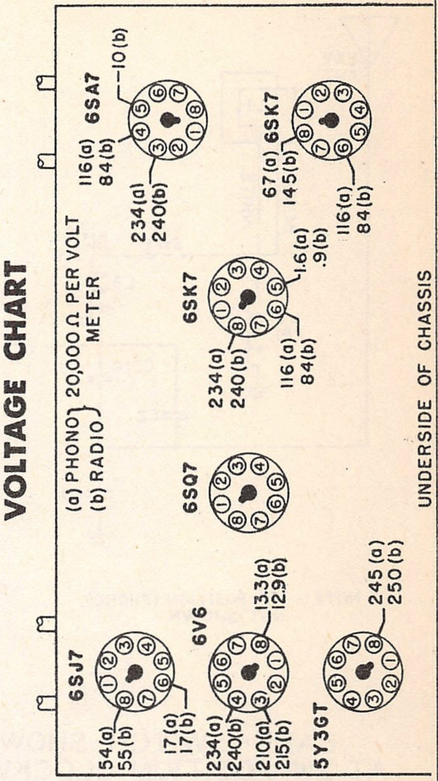
| Description | Part No. |
|---|---|
| Compression Ring (For pointer) | 18A 5-2 |
| Cord, Dial | 50A 1-3 |
| Grommet, Rubber (For gang cond.) | 12A 1-2 |
| Knob | 33A 19-2 |
| Pilot Light #47 | 81A 1-8 |
| Pilot Light Socket & Leads | 82A 3-3 |
| Pointer | 25B 22 |
| Scale, Dial | 21B 30-2 |
| Shaft, Pointer | 28A 16 |
| Shaft, Tuning | 28A 10-1 |
| Spring, Dial Drum Cord Tension | 19B 1-5 |
| Spring, Tuning Shaft Tension | 19A 18 |

*** Supplied only if old cabinet cannot be repaired. When ordering, describe condition of old cabinet in detail.**

## ADMIRAL CORPORATION

**MODEL 7C63, Chassis 7C1**


6SK7
6SA7
6SK7
6SQ7
6SJ7
6V6
5Y3G
T1
T2
T3
T4
P2
S2
S3
SW4
PHONO MOTOR
CH-1
CH-2
DL1
DL2
RF. SW3
OSC. SW2
ANT SW1
VOLUME CONTROL
TONE CONTROL
EXT ANT
BLACK
WHITE
L1
S1
P1
D
E
F
G
POS.1 PHONO
POS.2 B.C.
POS.3 S.W.
BAND SWITCH
I.F. = 455 K.C.
BAND SWITCH SHOWN IN PHONO (COUNTER CLOCKWISE POSITION.)
CHASSIS GROUND


VOLTAGE CHART
(a) PHONO
(b) RADIO
20,000 Ω PER VOLT METER
6SA7
116(a) 84(b)
-10(b)
234(a) 240(b)
6SK7
67(a) 145(b)
116(a) 84(b)
6SK7
234(a) 240(b)
1.6(a) .9(b)
116(a) 84(b)
6SQ7
6SJ7
54(a) 55(b)
17(a) 17(b)
6V6
234(a) 240(b)
210(a) 215(b)
13.3(a) 12.9(b)
5Y3GT
245(a) 250(b)
UNDERSIDE OF CHASSIS

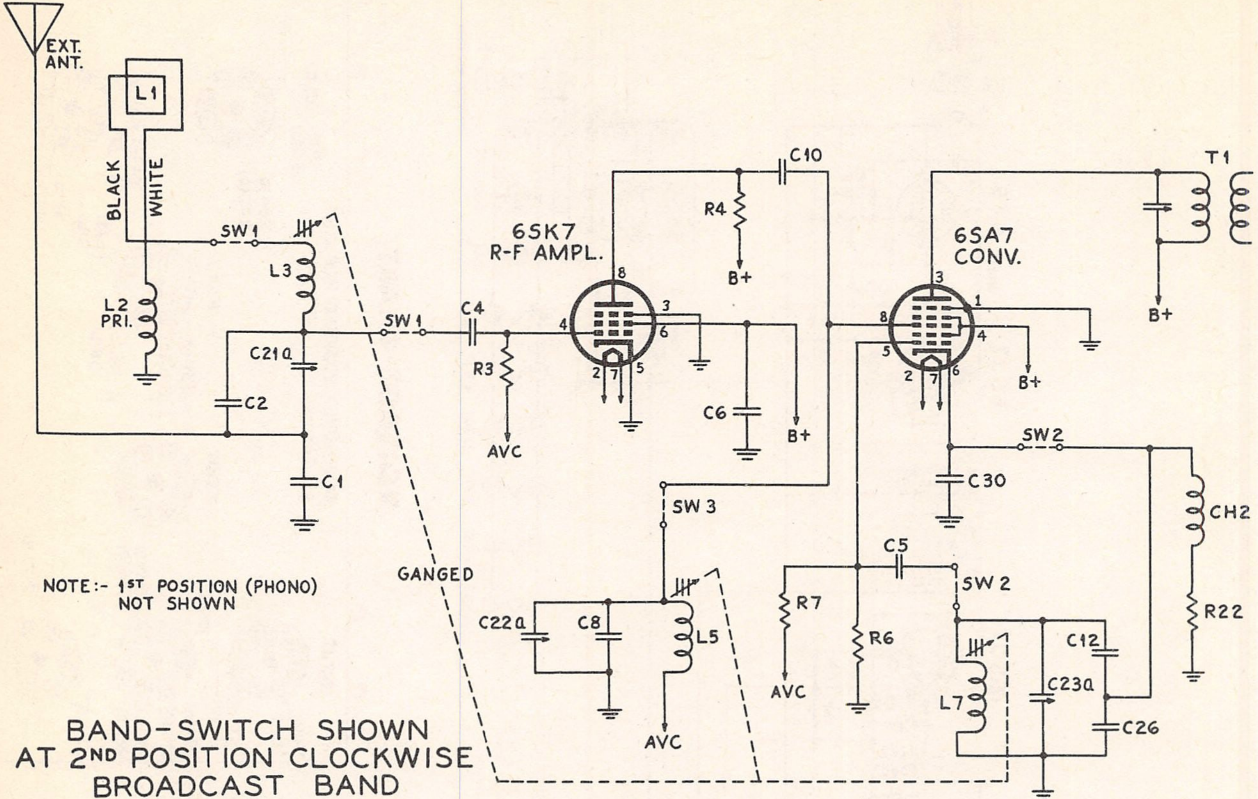
## VOLTAGE DATA

- Measured on 117 Volt A.C. Line
- Volume control at lowest volume setting.
- No station tuned in.
- Radio readings with bandswitch in broadcast position.
- Voltages measured between point indicated and chassis.

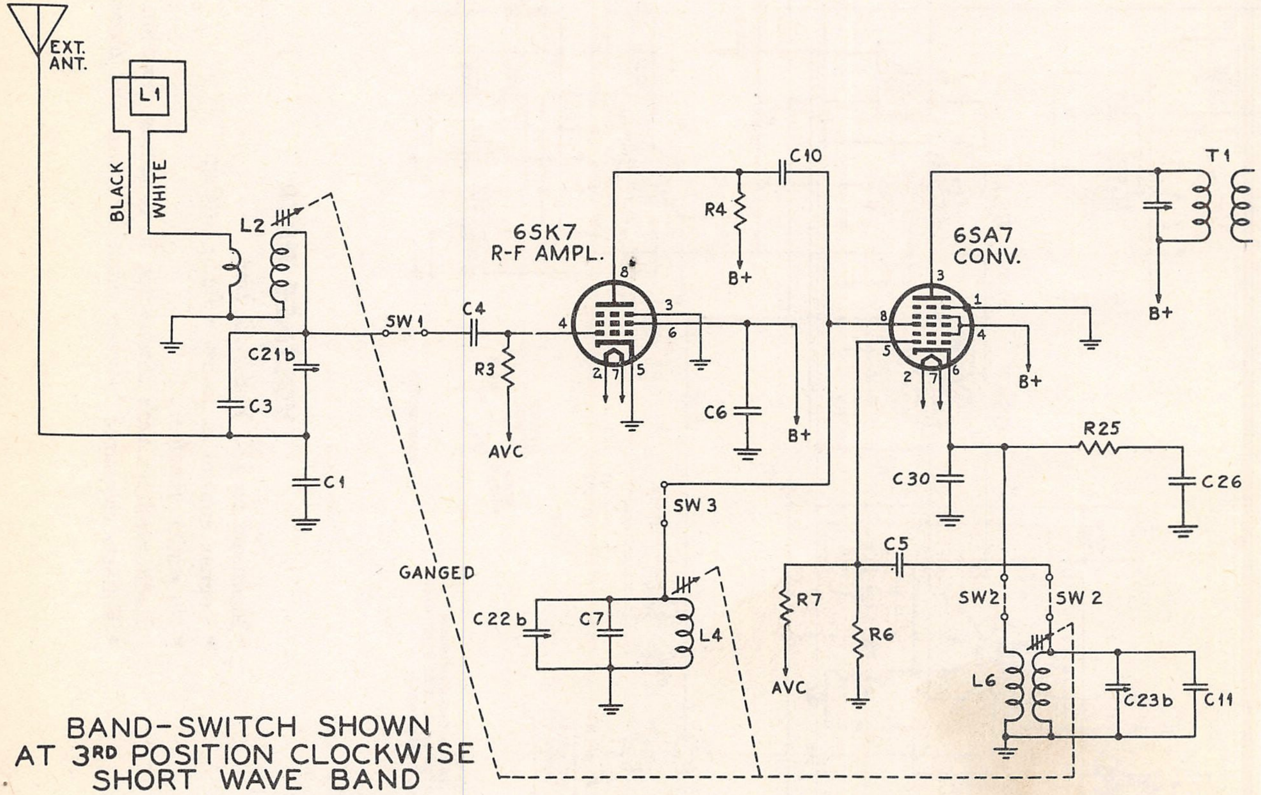
Record Changer: Admiral Model RC170

**MODEL 7C63,**

## ADMIRAL CORPORATION


EXT. ANT.
L1
BLACK
WHITE
SW 1
L3
L2 PRI.
SW 1
C4
C21a
C2
C1
R3
AVC
6SK7 R-F AMPL.
8
4
3
6
2
7
5
R4
B+
C10
C6
B+
6SA7 CONV.
3
8
1
5
4
2
7
6
B+
T1
B+
SW 2
C30
CH2
R22
SW 3
C22a
C8
L5
AVC
C5
SW 2
R7
R6
AVC
C12
C23a
L7
C26
GANGED
NOTE:- 1ST POSITION (PHONO) NOT SHOWN

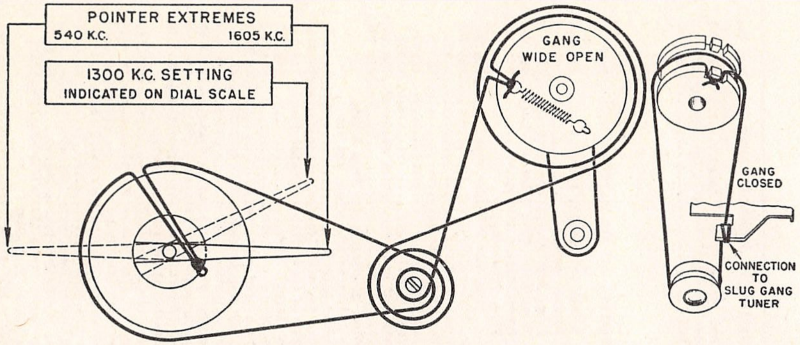
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE BROADCAST BAND 540-1605 KC.


EXT. ANT.
L1
BLACK
WHITE
L2
SW 1
C4
C21b
C3
C1
R3
AVC
6SK7 R-F AMPL.
8
4
3
6
2
7
5
R4
B+
C10
C6
B+
6SA7 CONV.
3
8
1
5
4
2
7
6
B+
T1
B+
R25
C30
C26
SW 3
C22b
C7
L4
C5
R7
R6
AVC
SW2
SW 2
L6
C23b
C11
GANGED

BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE SHORT WAVE BAND

**MODEL 7C63**

# ADMIRAL CORPORATION



## RECORD CHANGER SERVICE DATA

The element in the new Admiral pickup cartridge is made of a special rubber which acts as a high resistance electrical conductor. The resistance varies as the length of the rubber is changed. A needle is clamped to the center of the resistive rubber as shown at "B" (see schematic). A DC voltage is applied at AA'. The voltage drop from "B" to "C" varies as the resistance changes due to the "back and forth" movement of the needle. This varying voltage drop, which is in reality an alternating voltage of audio frequency, is applied through the coupling condenser to the grid of the audio amplifier tube. In case of distortion or low volume on phono operation only, check as follows:

1. Replace cartridge and check operation. If not satisfactory, proceed with tests.
2. With the volume control at maximum, touch the needle with the finger. If a loud hum is heard, then the circuit from the needle to the grid of the audio amplifier tube is not open or shorted. If hum is not heard, check the circuit from "B" to the grid.
3. If a hum is heard, check the voltage across outer terminals "A" and "C" on the bottom of cartridge. Generally it should measure from 80 to 100 volts DC. If it does not, check the circuit for fault.
4. The resistance of the cartridge is not critical, but should measure between 100,000 ohms and 2 megohms.
5. If the needle is bent, it can be straightened by bending it so that it projects 1/16 inch below the cartridge. It should then be pressed back several times with a flat object.

Do not attempt to repair cartridges or remove the cap on the cartridge assembly as this will void the warranty.

## POINTER ADJUSTMENT

Turn the tuning control knob clockwise until tuning gang is wide open. The pointer should now be at 1605 Kc. (last dial dot). If it is not, grasp the pointer with your hand and move it to 1605 Kc. Then proceed with alignment.

## REPLACING TUNING SLUG

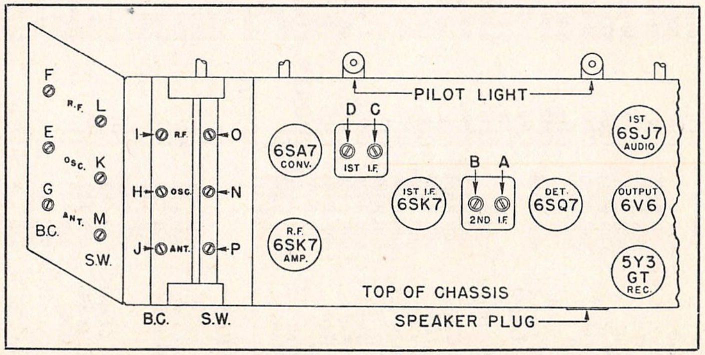
Set the gang to its wide open position, unsolder and remove the old slug. Set the slug adjusting screw about half way down. Place the new slug in such a position that 1⅜ inches of its length is above the coil form. Solder it in this position making sure that the slug wire is straight. Re-align the set as shown in the chart.

## ALIGNMENT PROCEDURE

1. Loop must be connected during alignment.
   Check the set screws that hold the tuning drum to the shaft to see that they are tight and that the drum has not slipped on the shaft. The correct position of the drum can be seen on the stringing diagram.
2. In the closed position the stop on the rear of the dial drum must be against the stop post.
3. **With the gang wide open, all slugs should be 1⅜ inches out of their coil forms. If there is any serious deviation or if there has been any tampering, turn the adjusting screws until this distance is correct.**
4. Be sure both the set and the signal generator are thoroughly warmed up before starting alignment.
5. Turn receiver Volume Control full on.
6. Use lowest output setting of signal generator that gives a satisfactory reading on meter.
7. Proceed in sequence as outlined below.

| Step | Connect Signal Generator To | Dummy Antenna Between Radio and Signal Generator | Signal Generator Frequency | Tuning Gang Setting | Adj. Trimmers in Following Order to Max. |
|---|---|---|---|---|---|
| 1 | Set Band Change Switch to Broadcast Position.<br>6SA7 Grid (Pin No. 8) | .1MFD. | 455 K.C. | Set Pointer to Upper Limit | A, B, C, D |
| 2 | Before proceeding to step 3 check pointer travel and slug position as described below. | | | | |
| 3 | Black Loop Lead | 10 MMFD. If not available wrap several turns of the generator lead around the black loop lead. | 1605 K.C. | Set Pointer to Upper Limit | E, F, G |
| 4 | Black Loop Lead | | 1300 K.C. | Set Pointer to 1300 K.C. on Dial Scale | H, I, J |
| 5 | Set Band Change Switch to Short Wave Position. | | | | |
| 6 | White Loop Lead | 400 Ohms | 12.5 M.C. | Set Pointer to Upper Limit | K, L, M |
| 7 | White Loop Lead | 400 Ohms | 12.0 M.C. | Set Pointer to 12.0 M.C. on Dial Scale | N, O, P |

## TUBE AND TRIMMER LAYOUTS



## ANTENNA CONNECTIONS

In replacing connections to antennas, it is necessary to see that the flat twin parallel conductor is not twisted. The rear parallel conductor should be connected to the rear terminal screw on each loop antenna. The front parallel conductor should be connected to the front terminal screw on each loop antenna.

MODEL 7C63
MODEL 7C73

# ADMIRAL CORPORATION

## PARTS LIST - 7C63

### RESISTORS

| SYMBOL | DESCRIPTION | PART NO. |
|---|---|---|
| R1 | 12,000 Ohms, 5 Watt | 61A 1-1 |
| R2 | 2.2 Megohms, Carbon, ½ Watt | 60B 8-225 |
| R3 | 470,000 Ohms, ½ Watt | 60B 8-474 |
| R4 | 10,000 Ohms, 2 Watt | 60B 20-103 |
| R6 | 22,000 Ohms, ½ Watt | 60B 8-223 |
| R7 | 10 Megohms, ½ Watt | 60B 8-106 |
| R8 | 1 Megohm, ½ Watt | 60B 8-105 |
| R9 | 2 Megohms Tone Control | 75B 1-8 |
| R10 | 27,000 Ohms, ½ Watt | 60B 8-273 |
| R11 | 1 Megohm Volume Control and Switch SW4 Tapped at 500,000 Ohms | 75B 2-2 |
| R12 | 470,000 Ohms, ½ Watt | 60B 8-474 |
| R13 | 470,000 Ohms, ½ Watt | 60B 8-474 |
| R14 | 3.3 Megohms, ½ Watt | 60B 8-335 |
| R15 | 390 Ohms, 1 Watt | 60B 14-391 |
| R16 | 10 Megohms, ½ Watt | 60B 8-106 |
| R17 | 100 Ohms, ½ Watt | 60B 8-101 |
| R18 | 220,000 Ohms, ½ Watt | 60B 8-224 |
| R19 | 100,000 Ohms, ½ Watt | 60B 8-104 |
| R20 | 100,000 Ohms, ½ Watt | 60B 8-104 |
| R22 | 100 Ohms, ½ Watt | 60B 8-101 |
| R23 | 100,000 Ohms, 1 Watt | 60B 14-104 |
| R24 | 47,000 Ohms, ½ Watt | 60B 8-473 |
| R25 | 470 Ohms, ½ Watt | 60B 8-471 |

### CONDENSERS

| SYMBOL | DESCRIPTION | PART NO. |
|---|---|---|
| C1 | 1000 mmfd., Mica | 65B 7-33 |
| C2 | 35 mmfd., Silver Mica 3% | 65B 1-31 |
| C3 | 25 mmfd., Silver Mica 3% | 65B 1-28 |
| C4 | 100 mmfd., Mica | 65B 7-17 |
| C5 | 50 mmfd., Ceramic | 65B 6-4 |
| C6 | .05 mfd., 400 V.D.C., Paper | 64B 1-22 |
| C7 | 65 mmfd., Silver Mica 3% | 65B 1-27 |
| C8 | 420 mmfd., Silver Mica | 65B 1-13 |
| C9 | 1000 mmfd., Mica | 65B 7-33 |
| C10 | 200 mmfd., Mica 2% | 65B 7-5 |
| C11 | 65 mmfd., Silver Mica 3% | 65B 1-27 |
| C12 | 200 mmfd., Silver Mica, 2% | 65B 1-14 |
| C13 | .1 mfd., 400 V.D.C., Paper | 64B 1-20 |
| C14 | 250 mmfd., Mica | 65B 7-22 |
| C15 | 1000 mmfd., Mica | 65B 7-33 |
| C16 | .02 mfd., 400 V.D.C., Paper | 64B 1-24 |
| C17 | .01 mfd., 400 V.D.C., Paper | 64B 1-25 |
| C18 | .005 mfd., 600 V.D.C., Paper | 64B 1-12 |
| C19 | .01 mfd., 600 V.D.C., Paper | 64B 1-10 |
| C20a | 30 mfd., 350 V.D.C., Elec. | 67C 6-25 |
| C20b | 30 mfd., 350 V.D.C., Elec. | |
| C20c | 20 mfd., 25 V.D.C., Elec. | |
| C21a | 3-40 mmfd., Dual Trimmer | 66A 1-5 |
| C21b | 3-40 mmfd., Dual Trimmer | |
| C22a | 3-40 mmfd., Trimmer | 66B 8-1 |
| C22b | 3-40 mmfd., Trimmer | 66B 8-1 |
| C23a | 3-40 mmfd., Trimmer | 66B 8-1 |
| C23b | 3-40 mmfd., Trimmer | 66B 8-1 |
| C24 | 100 mmfd., Mica | 65B 7-17 |
| C26 | 1,200 mmfd., Mica | 65B 5-34 |
| C27 | .05 mfd., 200 V.D.C., Paper | 64B 1-32 |
| C28 | .25 mfd., 200 V.D.C., Paper | 64B 1-28 |
| C29 | .1 mfd., 400 V.D.C., Paper | 64B 1-20 |
| C30 | .20 mmfd., Mica | 65B 7-5 |
| C31 | 500 mmfd. ± 20%, Ceramic | 65B 6-6 |

### CHOKES, COILS, TRANSFORMERS, Etc.

| SYMBOL | DESCRIPTION | PART NO. |
|---|---|---|
| L1 | Loop Antenna, (Record Support Side) | AD120 |
| L1 | Loop Antenna, (Pickup Arm Side) | AD117 |
| L2 | Coil, S.W. Antenna | AD116-1 |
| L3 | Coil, B. C. Antenna | AC105-2 |
| L4 | Coil, S.W., R.F. | AD116-2 |
| L5 | Coil, B. C., R.F. | AB100-1 |
| L6 | Coil, S.W., Oscillator | AD116-3 |
| L7 | Coil, B.C., Oscillator | AC101-1 |
| CH1 | Choke, Filter | 74A 3 |
| CH2 | Coil, Oscillator Choke | AB103-1 |
| T1 | Transformer, 1st I.F. | 72B 7 |
| T2 | Transformer, 2nd I.F. | 72B 8 |
| T3 | Transformer, Power | 80B 1 |
| T4 | Transformer, Output | 98A 20 |
| | Speaker 10" and Transformer | 78B 6 |

**When Ordering Slugs Specify Color Code**

| SYMBOL | DESCRIPTION | PART NO. |
|---|---|---|
| | Slug, Tuning (B.C.—Osc. & R.F.) | 71B 1-3 |
| | Slug, Tuning (S.W.—Ant., R.F. & Osc.) | 71B 1-9 |
| | Slug, Tuning (B.C. Ant.) | 71B 1-13 |

### SWITCHES, PLUGS AND SOCKETS

| SYMBOL | DESCRIPTION | PART NO. |
|---|---|---|
| P1 | Plug, Pickup | 88A 5-7 |
| P2 | Plug, Speaker | 88A 4 |
| S1 | Phono Socket, Shielded | 88A 5-9 |
| S2 | Socket, Speaker | 87A 6-1 |
| S3 | Phono-Motor Socket & Leads | 89A 6-8 |
| SW1 | Switch, Antenna | 76B 1-3 |
| SW2 | Switch, Oscillator | 76B 1-2 |
| SW3 | Switch, R.F. | 76B 1-1 |
| SW4 | Part of Volume Control R11 | |

### PHONOGRAPH PARTS

**Note: See record changer manual for complete parts list.**

| DESCRIPTION | PART NO. |
|---|---|
| Cartridge and Needle, Pickup | A1372 |
| Centerpost | G400B 137-1 |
| Drive Disc Assembly | G400A 179 |
| Idler Wheel (407B 3 Motor) | G400A 23 |
| Idler Wheel (407B 1 Motor) | G400A 57 |
| Motor | 407B 3-2 |
| Pickup Cable and Plug | A1305 |
| Tilt Out Hinge Assembly (Record Support Side) | AC118-1 |
| Tilt Out Hinge Assembly (Pickup Arm Side) | AC118-2 |
| Tilt Out Spring | 190A 15-1 |
| Tilt Out Tie Bar | 15B 126 |

### MISCELLANEOUS

| DESCRIPTION | PART NO. |
|---|---|
| *Cabinet (7C63), Wood | 35D 51 |
| Compression Ring-Pointer | 18A 5-2 |
| Cord, Dial | 50A 1-3 |
| Dial Background Assembly | A1357 |
| Dial Window—Plastic | 24B 1 |
| Drum and Hub Assembly, Pointer | A1355 |
| Drum and Hub Assembly, Tuner | A1356 |
| Escutcheon—Plastic Dial | 23C 22-1 |
| Handle, Door | 37B 10-1 |
| Knob | 33A 19-2 |
| Pilot Light No. 47 | 81A 1-8 |
| Pilot Light Socket | 82A 3-8 |
| Pointer, Dial | 25B 22 |
| Screw, Escutcheon Mounting | 1A 15-6-58 |
| Spring, Dial Cord Tension | 19B 1-10 |
| Spring, Tension | 19B 1-11 |
| Transmission Line (43") | 95A 16-1 |
| Transmission Line (54") | 95A 16-2 |

*Supplied only if old cabinet cannot be repaired. When ordering, describe condition of old cabinet in detail.

## PARTS LIST (CONTD.) - 7C73-9A1

| Symbol | COILS, TRANSFORMERS, ETC. | Part No. |
|---|---|---|
| CH1 | Choke, F.M. Antenna | AB 103-33 |
| CH2 | Choke, Grounded Grid Cathode | AB 103-35 |
| CH3 | Choke, Grounded Grid Plate | AB 103-35 |
| CH4 | Choke, R.F. Plate | AB 103-36 |
| CH5 | Choke, A.M. Oscillator Cathode | AB 103-1 |
| CH6 | Choke, F.M. Oscillator Cathode | AB 103-34 |
| CH7 | Choke, R.F. Filament...Consists of approximately 8 turns of #20 solid hookup wire wound around condenser C51 | |
| CH8 | Choke, Filter | 74A 9 |
| L1 | Antenna, F.M. Folded Dipole | AB 128 |
| L2 | Antenna, A.M. (13') | 95A 18 |
| L3 | Coil, A.M. Antenna (less slug) | AC 105-2 |
| L4 | Coil, F.M.-R.F. (less slug) | AA 122 |
| L5 | Coil, F.M. Converter (less slug) | AA 122 |
| L6 | Coil, A.M. Converter (less slug) | AB 100-1 |
| L7 | Coil, F.M. Oscillator (less slug) | AA 123 |
| L8 | Coil, A.M. Oscillator (less slug) | AC 101-2 |
| SW1 | Switch, Antenna (Second from chassis front) | 76C 11-3 |
| SW2 | Switch, R.F. (Fourth from chassis front) | 76C 11-5 |
| SW3 | Switch, Oscillator (Third from chassis front) | 76C 11-4 |
| SW4 | Switch, I.F. (Farthest from chassis front) | 76C 11-6 |
| SW5 | Switch, Audio (Closest to chassis front) | 76C 11-2 |
| SW6 | Switch (ON-OFF) | Part of R-23 |
| SW7 | Switch (Tone Control) | Part of R-26 |
| | Band-Switch Shaft Assembly | 76C 11-1 |
| | Set Screw, #6-32 x 1/4 | 1A 5-54 |
| | Spacers for Shaft Assembly | 29A 4-4 |
| T1 | Transformer, 1st I.F. (F.M.) | 72B 24 |
| T2 | Transformer, 2nd I.F. (F.M.) | 72B 26 |
| T3 | Transformer, Ratio Detector | 72B 27 |
| T4 | Transformer, 1st I.F. (A.M.) | 72B 25 |
| T5 | Transformer, 2nd I.F. (A.M.) | 72B 25 |
| T6 | Transformer, Power | 80B 2 |
| T7 | Transformer, Output | 98A 22 |
| | Speaker (12"P.M.) and Output Transformer | 78B 21 |

When Ordering Slugs Specify Color Code

| Description | Part No. |
|---|---|
| Slug, Iron Core (F.M.-Osc., Conv., & R.F.) | 71B 1-19 |
| Slug, Iron Core (A.M.-Osc., Conv.) | 71B 1-20 |
| Slug, Iron Core (A.M.-Antenna) | 71B 1-21 |

| Description | TUNER PARTS | Part No. |
|---|---|---|
| Tuning Shaft | | 28A 17 |
| Slug Travel Bracket, Bushing and Roller Assy. (front) | | A1396 |
| Slug Travel Bracket, Bushing and Roller Assy. (rear) | | A1398 |
| Brass Guide Rod (Tuner) | | 28A 7-2 |
| Cam and Hub for Tuner (front) | | A1400 |
| Cam and Hub for Tuner (rear) | | A1467 |
| Spring, Bearing Takeup | | 19A 16 |
| Cable, Drive (for Cam and Hub) | | 95A 15 |
| Spring, Coil (for Cam and Hub) | | 19B 1-14 |
| Bakelite Plate for slug mounting (1-15/16" x 2-3/8") | | 32A 36 |
| Slug-Adjusting Screw | | 27A 4 |
| Drum and Hub on Tuner Shaft (includes 1" drum and 3-11/32"drum) | | A1401 |

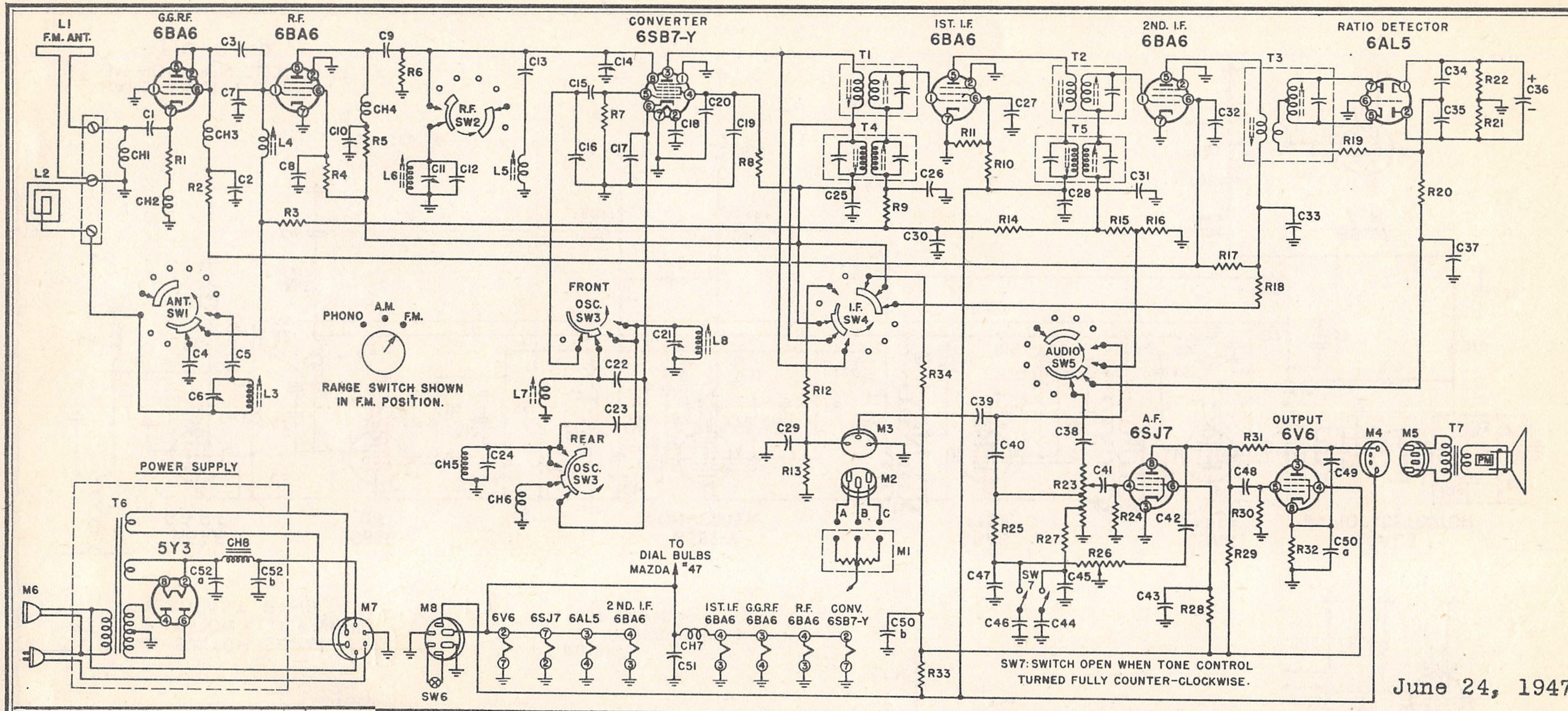
| Description | DIAL PARTS | Part No. |
|---|---|---|
| Pointer Shaft | | 28A 19 |
| Drum and Hub Assembly (Pointer Shaft) | | A1388 |
| Dial Cord (100 inches) | | 50A 1-3 |
| Spring, Dial Cord (2 used) | | 19B 1-5 |
| Dial Scale & Indicator Assembly | | A1404 |
| Indicator Link | | 15A 176 |
| Indicator Arm & Hub (on Band Switch Shaft) | | A1405 |
| Dial Bulb #47 | | 81A 1-8 |
| Socket, Dial Bulb | | 82A 3-9 |
| Dial Pointer | | A1477 |
| Dial Escutcheon (less rectangular insert) | | 23B 20 |
| Dial Escutcheon insert (Approx. 2-1/2" x 3-3/4") | | 23C 25 |

| Description | PHONOGRAPH PARTS | Part No. |
|---|---|---|
| M1... Cartridge and Needle, Pickup | | A1372 |
| M2... Pickup Cable & Plug Assembly | | A1415 |
| Centerpost | | G400B 137-1 |
| Drive Disc Assembly (under turntable) | | G400A 179 |
| Idler Wheel (407B 3 Motor) | | G400A 23 |
| Idler Wheel (407B 1 Motor) | | G400A 57 |
| Motor | | 407B 3-2 |
| Pickup Cable and Plug | | A1305 |
| Tilt Out Hinge Assembly (Record Support Side) | | AC118-1 |
| Tilt Out Hinge Assembly (Pickup Arm Side) | | AC118-2 |
| Tilt Out Spring (2-1/4" long) | | 19A 15-1 |
| Shoulder Eye Bolt (For Tilt Out Spring) | | 1A87-1 |
| Tilt Out Tie Bar | | 15B 126 |

| Description | MISCELLANEOUS | Part No. |
|---|---|---|
| M3... Socket and Shield, Phono | | 88A 5-9 |
| M4... Speaker Socket | | 87A 6-1 |
| M5... Plug, Speaker | | 88A 4-4 |
| M6... Phono Motor Plug & Leads | | 89A 6-5 |
| M7... Power Cable & Socket | | 87A 16-1 |
| M8... Plug, Power Supply (includes retainer ring) | | 88A 9 |
| Bumper, Rubber | | 12A 3-6 |
| Door Bracket (left) | | A1438 |
| Door Bracket (right) | | A1439 |
| Door Arm (left) | | A1440 |
| Door Arm (right) | | A1441 |
| Grommet, Rubber (for mounting chassis) | | 12A 1-11 |
| Knob | | 33A 13-2 |
| Set Screw (#6-32x1/4; for Drum & Hub, For Indicator Arm & Hub; and for Pointer Shaft) | | 1A 5-54 |
| Shoulder Eye Bolt (for adjusting spring) | | 1A 87-2 |
| Snap Button (used with Indicator Link) | | 13A 1-4-47 |
| Socket (octal) | | 87A 5-2 |
| Socket (Miniature Tube) | | 87A 3-6 |
| Speed Nut (for Guide Rod) | | 2A 10-1-59 |
| Speed Nut (for trimmers C7,C14, C16) | | 2A 10-11 |
| Spring, Adjusting (for chassis mounting) | | 19A 15-2 |
| Spring, Hairpin (for mounting coils) | | 19A 3-1 |
| Spring, Hairpin (for Pointer Shaft) | | 19A 2-2-0 |
| Tie Bar (for receiver chassis mounting) | | 15B 160 |
| Transmission Line (F.M.-300 Ohms; order length needed) | | 95A 16-5 |
| Washer, "C" (for Tuning Shaft) | | 4A 4-1-0 |
| Washer, Felt (for Knobs) | | 5A 4-2 |
| Washer, Spring (for Pointer Shaft and for Cam & Hub) | | 4A 6-11-0 |
| Washer, Spring, (used with Indicator Link) | | 4A 6-2-0 |
| Washer, Spring (for Tuning Shaft) | | 4A 6-5-0 |
| Sponge Rubber Strip (3/4"x7/16"x5-1/2") | | 12A11 |
| Sponge Rubber Stripping (1/8" x 3/8" x 14") | | 12A5-3 |
| Sponge Rubber Stripping (1/8" x 3/4" x 3/4") | | 12A5-4 |

# MODEL 7C73, Chassis 9A1, Preliminary

# ADMIRAL CORPORATION


L1 F.M. ANT.
L2
G.G.R.F. 6BA6
R.F. 6BA6
CONVERTER 6SB7-Y
IST. I.F. 6BA6
2ND. I.F. 6BA6
RATIO DETECTOR 6AL5
A.F. 6SJ7
OUTPUT 6V6
PHONO
A.M.
F.M.
RANGE SWITCH SHOWN IN F.M. POSITION.
ANT. SW1
R.F. SW2
FRONT OSC. SW3
REAR OSC. SW3
I.F. SW4
AUDIO SW5
POWER SUPPLY
5Y3
T6
CH8
M6
M7
M8
SW6
TO DIAL BULBS MAZDA #47
6V6
6SJ7
6AL5
2ND. I.F. 6BA6
IST. I.F. 6BA6
G.G.R.F. 6BA6
R.F. 6BA6
CONV. 6SB7-Y
M1
M2
M3
M4
M5
T7
PM
SW7: SWITCH OPEN WHEN TONE CONTROL TURNED FULLY COUNTER-CLOCKWISE.

June 24, 1947

| Symbol | RESISTORS | Part No. |
|---|---|---|
| R1... | 100 Ohms, 1/2 Watt | 60B 8-101 |
| R2... | 330 Ohms, 1/2 Watt | 60B 8-331 |
| R3... | 470,000 Ohms, 1/2 Watt | 60B 8-474 |
| R4... | 39,000 Ohms, 1 Watt | 60B 14-393 |
| R5... | 4,700 Ohms, 1 Watt | 60P 14-472 |
| R6... | 33,000 Ohms, 1/2 Watt | 60B 8-333 |
| R7... | 47,000 Ohms, 1/2 Watt | 60B 8-473 |
| R8... | 18,000 Ohms, 2 Watt | 60B 20-183 |
| R9... | 120,000 Ohms, 1/2 Watt | 60B 8-124 |
| R10... | 18,000 Ohms, 1 Watt | 60B 14-183 |
| R11... | 22,000 Ohms, 1 Watt | 60B 14-223 |
| R12... | 120,000 Ohms, 1/2 Watt | 60B 8-124 |
| R13... | 100,000 Ohms, 1/2 Watt | 60B 8-104 |
| R14... | 470,000 Ohms, 1/2 Watt | 60B 8-474 |
| R15... | 220,000 Ohms, 1/2 Watt | 60B 8-224 |
| R16... | 82,000 Ohms, 1/2 Watt | 60B 8-823 |
| R17... | 8,200 Ohms, 2 Watt | 60B 20-822 |
| R18... | 2,200 Ohms, 1 Watt | 60B 14-222 |
| R19... | 390 Ohms, ±5%, 1/2 Watt | 60B 7-391 |
| R20... | 27,000 Ohms, 1/2 Watt | 60B 8-273 |
| R21... | 6,800 Ohms, ±5%, 1/2 Watt | 60B 7-682 |
| R22... | 6,800 Ohms, ±5%, 1/2 Watt | 60B 7-682 |
| R23... | 1 Megohm Volume Control & on-off switch SW6. Tapped at 300,000 and 600,000 Ohms | 75B 3-4 |

| Symbol | RESISTORS | Part No. |
|---|---|---|
| R24... | 4.7 Megohms, 1/2 Watt | 60B 8-475 |
| R25... | 47,000 Ohms, 1/2 Watt | 60B 8-473 |
| R26... | 2 Megohms Tone control & D.P.S.T. switch SW7 | 75B 1-14 |
| R27... | 10,000 Ohms, 1/2 Watt | 60B 8-103 |
| R28... | 470,000 Ohms, 1/2 Watt | 60B 8-474 |
| R29... | 100,000 Ohms, 1/2 Watt | 60B 8-104 |
| R30... | 470,000 Ohms, 1/2 Watt | 60B 8-474 |
| R31... | 2.2 Megohms, 1/2 Watt | 60B 8-225 |
| R32... | 390 Ohms, 1 Watt | 60B 14-391 |
| R33... | 390 Ohms, 2 Watt | 60B 20-391 |
| R34... | 100 Ohms, 1/2 Watt | 60B 8-101 |

| Symbol | CONDENSERS | Part No. |
|---|---|---|
| C1... | 1000 mmfd., Mica | 65B 5-33 |
| C2... | .01 mfd., 400 Volts, Paper | 64B 1-25 |
| C3... | 35mmfd., Ceramic | 65B 6-14 |
| C4... | 27mmfd., Ceramic | 65B 6-17 |
| C5... | 500 mmfd., Mica | 65B 5-27 |
| C6... | 3-40 mmfd., Trimmer | 66A 12-5 |
| C7... | 3-12 mmfd., Trimmer | 66A 22-1 |

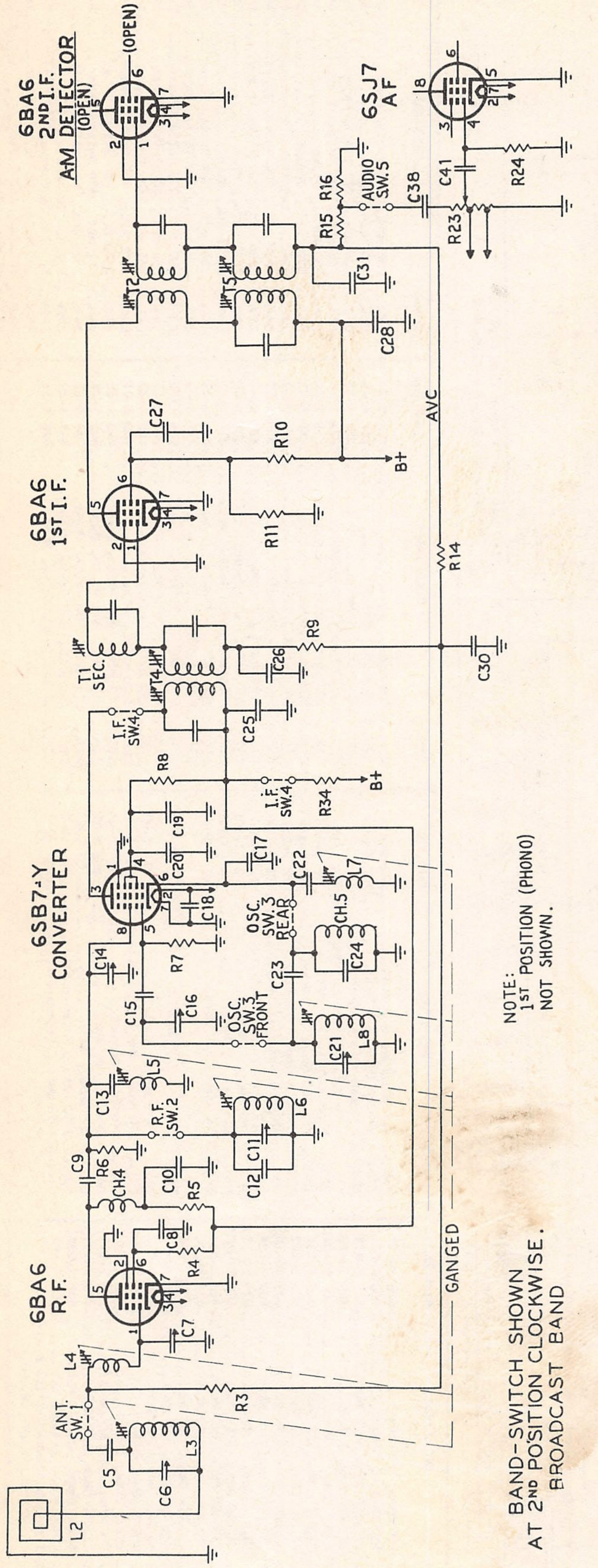
| Symbol | CONDENSERS | Part No. |
|---|---|---|
| C8... | 200 mmfd., Mica | 65B 5-21 |
| C9... | 35 mmfd., Ceramic | 65B 6-14 |
| C10... | 40 mmfd., Ceramic | 65B 6-22 |
| C11... | 12-170 mmfd., Trimmer | 66A 12-1 |
| C12... | 300 mmfd., Silver Mica | 65B 1-24 |
| C13... | 25mmfd., Ceramic | 65B 6-15 |
| C14... | 3-12 mmfd., Trimmer | 66A 22-1 |
| C15... | 50 mmfd., Ceramic | 65B 6-13 |
| C16... | 3-12 mmfd., Trimmer | 66A 22-1 |
| C17... | 200 mmfd., ±3%, Ceramic | 65B 6-20 |
| C18... | .005 mfd., 600 Volts, Paper | 65B 1-12 |
| C19... | 100 mmfd., Ceramic | 65B 6-19 |
| C20... | 5000 mmfd., Ceramic | 65B 9-53 |
| C21... | 3-40 mmfd., Trimmer | 66A 12-5 |
| C22... | 27 mmfd., Ceramic | 65B 6-17 |
| C23... | 180 mmfd., ±5%, Ceramic | 65B 6-23 |
| C24... | 2000 mmfd., Mica | 65B 5-37 |
| C25... | .01 mfd., 400 Volts, Paper | 64B 1-25 |
| C26... | .01 mfd., 400 Volts, Paper | 64B 1-25 |
| C27... | .01 mfd., 400 Volts, Paper | 64B 1-25 |
| C28... | .10 mfd., 400 Volts, Paper | 64B 1-20 |
| C29... | .2 mfd., 400 Volts, Paper | 64B 1-19 |

| Symbol | CONDENSERS | Part No. |
|---|---|---|
| C30... | .05 mfd., 400 Volts, Paper | 64B 1-32 |
| C31... | 200 mmfd., Mica | 65B 5-21 |
| C32... | .05 mfd., 200 Volts, Paper | 64B 1-22 |
| C33... | .05 mfd., 200 Volts, Paper | 64B 1-22 |
| C34... | 100 mmfd., Ceramic | 65B 6-19 |
| C35... | 100 mmfd., Ceramic | 65B 6-19 |
| C36... | 4 mfd., 150 Volts, Electrolytic | 67A 4-2 |
| C37... | .002 mfd., 600 Volts, Paper | 64B 1-14 |
| C38... | .005 mfd., 600 Volts, Paper | 64B 1-12 |
| C39... | 1000 mmfd., Mica | 65B 5-33 |
| C40... | 500 mmfd., Mica | 65B 5-27 |
| C41... | .005 mfd., 600 Volts, Paper | 64B 1-12 |
| C42... | .005 mfd., 600 Volts, Paper | 64B 1-12 |
| C43... | .05 mfd., 200 Volts, Paper | 64B 1-22 |
| C44... | .05 mfd., 400 Volts, Paper | 64B 1-32 |
| C45... | .01 mfd., 400 Volts, Paper | 64B 1-25 |
| C46... | .005 mfd., 600 Volts, Paper | 64B 1-12 |
| C47... | .005 mfd., 600 Volts, Paper | 64B 1-12 |
| C48... | .01 mfd., 400 Volts, Paper | 64B 1-25 |
| C49... | .002 mfd., 600 Volts, Paper | 64B 1-14 |
| C50a.. | 20mfd., 250 Volts)<br>Electrolytic | 67C 7-7 |
| C50b.. | 30 mfd., 350 Volts) | |
| C51... | .01 mfd., 400 Volts, Paper | 64B 1-25 |
| C52a.. | 30 mfd., 350 Volts)<br>Electrolytic | 67C 6-22 |
| C52b.. | 30 mfd., 350 Volts) | |

For additional Parts list, see P.16-6

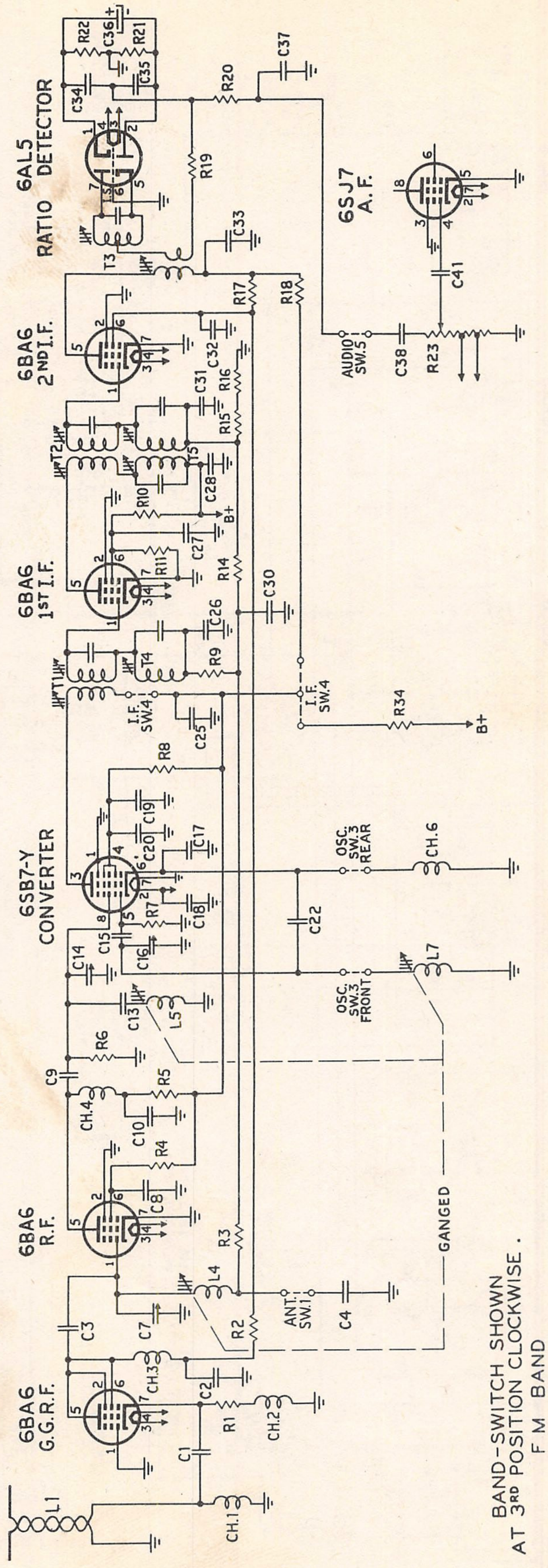
**MODEL 7C73**

## ADMIRAL CORPORATION


6BA6 R.F.
6SB7-Y CONVERTER
6BA6 1ST I.F.
6BA6 2ND I.F. AM DETECTOR
(OPEN)
6SJ7 AF
ANT. SW.1
L2
L3
L4
C5
C6
C7
R3
R4
R5
C8
C9
R6
CH.4
C10
C11
C12
L6
R.F. SW.2
C13
L5
C14
C15
C16
R7
OSC. SW.3 FRONT
OSC. SW.3 REAR
L8
C21
C23
CH.5
C24
C22
L7
C17
C18
C19
C20
R8
I.F. SW.4
R34
B+
C25
T4
T1 SEC.
C26
R9
C30
R14
AVC
R11
R10
C27
C28
T5
T2
C31
R15
R16
AUDIO SW.5
C38
R23
C41
R24
GANGED

NOTE: 1ST POSITION (PHONO) NOT SHOWN.

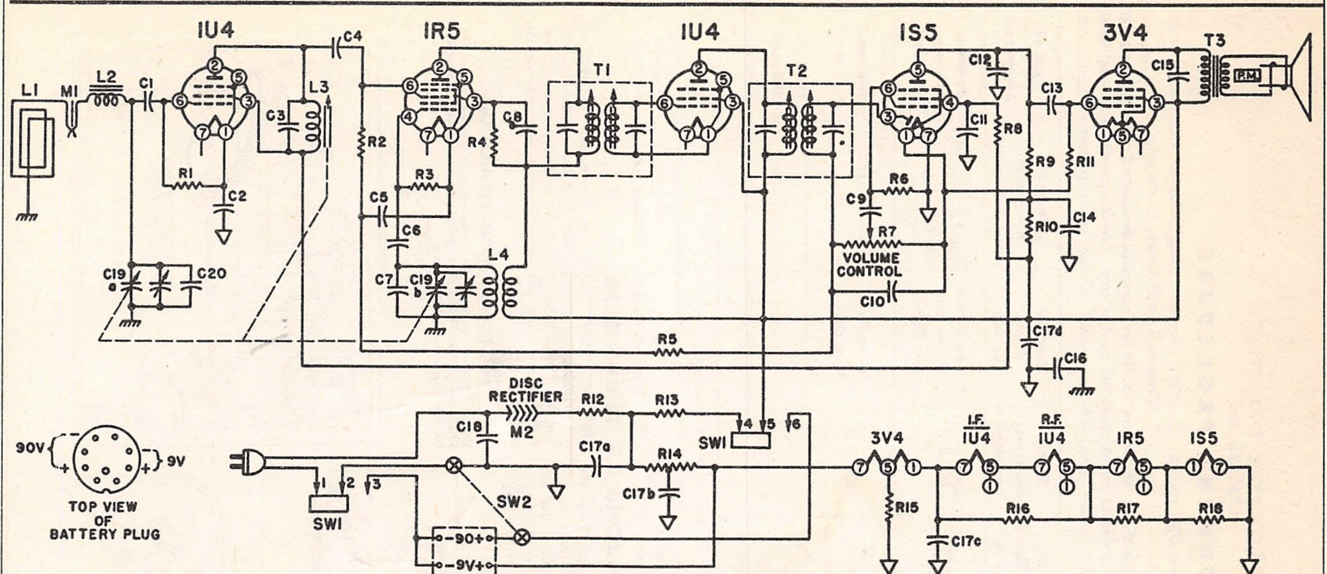
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST BAND


6BA6 G.G.R.F.
6BA6 R.F.
6SB7-Y CONVERTER
6BA6 1ST I.F.
6BA6 2ND I.F.
6AL5 RATIO DETECTOR
6SJ7 A.F.
L1
CH.1
C1
R1
CH.2
C2
CH.3
C3
C7
L4
R2
ANT. SW.1
C4
R3
C8
R4
C10
CH.4
C9
R5
R6
C13
L5
C14
C15
C16
R7
C18
C17
C20
C19
R8
OSC. SW.3 FRONT
OSC. SW.3 REAR
C22
CH.6
L7
C25
I.F. SW.4
T1
T4
R9
C26
C30
R34
B+
R14
R11
C27
R10
C28
T5
T2
R15
C31
R16
C32
R17
R18
T3
C33
R19
C34
C35
C36
R21
R22
R20
C37
AUDIO SW.5
C38
R23
C41
GANGED

BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE. F M BAND

# ADMIRAL CORPORATION

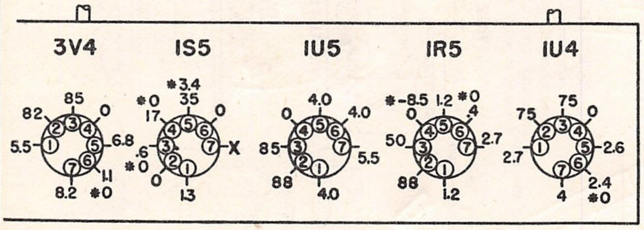
## MODELS 7P32,7P33,7P34, Chassis 5H1


1U4
1R5
1U4
1S5
3V4
T3
L1
M1
L2
C1
C4
L3
C3
R2
R1
C2
C19 a
C20
R3
C5
C6
R4
C8
T1
T2
C12
C15
C11
R8
C13
P.M.
R9
R11
C9
R6
R7
VOLUME CONTROL
C10
R10
C14
C7
C19 b
L4
R5
C17d
C16
DISC RECTIFIER
M2
R12
R13
C18
C17a
R14
C17b
SW1
SW2
90V
9V
TOP VIEW OF BATTERY PLUG
-90+
-9V+
R15
C17c
I.F. 1U4
R.F. 1U4
1R5
1S5
R16
R17
R18

NOTES:
I.F. = 455 K.C.
COMMON (LINE GROUND)
CHASSIS GROUND

5-47

### VOLTAGE CHART


3V4
85
82
0
5.5
6.8
1.1
8.2
*0
1S5
*3.4
35
*0
17
0
.6
X
*0
0
13
1U5
4.0
0
4.0
85
5.5
88
4.0
1R5
*-8.5
1.2
*0
0
.4
50
2.7
88
1.2
1U4
75
75
0
2.7
2.6
2.4
4
*0

*Indicates reading taken with 1000 ohm-per-volt meter.

## VOLTAGE DATA

- All readings made between Tube Socket Terminals and Terminal No. 7 on the 1S5 (Point "X" on Voltage Chart).
- A.C. Voltages measured on a 117 Volt A.C. line.
- Dial turned to low frequency end, no signal.
- All Voltages measured with a VoltOhmyst.
- A second voltage reading (marked with an asterisk *) indicates readings made with a 1000 ohm-per-volt meter when use of this instrument would result in appreciably lower readings.

## REPLACEMENT PARTS

### RESISTORS

| Symbol | Description | Part No. |
|---|---|---|
| R1 | 2.2 Megohms, ¼ Watt | 60B 3-225 |
| R2 | 1 Megohm, ¼ Watt | 60B 3-105 |
| R3 | 100,000 Ohms, ¼ Watt | 60B 3-104 |
| R4 | 18,000 Ohms, 1/3 Watt | 60B 2-183 |
| R5 | 3.3 Megohms, ¼ Watt | 60B 2-335 |
| R6 | 10 Megohms, ¼ Watt | 60B 3-106 |
| R7 | 1 Megohm Volume Control and Switch SW2 (DPST) | 75B 1-18 |
| R8 | 4.7 Megohms, ¼ Watt | 60B 2-475 |
| R9 | 470,000 Ohms, ¼ Watt | 60B 3-474 |
| R10 | 10,000 Ohms, ¼ Watt | 60B 3-103 |
| R11 | 2.2 Megohms, ¼ Watt | 60B 3-225 |
| R12 | 47 Ohms, 1 Watt | 60B 14-470 |
| R13 | 2700 Ohms, 1 Watt | 60B 14-272 |
| R14 | 2600 Ohms, 5 Watt | 61A 6-1 |
| R15 | 1500 Ohms, ¼ Watt | 60B 2-152 |
| R16 | 820 Ohms, ¼ Watt | 60B 2-821 |
| R17 | 220 Ohms, ¼ Watt | 60B 2-221 |
| R18 | 150 Ohms, ¼ Watt | 60B 2-151 |

### CONDENSERS

| Symbol | Description | Part No. |
|---|---|---|
| C1 | 250 Mmfd., Mica | 65B 7-22 |
| C2 | .25 Mfd., 200 Volts, Paper | 64B 1-28 |
| C3 | 420 Mmfd., Mica | 65B 1-13 |
| C4 | 250 Mmfd., Mica | 65B 7-22 |
| C5 | .01 Mfd., 400 Volts, Paper | 64B 1-25 |
| C6 | 100 Mmfd., Mica | 65B 7-17 |
| C7 | 15 Mmfd., Ceramic | 65B 6-18 |
| C8 | .01 Mfd., 400 Volts, Paper | 64B 1-25 |
| C9 | .01 Mfd., 400 Volts, Paper | 64B 1-25 |
| C10 | 250 Mmfd., Mica | 65B 7-22 |
| C11 | .01 Mfd., 400 Volts, Paper | 64B 1-25 |

### CONDENSERS

| Symbol | Description | Part No. |
|---|---|---|
| C12 | 100 Mmfd., Mica | 65B 7-17 |
| C13 | .01 Mfd., 400 Volts, Paper | 64B 1-25 |
| C14 | 4 Mfd., 150 Volts, Electrolytic | 67A 4-2 |
| C15 | .002 Mfd., 600 Volts, Paper | 64B 1-14 |
| C16 | .18 Mfd., 200 Volts, Paper | 64A 2-2 |
| C17a | 50 Mfd., 150 Volts, Elect. | 67C 7-5 |
| C17b | 20 Mfd., 150 Volts, Elect. | |
| C17c | 200 Mfd., 25 Volts, Elect. | |
| C17d | 20 Mfd., 150 Volts, Elect. | |
| C18 | .05 Mfd., 400 Volts, Paper | 64B 1-22 |
| C19a | 0 to 420 Mmfd., Gang | 68B 6 |
| C19b | 0 to 162 Mmfd., Gang | |
| C20 | 10 Mmfd., Ceramic | 65B 6-24 |

### COILS, TRANSFORMERS, SWITCHES, ETC.

| Symbol | Description | Part No. |
|---|---|---|
| L1 | Antenna, Loop (Part of cabinet —not supplied separately) | |
| L2 | Coil, Loading | AA 121 |
| L3 | Coil, R. F. | AB 100-7 |
| L4 | Coil, Oscillator | 69A 15 |
| P1 | Plug, Battery (9 prong) | 88A 3-3 |
| SW1 | Switch, Power Change | 77A 2-4 |
| SW2 | Switch, On-Off (Part of volume control R7) | |
| T1 | Transformer, 1st I. F. | 72B 28-1 |
| T2 | Transformer, 2nd I.F. | 72B 28-1 |
| T3 | Transformer, Output | 98A 21 |
| | Slug, Tuning (R.F.) | 71B 1-3 |
| | Adjustment Screw for Slug | 27A 4 |
| | Speaker 6" P.M. & Output Transformer | 78B 17-3 |

### MISCELLANEOUS

| Description | Part No. |
|---|---|
| M1....Jack for External Loop Antenna | |
| M2....Rectifier, Selenium | 93A 1-2 |
| Buttons, Snap (for dial scale) | 13A 1-1-2 |
| Cabinet (Black 7P32) | 35D 58-1 |
| Cabinet (Black 7P33) | 35D 50-1 |
| Cabinet (Brown 7P34) | 35D 50-2 |
| Cord, Dial | 50A 1-3 |
| Dial Window, Plastic (7P33, 7P34) | 24B 2 |
| Dial Window and Speaker Grill (7P32) | 23C 26 |
| Drum & Cam Assembly | A 1313 |
| Escutcheon, Plastic (7P33, 7P34) | 23D 24 |
| Grommet (for mounting R.F. coil) | 12A 1-12 |
| Handle, Plastic (7P32, 7P33) | 37C 11-1 |
| Knob (7P32) | 33A 18-3 |
| Knob (7P33, 7P34) | 33A 18-1 |
| Latch, Cover (7P33, 7P34) | 37B 2-1 |
| Mounting Clip (for I.F. transformer) | 72B 28-10 |
| Mounting Plate (for R.F. coil) | 32A 40 |
| Pointer, Dial | 25A 24 |
| Scale, Dial (metal) | 21B 44 |
| Spring | 19B 1-13 |
| Spring, Tension (Dial Cord) | 19B 1-5 |
| Tube Shield | 87A 7-7 |
| Tube Socket | 87A 3-2 |
| Tuner Arm (for R.F. slug tuner) | A1314 |
| Washer, Felt (¾") (for knobs) | 5A 4-3 |
| Washer, Spring (for tuner arm) | 4A 6-3-0 |

**MODELS 7P32,7P33,7P34**
**MODELS 7T06,7T12**

# ADMIRAL CORPORATION

MODELS 7T06, 7T12
CHASSIS 4B1

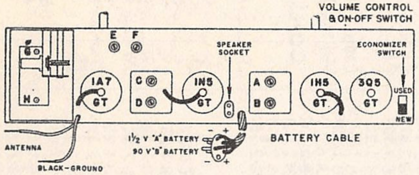
## ALIGNMENT PROCEDURE

1. IMPORTANT — Check to see that dial pointer reaches each end of dial scale when Station Selector Control is turned from one end to the other.
2. Volume control—Maximum for all adjustments.
3. Connect radio chassis to ground post of signal generator with a short heavy lead.
4. Connect output meter across voice coil of speaker.
5. Connect dummy Antenna value in series with generator output lead, when needed (see below).
6. Allow chassis and signal generator to "heat up" for several minutes.
7. Use lowest Output setting of Signal Generator capable of producing adequate Output Meter indication and then proceed in the following sequence.

| Band | Signal Generator |  | Connection to Radio | Receiver Dial Setting | Trimmers Adjusted (In Order Shown) | Trimmer Function | Type of Adjustment |
|---|---|---|---|---|---|---|---|
|  | Frequency Setting | Dummy Antenna |  |  |  |  |  |
| I.F. | 455 KC. | .1 mfd. | Grid of 1A7 (Cap) | High Frequency end of dial | A-B—2nd I.F. | Output I.F. | Adjust to maximum output |
| I.F. | 455 KC. | .1 mfd. | Grid of 1A7 (Cap) | High Frequency end of dial | C-D—1st I.F. | Input I.F. | Adjust to maximum output |
| Broad-cast | 1630 KC. | .00020 mfd. Mica | Antenna Lead | High Frequency end of dial | E-(See note below)<br>F-(See note below) | Oscillator Antenna | Adjust to maximum output |
| Broad-cast | 1300 KC. | .00020 mfd. Mica | Antenna Lead | 1300 KC. | G<br>H | Oscillator Antenna | Adjust to maximum output |

NOTE: Before adjusting trimmers "E" and "F," make sure that each iron core is 1⅜" or more outside of its coil form. If necessary, turn adjustments "G" and "H" to accomplish this.

### TUBE AND TRIMMER LOCATION


VOLUME CONTROL
& ON-OFF SWITCH
E
F
G
H
SPEAKER SOCKET
ECONOMIZER SWITCH
1A7 GT
C
D
1N5 GT
A
B
1H5 GT
3Q5 GT
USED
NEW
ANTENNA
BLACK-GROUND
1½ V "A" BATTERY
90 V "B" BATTERY
BATTERY CABLE

### CIRCUIT

Battery-operated 4 Tube Superheterodyne with Single Tuning Range: 535 KC. to 1630 KC. Covers standard broadcast band, using antenna and ground. Permeability tuning on Antenna and Oscillator circuits. Intermediate Frequency is 455 KC.

### POWER SUPPLY

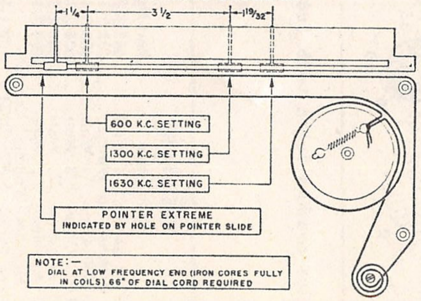
Single unit "AB" battery pack: 90 volt "B", 1½ volt "A." Plug-in connection. Use Ensign AB48, Burgess 17G-D60, Eveready 748, General 60DL-11L, Ray-O-Vac AB-82, Bond 0528 Battery or equivalent.

### ECONOMIZER SWITCH

The battery economizer switch is located on the top of the chassis, right side.

**Always have this Economizer Switch in the "NEW" battery position when first placing radio in operation or when installing a new battery.**

### STRINGING DIAGRAM


1¼
3½
1$\frac{19}{32}$
600 K.C. SETTING
1300 K.C. SETTING
1630 K.C. SETTING
POINTER EXTREME
INDICATED BY HOLE ON POINTER SLIDE
NOTE:—
DIAL AT LOW FREQUENCY END (IRON CORES FULLY IN COILS) 66" OF DIAL CORD REQUIRED

MODELS 7P32, 7P33, 7P34
CHASSIS 5H1

## ALIGNMENT PROCEDURE

1. Disconnect Loop Antenna leads from clips on set and remove chassis from cabinet.
2. Make alignment using a battery whenever possible.
3. Connect a fresh battery to the set.

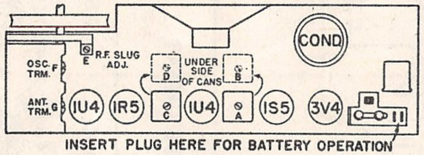
**IMPORTANT: Check dial drum position on shaft. Tuner arm should just complete downward travel when gang is fully meshed. At this point, tuner arm should be on short flat part of cam. Check pointer. It should be at last dial scale mark just below 550 K.C. when gang is fully meshed. If not, move pointer on dial cord**

| Step | Dummy Antenna Used in Series with Signal Generator | Connect High Side Signal Generator to | Signal Generator Frequency | Receiver Gang Setting | Trimmer Designation and Description | Type of Adjustment |
|---|---|---|---|---|---|---|
| (1) | .00025 Mfd. when using A.C. .1 Mfd. when using Battery | Grid of 1R5 (Pin 6) | 455 K.C. | Any point where it does not affect Signal | 2nd I.F. (A), (B).<br>1st I.F. (C), (D). | Maximum Deflection Then repeat |
| (2) | .00025 Mfd. when using A.C. .1 Mfd. when using Battery | Stator lug of rear variable condenser section | 1620 K.C. | Tuning Gang Wide Open | Oscillator Trimmer (F) | Maximum Deflection |
| (3) | .00025 Mfd. when using A.C. .1 Mfd. when using Battery | Stator lug of rear variable condenser section | 1400 K.C. | Tune in Generator Signal | R.F. Slug (E) | Maximum Deflection |
| (4) | Replace Set in Cabinet |  |  |  |  |  |
| (5) | .00025 Mfd. | Antenna and Ground Leads | 1400 K.C. | Tune in Generator Signal | Antenna Trimmer (G) | Maximum Deflection |

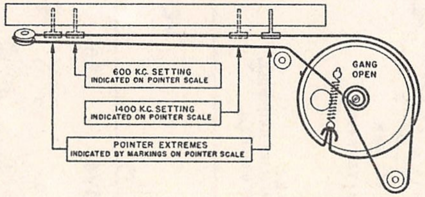
### REPLACING R.F. TUNING SLUG

If the R.F. Tuning Slug has to be changed use the following procedure. Set the gang condenser to the point where the plates are fully meshed. Screw the slug adjusting screw about halfway down. Place the slug in the coil in such a position that the top of the slug is flush with the top of the coil. Solder the slug wire to the adjusting screw. Be sure that the position of the slug does not change during the soldering and that the slug wire is straight. Proceed to realign the set as shown in the chart.

### TUBE AND TRIMMER LAYOUT

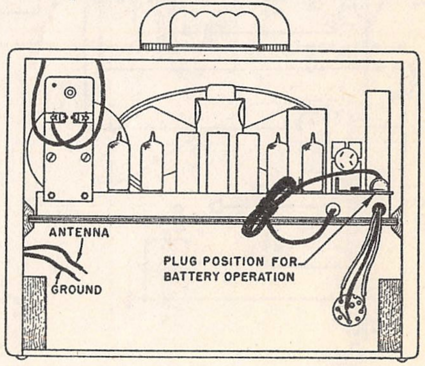

OSC. TRM. F
ANT. TRM. G
E
R.F. SLUG ADJ.
D
UNDER SIDE OF CANS
B
C
A
1U4
1R5
1U4
1S5
3V4
COND
INSERT PLUG HERE FOR BATTERY OPERATION

### DIAL CORD STRINGING


GANG OPEN
600 K.C. SETTING
INDICATED ON POINTER SCALE
1400 K.C. SETTING
INDICATED ON POINTER SCALE
POINTER EXTREMES
INDICATED BY MARKINGS ON POINTER SCALE

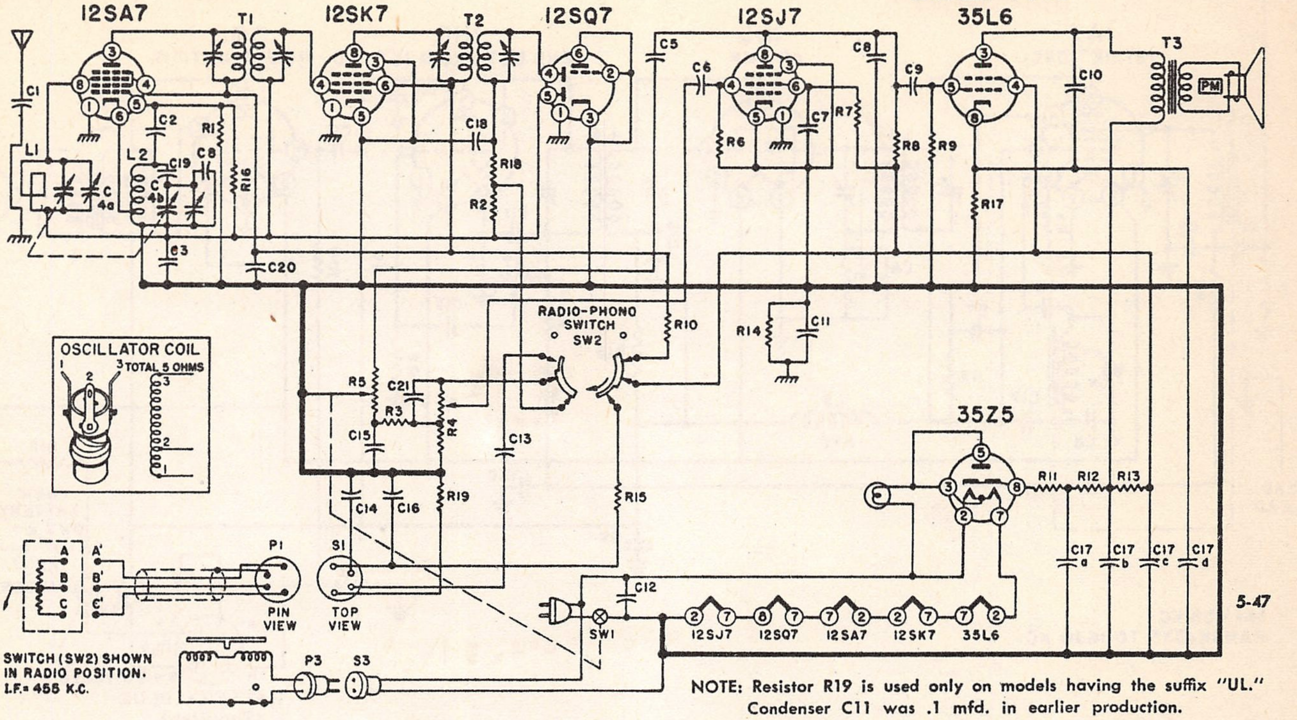
### INTERNAL ANTENNA CONNECTIONS

**Note: Antenna connections cross over as shown above for 7P32 only. The 7P33, 7P34 antenna connections are made to the clip nearest the wire.**


ANTENNA
GROUND
PLUG POSITION FOR BATTERY OPERATION

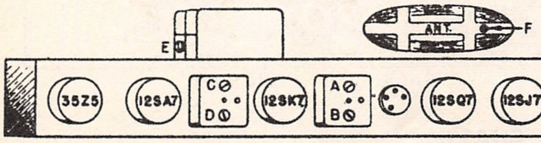
# ADMIRAL CORPORATION

**MODELS 7RT41, 7RT42, 7RT43**
**Chassis 6L1**
**MODEL 7C62**


12SA7
T1
12SK7
T2
12SQ7
12SJ7
35L6
T3
PM
C1
L1
C2
R1
L2
C4a
C4b
C19
C8
R16
C3
C20
C18
R18
R2
C5
C6
C8
C9
C10
R6
C7
R7
R8
R9
R17
OSCILLATOR COIL
1 2 3
TOTAL 5 OHMS
RADIO-PHONO SWITCH SW2
R10
R14
C11
R5
C21
R3
R4
C15
C13
C14
C16
R19
R15
35Z5
R11
R12
R13
C17 a
C17 b
C17 c
C17 d
A
B
C
A'
B'
C'
P1
PIN VIEW
S1
TOP VIEW
C12
SW1
12SJ7
12SQ7
12SA7
12SK7
35L6
P3
S3
5-47
SWITCH (SW2) SHOWN IN RADIO POSITION.
I.F. = 455 K.C.

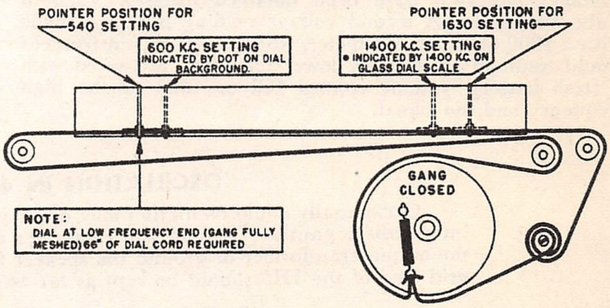
NOTE: Resistor R19 is used only on models having the suffix "UL."
Condenser C11 was .1 mfd. in earlier production.

## TUBE & TRIMMER LOCATION


ANT.
F
E
35Z5
12SA7
C
D
12SK7
A
B
12SQ7
12SJ7
35L6

TOP VIEW

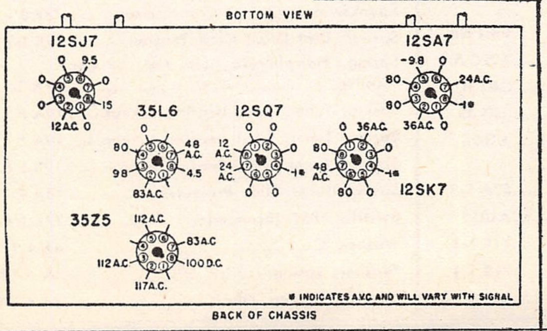
## DIAL CORD STRINGING & POINTER SETTING


POINTER POSITION FOR 540 SETTING
600 K.C. SETTING INDICATED BY DOT ON DIAL BACKGROUND.
POINTER POSITION FOR 1630 SETTING
1400 K.C. SETTING ● INDICATED BY 1400 K.C. ON GLASS DIAL SCALE
GANG CLOSED
NOTE: DIAL AT LOW FREQUENCY END (GANG FULLY MESHED) 66" OF DIAL CORD REQUIRED

## VOLTAGE DATA

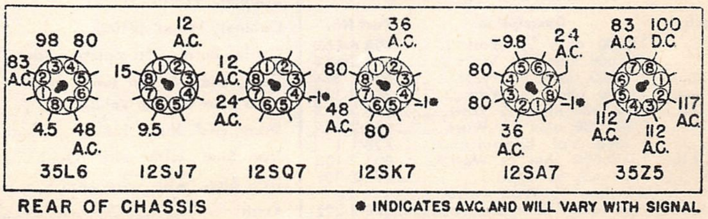
- All readings made between Tube Socket Terminals and B minus.
- Measured on a 117 Volt A.C. line.
- Volume control full on.
- Dial tuned to low frequency end, no signal.
- Voltage obtained on Vacuum Tube Voltmeter.

### MODEL 7C62


BOTTOM VIEW
12SJ7
0
9.5
0
0
0
15
12A.C.
0
35L6
0
80
48 A.C.
98
4.5
83A.C.
12SQ7
0
0
12 A.C.
0
24 A.C.
-1●
0
0
12SK7
0
36A.C.
80
0
48 A.C.
-1●
80
0
12SA7
-9.8
0
80
24A.C.
80
-1●
36A.C.
0
35Z5
112A.C.
83A.C.
112A.C.
100D.C.
117A.C.
● INDICATES A.V.C. AND WILL VARY WITH SIGNAL
BACK OF CHASSIS

### MODEL 7RT41, 7RT42, 7RT43

## VOLTAGE CHART

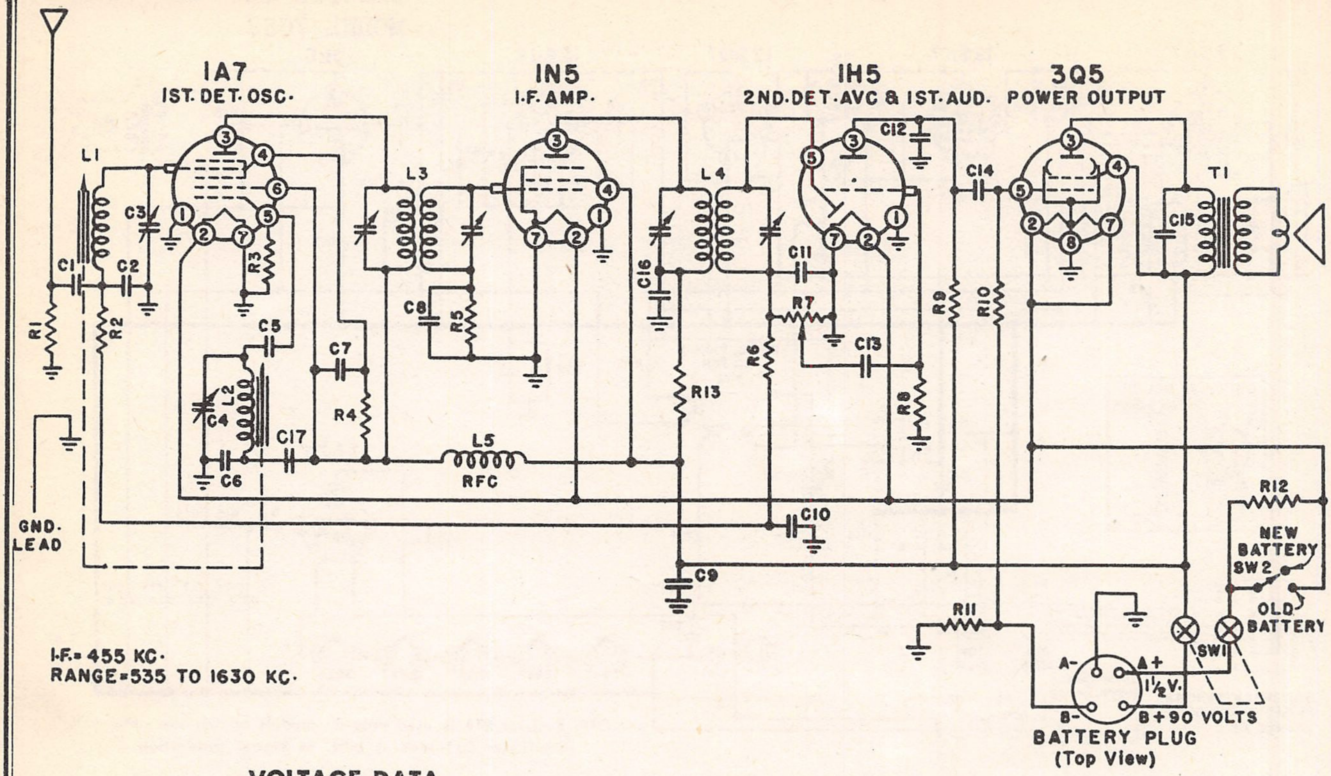

98
80
83 A.C.
4.5
48 A.C.
35L6
12 A.C.
15
9.5
12SJ7
12 A.C.
24 A.C.
-1●
12SQ7
36 A.C.
80
48 A.C.
80
-1●
12SK7
-9.8
24 A.C.
80
80
-1●
36 A.C.
12SA7
83 A.C.
100 D.C.
117 A.C.
112 A.C.
112 A.C.
35Z5
REAR OF CHASSIS
● INDICATES A.V.C. AND WILL VARY WITH SIGNAL

RECORD CHANGER: Admiral Model 160A, P.15-17

For Alignment, see P.16-1
For Parts list, see P.16-2

MODELS 7T06, 7T12,
Chassis 4B1

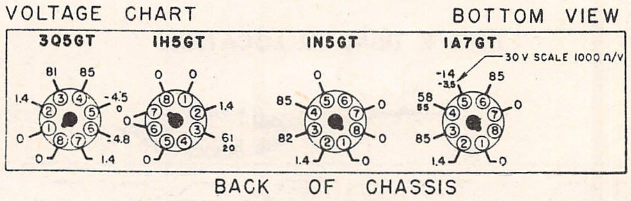
# ADMIRAL CORPORATION


1A7
IST. DET. OSC.
IN5
I.F. AMP.
IH5
2ND. DET. AVC & IST. AUD.
3Q5
POWER OUTPUT
L1
L2
L3
L4
L5
RFC
T1
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
GND. LEAD
NEW BATTERY
SW 2
OLD BATTERY
SW1
A-
A+
1½V.
B-
B+90 VOLTS
BATTERY PLUG
(Top View)

I.F. = 455 KC.
RANGE = 535 TO 1630 KC.

## VOLTAGE DATA

All readings made between tube socket terminals and chassis. Voltages indicated have been obtained using a Vacuum Tube Voltmeter. A second voltage reading is shown made with a 1000 ohm-per-volt meter, when use of this instrument would result in appreciably lower readings. Measured with a fresh battery, volume control full on, dial at the high frequency end, no signal.


VOLTAGE CHART
BOTTOM VIEW
3Q5GT
1H5GT
1N5GT
1A7GT
30 V SCALE 1000 Ω/V
81
85
1.4
-4.5
0
-4.8
0
0
1.4
0
0
1.4
0
61
20
0
0
85
0
82
0
1.4
0
-14
-3.5
85
58
55
0
85
1.4
0
BACK OF CHASSIS

## OSCILLATION IN 4B1 RADIO CHASSIS

Occasionally audio oscillation may occur in the 4B1 chassis with the volume control in an intermediate position. Should you encounter this trouble, reverse the leads of the primary of the output transformer or ground the speaker frame to the chassis. The speaker leads and the grid lead of the 1H5 should be kept as far as possible from the 3Q5 output tube.

## REPLACEMENT PARTS

ISSUE A 1947

### CONDENSERS

| Symbol | Description | Part No. |
|---|---|---|
| C1 | .01 mfd. 400 Volts | 64B 1-25 |
| C2 | .0008 mfd., Mica | 65B 5-31 |
| C3 | Trimmer, Antenna | 66A 9-1 |
| C4 | Trimmer, Oscillator | |
| C5 | .0001 mfd., Mica | 65B 7-17 |
| C6 | .0008 mfd., Mica | 65B 5-31 |
| C7 | .01 mfd., 400 Volts | 64B 1-25 |
| C8 | .002 mfd., 600 Volts | 64B 1,14 |
| C9 | 4. mfd., 150 Volts (Elect) | 67A 4-2 |
| C10 | .05 mfd., 200 Volts | 64B 1-32 |
| C11 | .00025 mfd., Mica | 65B 7-22 |
| C12 | .00025 mfd., Mica | 65B 7-22 |
| C13 | .01 mfd., 400 Volts | 64B 1-25 |
| C14 | .01 mfd., 400 Volts | 64B 1-25 |
| C15 | .005 mfd., 600 Volts | 64B 1-12 |
| C16 | .01 mfd., 400 Volts | 64B 1-25 |
| C17 | .01 mfd., 400 Volts | 64B 1-25 |
| | (C17 omitted in early models) | |

### RESISTORS

| Symbol | Description | Part No. |
|---|---|---|
| R1 | 15,000 ohm ½ Watt | 60B 8-153 |
| R2 | 470,000 ohm ¼ Watt | 60B 2-474 |
| R3 | 220,000 ohm ½ Watt | 60B 8-224 |
| R4 | 33,000 ohm ½ Watt | 60B 8-333 |
| R5, R8 | 4,700,000 ohm ¼ Watt | 60B 2-475 |
| R6 | 2,200,000 ohm ¼ Watt | 60B 2-225 |
| R7 | 1 meg. Vol. Control | 75B 1-1 |
| R9, R10 | 1,000,000 ohm ¼ Watt | 60B 2-105 |
| R11 | 390 ohm ¼ Watt | 60B 2-391 |
| R12 | .75 ohm ½ Watt (wire) | 61A 2-1 |
| R13 | 2200 ohm ¼ Watt | 60B 2-222 |

### TRANSFORMERS and COILS

| Symbol | Description | Part No. |
|---|---|---|
| L1 | Antenna Coil | AC105-1 |
| L2 | Oscillator Coil | A1020 |
| L3 | 1st I.F. Transformer | 72B 5 |
| L4 | 2nd I.F. Transformer | 72B 6 |
| L5 | Choke Coil (RF) | AB103-1 |
| T1 | Output Transformer | 98A 5 |

### MISCELLANEOUS

| Description | Part No. |
|---|---|
| Background, Dial | X22C 5-1 |
| Cabinet, Plastic (7T12) | 34D 10 |
| Cabinet, Wood (7T06) | 35D 49 |
| Cable, Battery (complete with plug) | A1026 |
| Cord, Dial (5" on tuner and 66" on dial drive) | 50A 1-3 |
| Drum and Hub, Tuning | A1035 |
| Iron Slug, with wire (Osc.) | 71B 1-3 |
| Iron Slug, with wire (Ant.) | 71B 1-4 |
| Knob | 33A 21-3 |

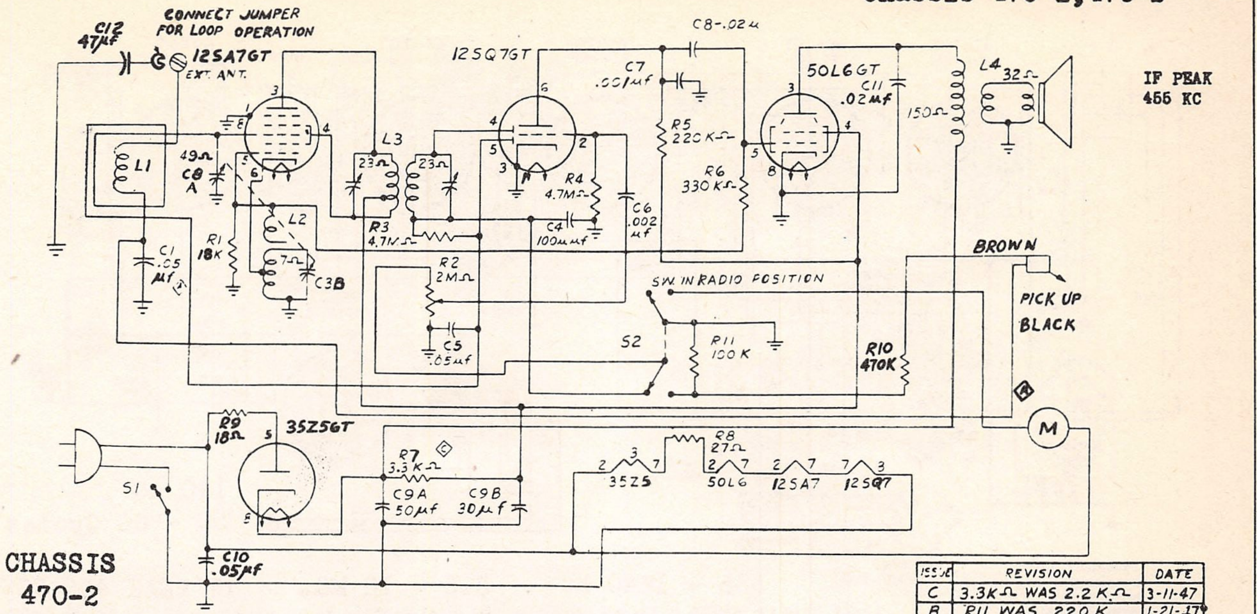
### MISCELLANEOUS

| Description | Part No. |
|---|---|
| Plug, Battery 5 Prong | 88A 4-4 |
| Pointer, Dial | 25A 9-1 |
| Pulley, Fibre Dial | 17A 1-3 |
| Scale, Glass Dial (7T06) | 21B 31-1 |
| Scale, Glass Dial (7T12) | 21B 32-1 |
| Screw studs (for iron cores) | 27A 4 |
| Shaft, Tuning | 28A 1-1 |
| Shield, Tube | 87A 8 |
| Socket, Octal Tube | 87A 5-1 |
| Speaker and Output Transformer | 78B 3 |
| Spring, Dial Drum Cord Tension | 19B 1-7 |
| Spring, Hairpin (To hold Ant. or Osc. coils) | 19A 3-1 |
| Spring, Tuner, back bearing takeup | 19A 6 |
| Spring, Tuner, front bearing takeup | 19A 5 |
| Spring, Tuner Slide Cord Tension | 19B 1-8 |
| Spring, Tuner Slide Pressure | 18A 9 |
| Switch, SPST (Economizer) SW2 | 77B 1-6 |
| Washer, C | 4A 4-1 |
| Washer, spring (coils) | 4A 6-12-0 |
| Washer, spring (shaft) | 4A 6-3-0 |

For Alignment, data, see P.16-10

# AIR KING PRODUCTS CO., INC. MODEL A-403 COURT JESTER
## Chassis 470-1, 470-2

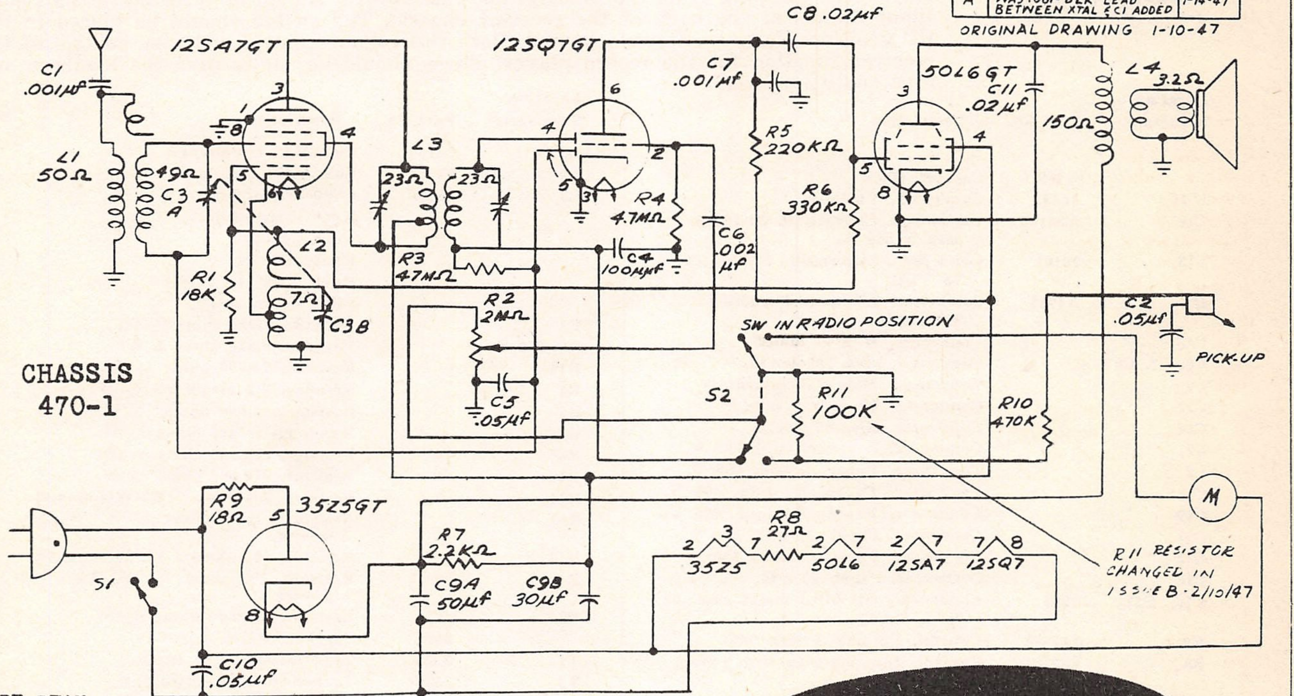
IF PEAK
455 KC


C12 47µf
CONNECT JUMPER FOR LOOP OPERATION
12SA7GT
EXT. ANT.
L1
49Ω
C8 A
R1 18K
C1 .05 µf
L2
7Ω
C3B
L3
23Ω
23Ω
R3 4.7MΩ
12SQ7GT
C7 .001µf
R4 4.7MΩ
C4 100µµf
C6 .002 µf
R2 2MΩ
C5 .05µf
C8-.02µ
R5 220KΩ
R6 330KΩ
50L6GT
C11 .02µf
150Ω
L4 3Ω
BROWN
PICK UP
BLACK
SW. IN RADIO POSITION
S2
R11 100K
R10 470K
M
R9 18Ω
35Z5GT
S1
R7 3.3KΩ
C9A 50µf
C9B 30µf
R8 27Ω
35Z5
50L6
12SA7
12SQ7
C10 .05µf

CHASSIS 470-2

| ISSUE | REVISION | DATE |
|---|---|---|
| C | 3.3KΩ WAS 2.2KΩ | 3-11-47 |
| B | R11 WAS 220K | 1-21-47 |
| A | C2 & GROUND REMOVED-C1 WAS .001-BLK LEAD BETWEEN XTAL & C1 ADDED | 1-14-47 |

ORIGINAL DRAWING 1-10-47


C1 .001µf
L1 50Ω
12SA7GT
C3 A
49Ω
R1 18K
L2
7Ω
C3B
L3
23Ω
23Ω
R3 47MΩ
12SQ7GT
C7 .001µf
C8 .02µf
R4 4.7MΩ
C4 100µµf
C6 .002 µf
R2 2MΩ
C5 .05µf
R5 220KΩ
R6 330KΩ
50L6GT
C11 .02µf
150Ω
L4 3.2Ω
C2 .05µf
PICK-UP
SW. IN RADIO POSITION
S2
R11 100K
R10 470K
M
R11 RESISTOR CHANGED IN ISSUE B-2/10/47
R9 18Ω
35Z5GT
S1
R7 2.2KΩ
C9A 50µf
C9B 30µf
R8 27Ω
35Z5
50L6
12SA7
12SQ7
C10 .05µf

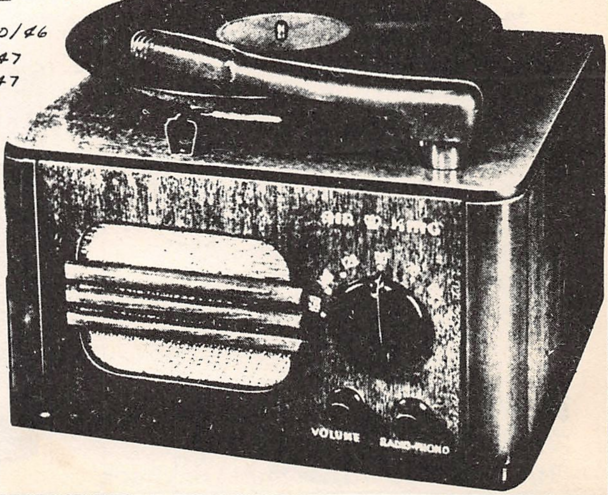
CHASSIS 470-1

IF PEAK
455 KC

ORIGINAL DWG DATED 12/10/46
ISSUE A REVISION 1/10/47
ISSUE B REVISION 2/10/47

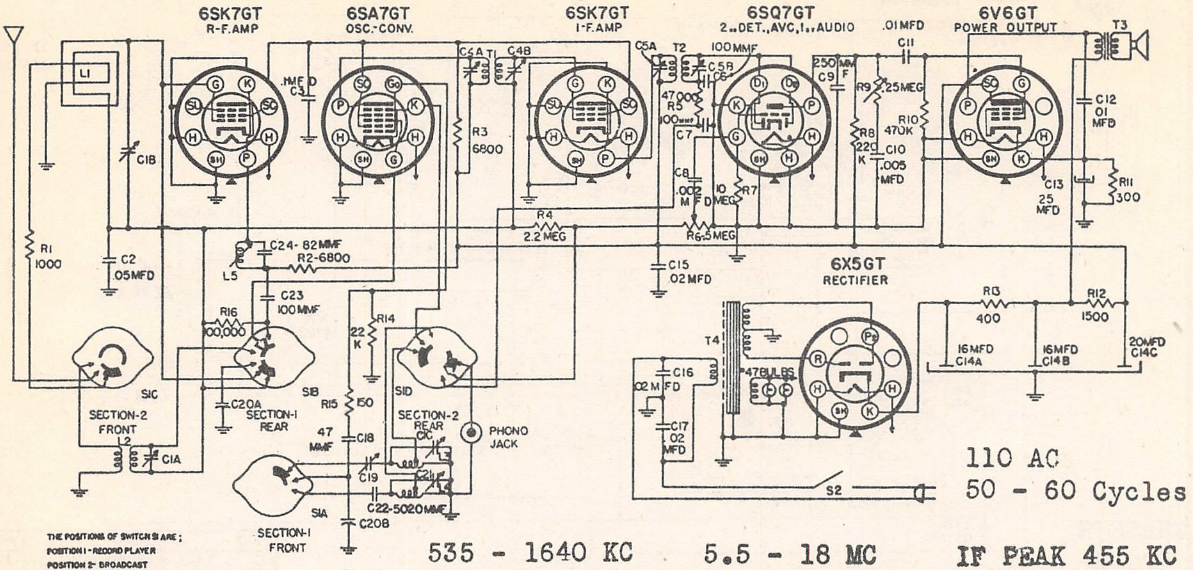
| | |
|---|---|
| A403 | Cabinet, wood less lid |
| 5877 | Speaker and output transformer |
| 39160 | Knob, tuning wood |
| 39161 | Knob, (volume, phono-radio) |
| 59307 | Instruction book |
| [illegible] | Variable condenser |
| [illegible] | Electrolytic condenser unit 50-30 mf/150 v |
| [illegible] | Volume control 2 meg with switch |
| 28184 | Oscillator coil |
| 28185 | Antenna coil (chassis 470-1) |
| 3376 | I.F. transformer |
| 28186 | |
| 28189 | Loop and loading coil (chassis 470-2) |
| 5559 | Line cord |
| 3828 | Switch radio/phono |
| 6343 | Pick-up arm and rest |
| 6418 | Motor and turntable 8" |
| | Lifetime needle |
| | Paper condenser .05 mf 400 v. |
| | " " .002 200 v. |
| | " " .02 " |
| | " " .05 " |
| | " " .001 " |
| | Ceramic 100 mmf 500 volts |
| | 16K ohms ¼ w. |
| | 4.7 meg ohms ¼ w. |
| | 220K " " |
| | 2200 " 2 w. |
| | 18 " ½ w. |
| | 47 " 1 w. |
| | 330K " ¼ w. |
| | 470K " 1 w. |

PARTS LIST AND
CABINET ARE THE
SAME FOR BOTH
CHASSIS 470-1
and 470-2


AIR KING
VOLUME
RADIO-PHONO

**MODELS 4604D, 4604F**
**Chassis 458-2**

# AIR KING PRODUCTS CO., INC.


6SK7GT
R-F. AMP
6SA7GT
OSC.-CONV.
6SK7GT
I-F. AMP
6SQ7GT
2ND DET., AVC, 1ST AUDIO
.01MFD
6V6GT
POWER OUTPUT
T3
L1
C3
.1MFD
C4A T1 C4B
C5A T2
100MMF
C5B
C6
C11
C9
250MMF
C12
.01
MFD
C18
R3
6800
R5
47000
100MMF
C7
R9 .25MEG
R10
470K
R8
220K
C10
.005
MFD
C8
.002
MFD
10
MEG
R7
C13
25
MFD
R11
300
R1
1000
C2
.05MFD
C24- 82MMF
R2-6800
L5
R4
2.2 MEG
R6 .5MEG
C15
.02MFD
6X5GT
RECTIFIER
C23
100MMF
R16
100,000
R14
22
K
R13
400
R12
1500
16MFD
C14A
16MFD
C14B
20MFD
C14C
T4
C16
.02MFD
47 BULBS
SIC
SECTION-2
FRONT
C20A
SECTION-1
REAR
SIB
R15
150
47
MMF
C18
SID
SECTION-2
REAR
PHONO
JACK
C1A
C17
.02
MFD
C19
C22-5020MMF
SIA
C20B
SECTION-1
FRONT
S2

110 AC
50 - 60 Cycles

THE POSITIONS OF SWITCH SI ARE;
POSITION I - RECORD PLAYER
POSITION 2 - BROADCAST
POSITION 3 - SHORT WAVE
THE SWITCH IS DRAWN IN POSITION I
(MAXIMUM COUNTERCLOCKWISE)

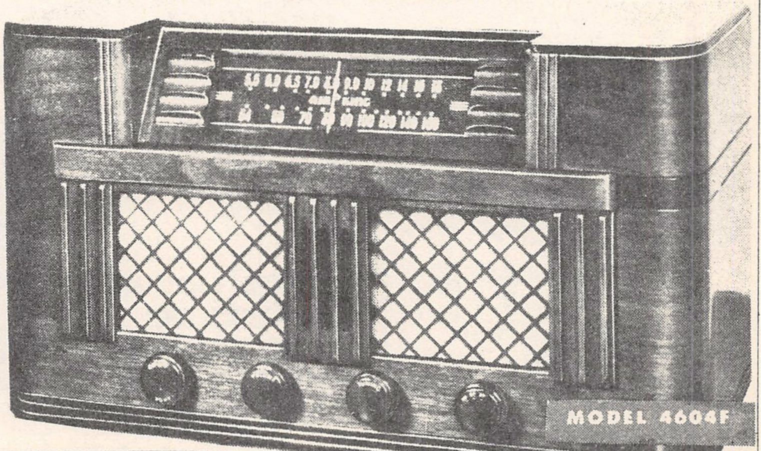
535 - 1640 KC 5.5 - 18 MC IF PEAK 455 KC

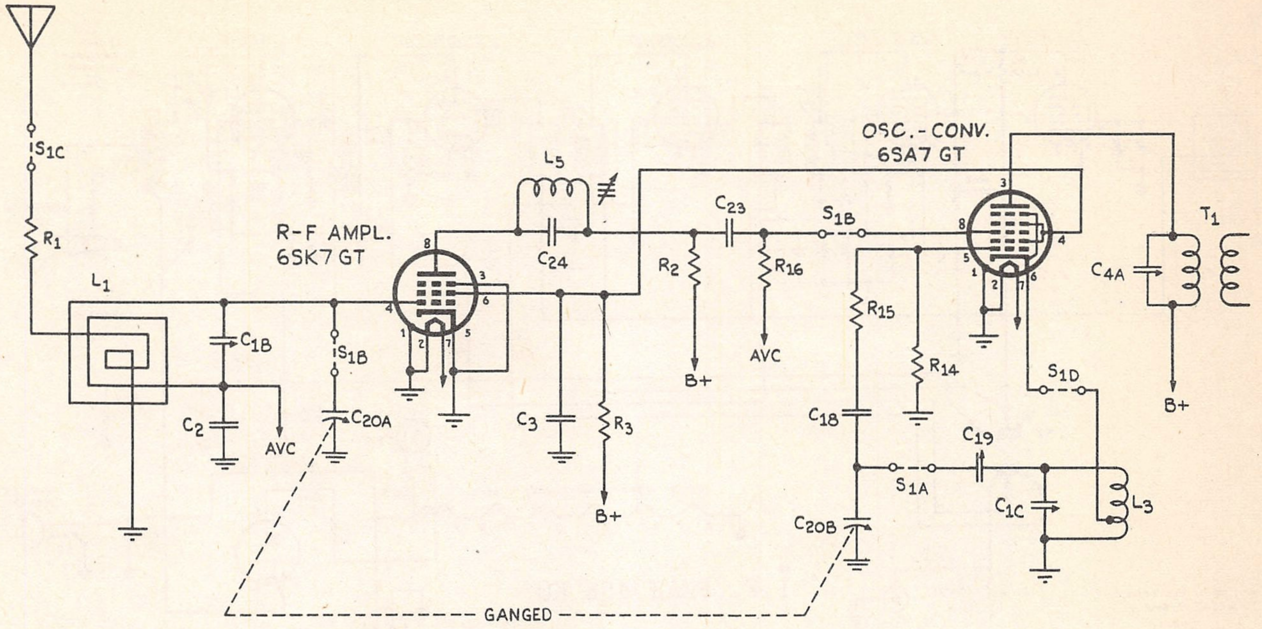
If this receiver is to be operated in conjunction with an external phonograph record player, the pin plug from the phonograph pick-up arm should be inserted in the Phono Input Socket at the back of the receiver chassis. The switch should be placed in the RP position (fully counter-clockwise). Both the volume control and tone control of the receiver function for the record player. These should be set to give the loudness and tone quality desired.

| Location Schematic | Part No. | Description |
|---|---|---|
| | 62189 | Cabinet Back |
| C-20 | 1668 | Condenser, Variable |
| C14 | A20102 | Condenser, Electrolytic 20-16-16 mfd. x 350 V. |
| C13 | 20105 | Condenser, Electrolytic 25 mfd. x 25 VDC. |
| C1 | A1725 | Condenser, Trimmer, 3 Section, 3-30mmfd. |
| C18 | | Condenser, Mica 47 mmfd. |
| C6, C7, C23 | | Condenser, Mica 100 mmfd. |
| C9 | | Condenser, Mica 250 mmfd. |
| C22 | | Condenser, Mica 5020 mmfd. |
| C24 | | Condenser, Mica 82 mmfd. |
| C2 | | Condenser, Paper .05 mfd. 600 V. |
| C3 | | Condenser, Paper .1 mfd. 400 V. |
| C8 | | Condenser, Paper .002 mfd. 400 V. |
| C10 | | Condenser, Paper .005 mfd. 400 V. |
| C11 | | Condenser, Paper .01 mfd. 600 V. |
| C12 | | Condenser, Paper .01 mfd. 800 V. |
| C15 | | Condenser, Paper .02 mfd. 400 V. |
| C16, C17 | 1975 | Condenser, Oil filled metal case .02 mfd. 600V. |
| R6 | 2470-A | Control, Volume .5 Meg |
| R9 | 2521 | Control, Tone .25 Meg with switch |
| | | Cord, Line |
| L1 | 28170 | Coil, Loop |
| L2 | 28167 | Coil, S.W. Antenna |

| Location Schematic | Part No. | Description |
|---|---|---|
| L3 | 28169 | Coil, B.C. Oscillator |
| L4 | 28168 | Coil, S.W. Oscillator |
| L5 | 28175 | Coil, Wave Trap |
| | | Knob, Tone-off-on |
| | | Knob, Volume |
| | | Knob, Tuning |
| | | Knob, (RP, BC, SW) |
| | | Pilot Lamp #47 |
| R1 | | Resistor, 1,000 ohms ½ W. |
| R2, R3 | | Resistor, 6,800 ohms 2 W. |
| R14 | | Resistor, 22,000 ohms ½ W. |
| R4 | | Resistor, 2.2 Megohms ½ W. |
| R5 | | Resistor, 47,000 ohms ½ W. |
| R7 | | Resistor, 10 Meg ohms ½ W. |
| R8 | | Resistor, 220,000 ohms ½ W. |
| R10 | | Resistor, 470,000 ohms ½ W. |
| R11 | | Resistor, 300 ohms 2 W. Wirewound |
| R12 | | Resistor, 1500 ohms 2 W. Wirewound |
| R13 | | Resistor, 400 ohms 2 W. Wirewound |
| R15 | | Resistor, 150 ohms ½ W. Wirewound |
| R16 | | Resistor, 100,000 ohms ½ W. |
| | 5866 | Speaker, P. M. |
| T1 | 3360 | Transformer, I.F. Input |
| T2 | 3530 | Transformer, I.F. Output |
| T3 | 1333 | Transformer, Output |
| T4 | 1020 | Transformer, Power |

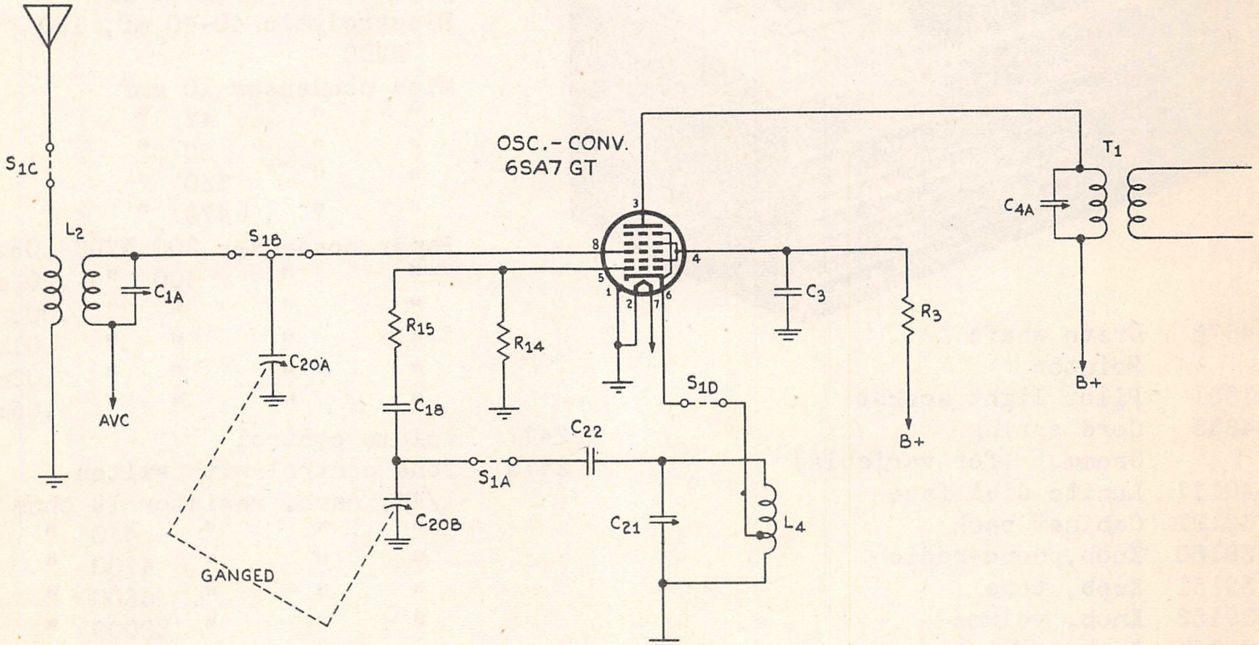
| | |
|---|---|
| CD-4604 | Cabinet 4604D |
| CF-4604 | Cabinet 4604F |
| 3785A | Rotary Bandswitch |
| 4675B | Drive Shaft Assembly |
| 54161 | Grommets for mounting Variable Condenser |
| 40114 | Dial scale |
| 4140 | Pointer |
| 4633 | Cord Spring |
| | Knob Felts |
| | Back Fastener Clips |
| 54170 | Antenna-Ground Post |
| 24A5 | Phono Jack |
| Ins | 4604 Instruction Book |


MODEL 4604F


S1C
R1
L1
C1B
C2
AVC
S1B
C20A
R-F AMPL.
6SK7 GT
L5
C24
C3
R3
B+
C23
R2
R16
B+
AVC
S1B
OSC.-CONV.
6SA7 GT
R15
R14
C18
S1D
C19
S1A
C1C
L3
C20B
C4A
T1
B+
GANGED

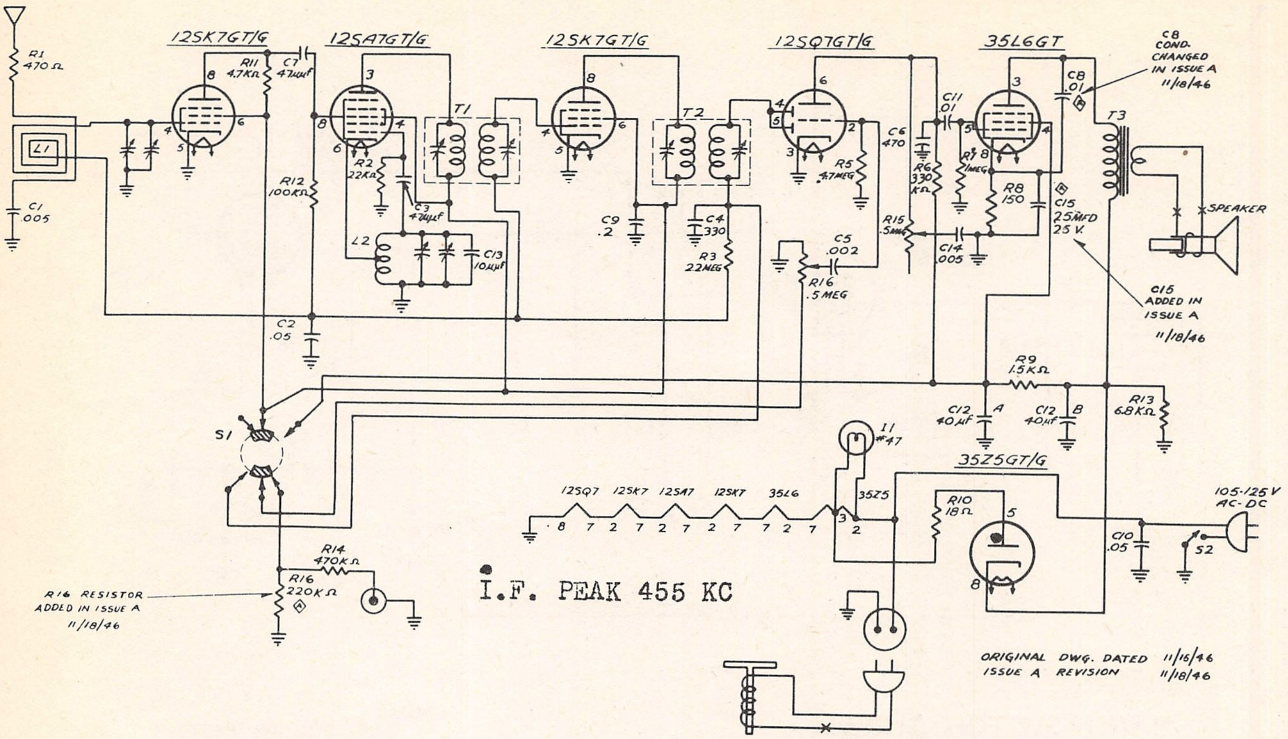
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
535 - 1640KC.

NOTE:
1ST POSITION (PHONO)
NOT SHOWN.


S1C
L2
C1A
AVC
S1B
C20A
OSC.-CONV.
6SA7 GT
R15
R14
C18
S1A
C22
C21
L4
C20B
GANGED
C3
R3
S1D
B+
T1
C4A
B+

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
5.5 - 18 MC.

# MODEL 4704 CROWN PRINCESS AIR KING PRODUCTS CO., INC.
Chassis 451-2

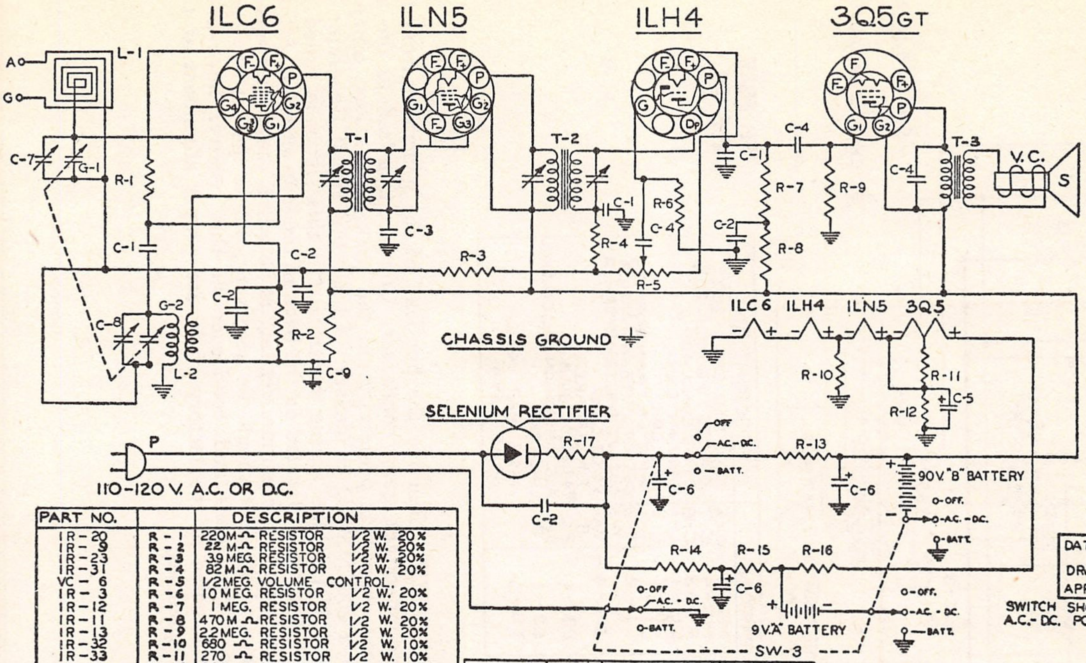

12SK7GT/G
12SA7GT/G
12SK7GT/G
12SQ7GT/G
35L6GT
R1 470Ω
L1
C1 .005
R11 4.7KΩ
C7 47μμf
R12 100KΩ
C2 .05
R2 22KΩ
C3 47μμf
L2
C13 10μμf
T1
T2
C9 .2
C4 330
R3 2.2MEG
C6 470
R5 4.7MEG
C5 .002
R16 .5 MEG
C11 .01
R6 330 KΩ
R7 1MEG
R15 .5MEG
C14 .005
R8 150
C8 .01
C8 COND. CHANGED IN ISSUE A 11/18/46
C15 25MFD 25 V.
C15 ADDED IN ISSUE A 11/18/46
T3
SPEAKER
R9 1.5KΩ
C12 40μf A
C12 40μf B
R13 6.8KΩ
S1
I1 #47
35Z5GT/G
12SQ7 12SK7 12SA7 12SK7 35L6 35Z5
R10 18Ω
C10 .05
S2
105-125 V AC-DC
R14 470KΩ
R16 220KΩ
R16 RESISTOR ADDED IN ISSUE A 11/18/46
ORIGINAL DWG. DATED 11/16/46
ISSUE A REVISION 11/18/46

I.F. PEAK 455 KC

| | |
|---|---|
| 4678 | Drive shaft |
| | Pointer |
| 1851 | Pilot light socket |
| 4633 | Cord spring |
| | Grommet (for variable) |
| 40117 | Lucite dial face |
| 62191 | Cabinet back |
| 39150 | Knob, phono-radio |
| 39151 | Knob, tone |
| 39152 | Knob, volume |
| 39153 | Knob, tuning |
| | Back fastener clips |
| 3827A | Phono switch |
| | Lifetime needle |
| C4704 | Cabinet |
| 5870 | Speaker w/transformer |
| C4704 | Record changer assembly |

| | |
|---|---|
| 1639 | Variable condenser |
| 28177 | Loop antenna |
| 28172 | Oscillator coil |
| 3329 | I.F. input transformer |
| 3529 | I.F. output transformer |
| | Electrolytic 40-40 mf, 150 WVDC |
| | Mica condenser 10 mmf |
| | " " 47 " |
| | " " 50 " |
| | " " 330 " |
| | " " 470 " |
| | Paper condenser 200 WVDC .05mf |
| | " " 400 " .002mf |
| | " " " " .005mf |
| | " " " " .01mf |
| | " " " " .02mf |
| | " " " " .05mf |
| 2477 | Volume control |
| 2476 | Tone control with switch |
| | 1/4W. carb. resistor 18 ohms |
| | " " " 470 " |
| | " " " 4700 " |
| | " " " 6800 " |
| | " " " 22000 " |
| | " " " 100000 " |
| | " " " 330000 " |
| | " " " 470000 " |
| | " " " 2.2meg " |
| | " " " 4.7meg " |
| | 1/2W. " " 150 " |
| | 2W. " " 2200 " |

# ALLIED RADIO CORP.


ILC6
ILN5
ILH4
3Q5GT
A
G
L-1
C-7
G-1
R-1
C-1
C-8
G-2
L-2
C-2
R-2
C-9
T-1
C-3
R-3
T-2
C-1
R-6
C-4
R-4
R-5
C-4
C-1
R-7
R-9
C-2
R-8
T-3
C-4
V.C.
S
CHASSIS GROUND
ILC6 ILH4 ILN5 3Q5
R-10
R-11
R-12
C-5
SELENIUM RECTIFIER
R-17
P
110-120 V. A.C. OR D.C.
C-2
OFF
AC.-DC.
BATT.
R-13
C-6
C-6
90V. "B" BATTERY
O-OFF
O-AC.-DC.
BATT.
R-14
R-15
R-16
C-6
O-OFF
AC.-DC.
O-BATT.
9V."A" BATTERY
SW-3
O-OFF
AC.-DC.
BATT.

DATE: 9-27-46
DRAWN BY:
APPROVED:

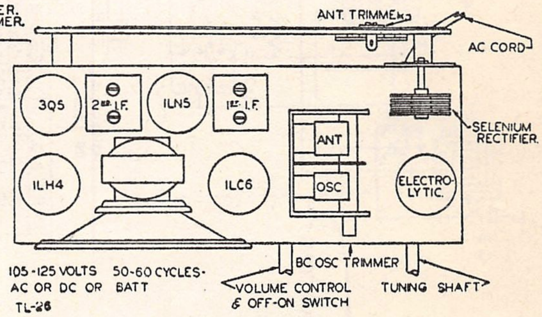
SWITCH SHOWN IN A.C.-DC. POSITION.

| PART NO. | | DESCRIPTION |
|---|---|---|
| IR-20 | R-1 | 220M-Ω- RESISTOR 1/2 W. 20% |
| IR-9 | R-2 | 22 M-Ω- RESISTOR 1/2 W. 20% |
| IR-23 | R-3 | 3.9 MEG. RESISTOR 1/2 W. 20% |
| IR-31 | R-4 | 82 M-Ω- RESISTOR 1/2 W. 20% |
| VC-6 | R-5 | 1/2 MEG. VOLUME CONTROL. |
| IR-3 | R-6 | 10 MEG. RESISTOR 1/2 W. 20% |
| IR-12 | R-7 | 1 MEG. RESISTOR 1/2 W. 20% |
| IR-11 | R-8 | 470 M-Ω-RESISTOR 1/2 W. 20% |
| IR-13 | R-9 | 2.2 MEG. RESISTOR 1/2 W. 20% |
| IR-32 | R-10 | 680 Ω RESISTOR 1/2 W. 10% |
| IR-33 | R-11 | 270 Ω RESISTOR 1/2 W. 10% |
| IR-21 | R-12 | 330 Ω RESISTOR 1/2 W. 10% |
| IR-34 | R-13 | 1200 Ω RESISTOR 1/2 W. 10% |
| WR-3 | R-14 | 1050 Ω CANDOHM RESISTOR |
| | R-15 | 1050 Ω |
| | R-16 | 40 Ω |
| IR-35 | R-17 | 75-Ω- RESISTOR 2 W. 10% |
| MC-2 | C-1 | 100 MMFD. MICA CONDENSER. |
| PC-5 | C-2 | .05 MFD. CONDENSER 400 V. |
| PC-7 | C-9 | .01 MFD CONDENSER 400 V. |
| PC-8 | C-3 | .1 MFD. CONDENSER 400V. |
| PC-6 | C-4 | .005 MFD. CONDENSER 600 V. |

| PART NO. | | DESCRIPTION |
|---|---|---|
| EC-6 | C-5 | 70 MFD. 10V. ELECTROLYTIC. |
| EC-4 | C-6 | 40-40-40-150 V. ELECTROLYTIC |
| TC-7 | C-7 | ANTENNA TRIMMER COND. |
| TC-6 | C-8 | OSC. TRIMMER COND. |
| GC-2 | G-1<br>G-2 | GANG CONDENSER. |
| LL-5 | L-1 | LOOP ANTENNA. |
| LO-8 | L-2 | .OSC COIL. |
| LI-3 | T-1 | INPUT I.F. TRANSFORMER. |
| LI-4 | T-2 | OUTPUT I.F. TRANSFORMER. |
| CO-1 | P | LINE CORD. |

| PART NO. | | DESCRIPTION |
|---|---|---|
| SPK-5 | T-3 | OUTPUT SPEAKER TRANSFORMER. |
| | VC | VOICE COIL. |
| | S | P.M. SPEAKER. |
| SW-3 | SW 3 | 4 POLE. 3-POSITION SW. |
| SR-1 | —— | SELENIUM RECTIFIER. |
| TU-20 | —— | ILC6-ILN5-ILH4-3Q5 |
| "A" BATTERY | | 9 VOLTS. |
| "B" BATTERY | | 90 VOLTS. |

IF PEAK
455 KC


ANT. TRIMMER
AC CORD
3Q5
2ND I.F.
ILN5
1ST I.F.
ANT
SELENIUM RECTIFIER
ILH4
ILC6
OSC
ELECTROLYTIC.
BC OSC TRIMMER
105-125 VOLTS 50-60 CYCLES-
AC OR DC OR BATT
TL-26
VOLUME CONTROL
& OFF-ON SWITCH
TUNING SHAFT

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

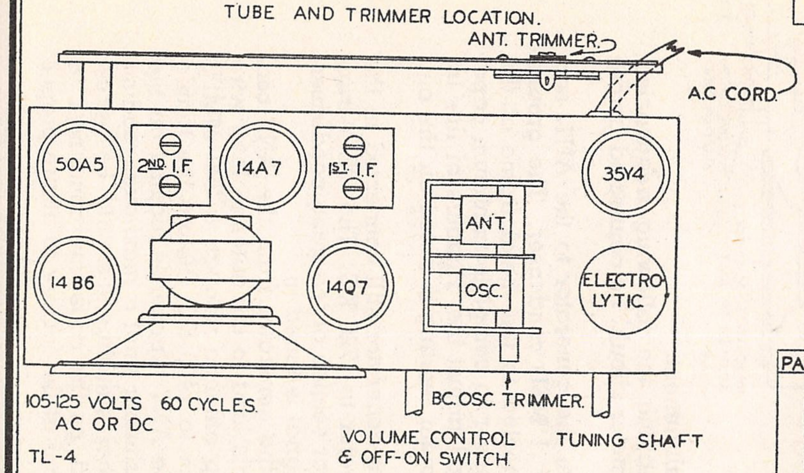
**FIRST STEP:** Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

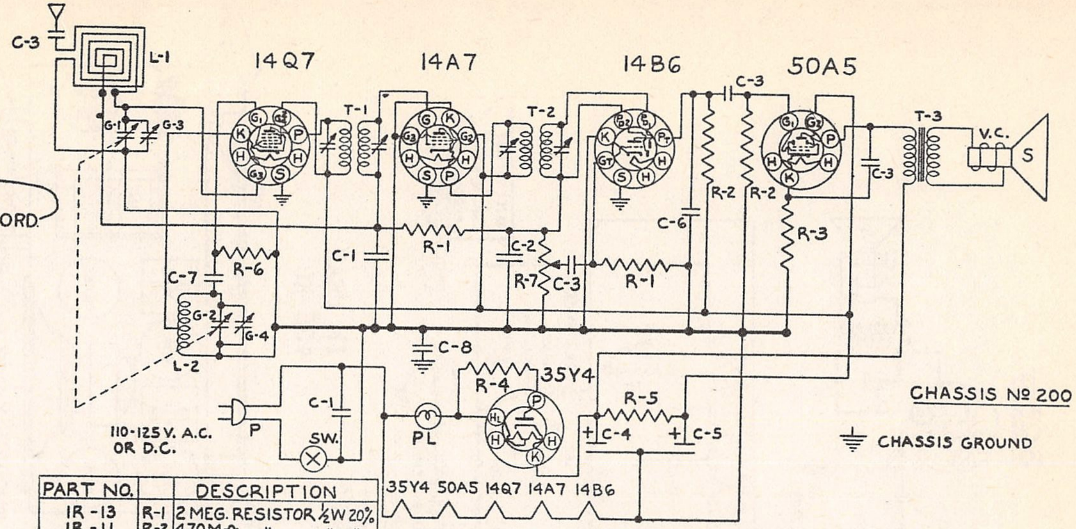
**SECOND STEP:** With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the top of the oscillator section of the gang condenser. Adjust this trimmer until the 1720 KC signal is tuned in.

**THIRD STEP:** Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

MODELS 5B-175,5B-176
Chassis 200

## ALLIED RADIO CORP.


TUBE AND TRIMMER LOCATION.
ANT. TRIMMER
A.C CORD
50A5
2ND I.F.
14A7
1ST I.F.
35Y4
ANT.
OSC.
14B6
14Q7
ELECTRO LYTIC
BC. OSC. TRIMMER
105-125 VOLTS 60 CYCLES. AC OR DC
VOLUME CONTROL & OFF-ON SWITCH
TUNING SHAFT
TL-4


C-3
L-1
G-1
G-3
14Q7
T-1
14A7
T-2
14B6
C-3
50A5
T-3
V.C.
S
R-2
R-2
C-3
C-6
R-3
C-7
R-6
C-1
R-1
C-2
R-7
C-3
R-1
G-2
G-4
L-2
C-8
R-4
35Y4
R-5
C-4
C-5
P
C-1
SW.
PL
110-125 V. A.C. OR D.C.
35Y4 50A5 14Q7 14A7 14B6
CHASSIS № 200
CHASSIS GROUND

| PART NO. | | DESCRIPTION |
|---|---|---|
| IR-13 | R-1 | 2 MEG. RESISTOR ½W 20% |
| IR-11 | R-2 | 470M ⁀ " " " |
| IR-14 | R-3 | 150 ⁀ " " " |
| IR-4 | R-4 | 47 ⁀ " " " |
| IR-15 | R-5 | 2200 ⁀ " " " |
| IR-16 | R-6 | 33,000 ⁀ " " " |
| V.C.-3 | R-7 | 1 MEG. VOLUME CONTROL |
| GC-2 | G-1<br>G-2 | GANG COND. |
| TC-7 | G-3 | ANT. TRIMMER COND. |
| TC-6 | G-4 | OSC. TRIMMER COND. |
| PC-5 | C-1 | .05 MFD. COND. 400 V. |
| MC-2 | C-2 | .0001 MFD. MICA 20% |
| PC-7 | C-3 | .01 MFD. COND. 400 V. |
| EC-3 | C-4<br>C-5 | 40 MFD.<br>20 MFD. 150 V. ELECTROLYTIC |

| PART NO | | DESCRIRTION |
|---|---|---|
| MC-5 | C-6 | .0005 MFD. COND. 20% |
| MC-4 | C-7 | .000056 MFD. MICA 20% |
| PC-9 | C-8 | .1 MFD COND. 400 V. |
| LL-1 | L-1 | LOOP ANTENNA |
| LO-2 | L-2 | OSC. COIL |
| LI-1 | T-1 | INPUT I.F. TRANSFORMER |
| LI-2 | T-2 | OUTPUT I.F. TRANSFORMER |
| SPK-4 | T-3<br>V.C.<br>S | OUTPUT SPK. TRANSFORMER<br>VOICE COIL<br>P.M. SPEAKER |
| PB-1 | PL | #47 PILOT BULB |
| | SW | A.C. SWITCH ON VOL. CONTROL |
| CO-1 | P | LINE CORD |
| TU-6 | | 14Q7 14A7 14B6<br>50A5 35Y4 |

**IF PEAK**
**455 KC**

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

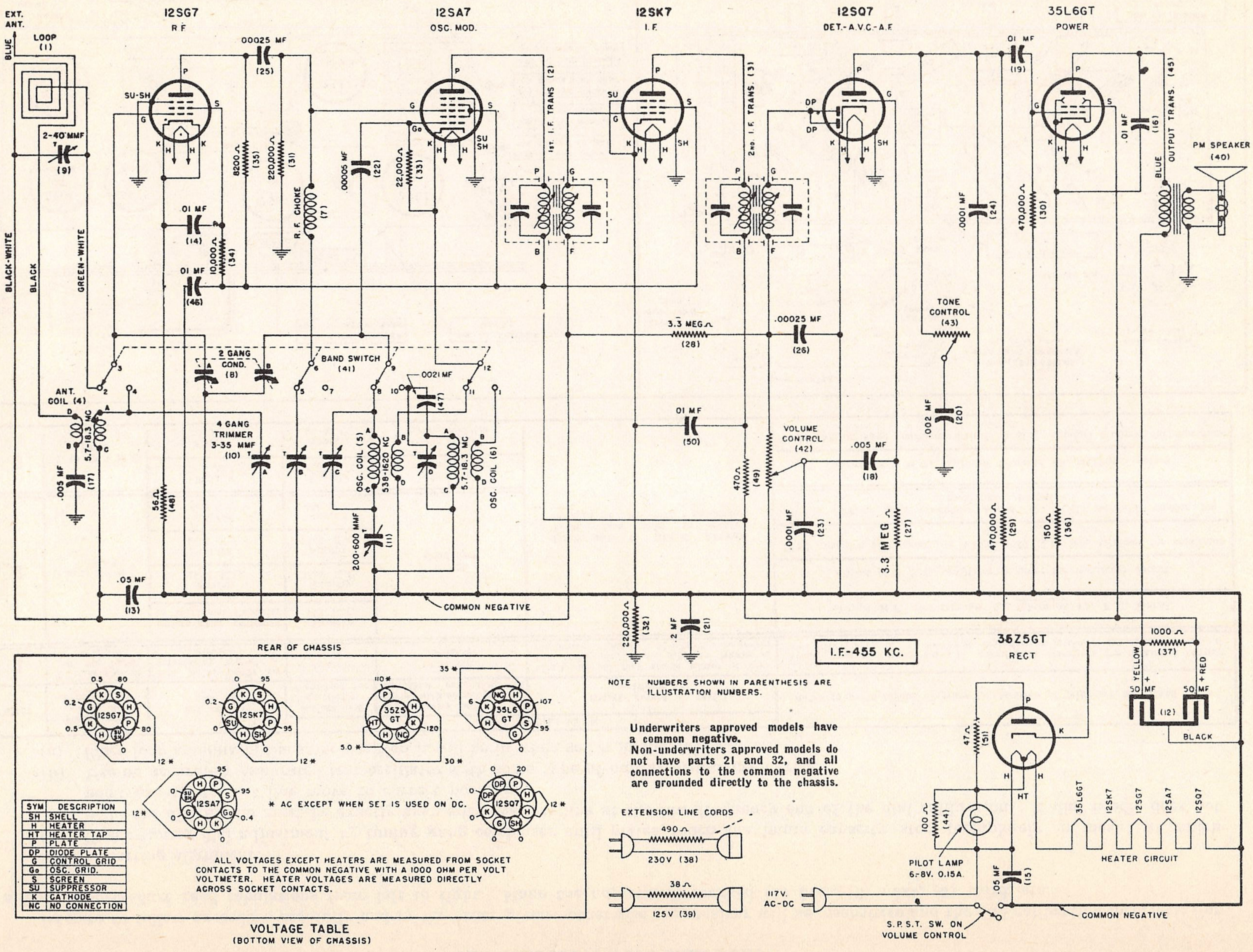
**FIRST STEP:** Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

**SECOND STEP:** With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis between the volume and tuning controls. Adjust this trimmer until the 1720 KC signal is tuned in.

**THIRD STEP:** Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

**MODEL 6B-122**

# ALLIED RADIO CORP.


EXT. ANT.
BLUE
LOOP (1)
BLACK-WHITE
BLACK
GREEN-WHITE
2-40 MMF (9)
12SG7 RF
SU-SH
G
P
S
K
H
H
K
.00025 MF (25)
8200 Ω (35)
220,000 Ω (31)
.01 MF (14)
10,000 Ω (34)
.01 MF (46)
R.F. CHOKE (7)
12SA7 OSC. MOD.
G
Go
S
SU SH
.00005 MF (22)
22,000 Ω (33)
1st. I.F. TRANS (2)
P
G
B
F
ANT. COIL (4)
5.7-18.3 MC
A
B
C
D
.005 MF (17)
2 GANG COND. (8)
BAND SWITCH (41)
4 GANG TRIMMER 3-35 MMF (10)
.0021 MF (47)
OSC. COIL (5)
538-1620 KC
5.7-18.3 MC
OSC. COIL (6)
200-600 MMF (11)
56 Ω (48)
.05 MF (13)
COMMON NEGATIVE
12SK7 I.F.
SU
SH
2nd. I.F. TRANS. (3)
3.3 MEG Ω (28)
.00025 MF (26)
.01 MF (50)
470 Ω (49)
VOLUME CONTROL (42)
.005 MF (18)
.0001 MF (23)
3.3 MEG Ω (27)
220,000 Ω (32)
.2 MF (21)
12SQ7 DET.-A.V.C.-A.F.
DP
DP
TONE CONTROL (43)
.002 MF (20)
.0001 MF (24)
470,000 Ω (29)
.01 MF (19)
470,000 Ω (30)
150 Ω (36)
35L6GT POWER
.01 MF (16)
OUTPUT TRANS. (45)
BLUE
PM SPEAKER (40)
I.F.-455 KC.
35Z5GT RECT
1000 Ω (37)
YELLOW
+ RED
50 MF
50 MF
(12)
BLACK
47 Ω (51)
HT
100 Ω (44)
PILOT LAMP 6-8V. 0.15A.
.05 MF (15)
35L6GT
12SK7
12SG7
12SA7
12SQ7
HEATER CIRCUIT
COMMON NEGATIVE
117V. AC-DC
S.P.S.T. SW. ON VOLUME CONTROL
EXTENSION LINE CORDS
490 Ω
230V (38)
38 Ω
125V (39)
REAR OF CHASSIS
12SG7: 0.5, 80, 0.2, 0.5, 80, 0, 12 *
12SK7: 0, 95, 0.2, 0, 95, 0, 12 *
35Z5 GT: 110 *, 120, 5.0 *, 30 *
35L6 GT: 35 *, 6, 107, 95, 0
12SA7: 95, 0, 95, 0, 0.4, 0, 12 *
12SQ7: 0, 20, 0, 0, 0, 0, 12 *

NOTE NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

**Underwriters approved models have a common negative. Non-underwriters approved models do not have parts 21 and 32, and all connections to the common negative are grounded directly to the chassis.**

* AC EXCEPT WHEN SET IS USED ON DC.

ALL VOLTAGES EXCEPT HEATERS ARE MEASURED FROM SOCKET CONTACTS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES ARE MEASURED DIRECTLY ACROSS SOCKET CONTACTS.

| SYM | DESCRIPTION |
|---|---|
| SH | SHELL |
| H | HEATER |
| HT | HEATER TAP |
| P | PLATE |
| DP | DIODE PLATE |
| G | CONTROL GRID |
| Go | OSC. GRID. |
| S | SCREEN |
| SU | SUPPRESSOR |
| K | CATHODE |
| NC | NO CONNECTION |

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

MODEL 6B-122

ALLIED RADIO CORP.

## ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third, etc.

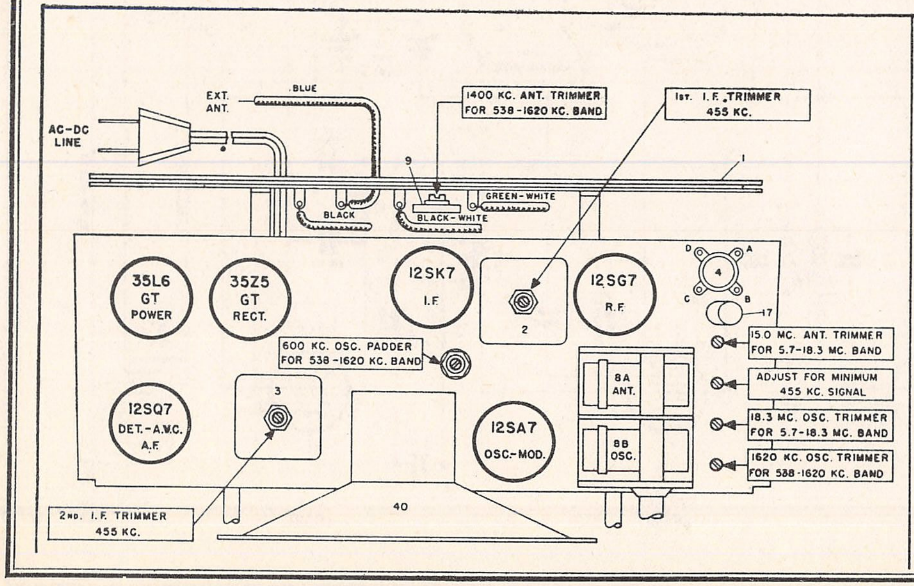
Before starting alignment:

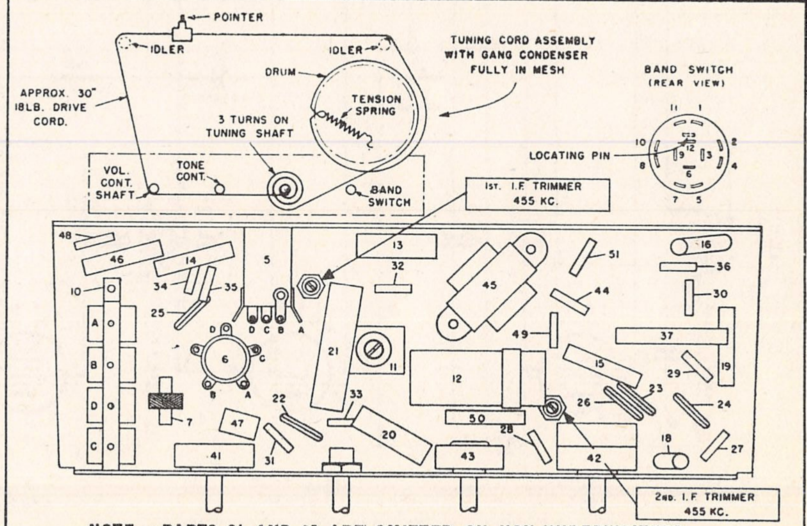
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Place loop antenna in the same position it will be in when set is in the cabinet.

| Steps | Place band switch for operation on: | Set receiver dial to: | TEST OSCILLATOR |  |  | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|---|
|  |  |  | Adjust test oscillator frequency to: | Use dummy antenna in series with output of test oscillator consisting of | Attach output of test oscillator to: |  |
| 1 | I.F. alignment use any band position. | Any point where no interfering signal is received | Exactly 455 K.C. | 0.2 Mfd. condenser | High side to rear stator plates of tuning condenser. Low side to frame of condenser through .01 Mfd. condenser | Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output. |
| 2 | 1620 to 538 K.C. Band | Rotate gang condenser to Maximum Capacity | Exactly 455 K.C. | .00025 Condenser | High side to BLUE Antenna Lead. Low side to chassis through a .01 mfd. condenser. | Adjust R.F. coil trimmer for **minimum** 455 K.C. signal. |
|  |  | Exactly 1620 K.C. | Exactly 1620 K.C. |  |  | Adjust 1620 K.C. oscillator trimmer for maximum output. |
|  |  | Approx. 1400 K.C. | Approx. 1400 K.C. |  |  | While rocking gang condenser adjust 1400 K.C. loop trimmer for maximum output. |
|  |  | Approx. 600 K.C. | Approx. 600 K.C. |  |  | While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output. |
| 3 | 5.7 to 18.3 M.C. Band | Exactly 18.3 M.C. | Exactly 18.3 M.C. | 400 Ohm carbon resistor |  | Adjust 18.3 M.C. oscillator trimmer for maximum output. |
|  |  | Approx. 15 M.C. | Approx. 15 M.C. | 400 Ohm carbon resistor |  | While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output. |


AC-DC LINE
EXT. ANT.
BLUE
1400 KC. ANT. TRIMMER FOR 538-1620 KC. BAND
1st. I.F. TRIMMER 455 KC.
1
9
BLACK
GREEN-WHITE
BLACK-WHITE
35L6 GT POWER
35Z5 GT RECT.
12SK7 I.F.
2
12SG7 R.F.
4
D
A
C
B
17
15.0 MC. ANT. TRIMMER FOR 5.7-18.3 MC. BAND
600 KC. OSC. PADDER FOR 538-1620 KC. BAND
ADJUST FOR MINIMUM 455 KC. SIGNAL
8A ANT.
8B OSC.
18.3 MC. OSC. TRIMMER FOR 5.7-18.3 MC. BAND
1620 KC. OSC. TRIMMER FOR 538-1620 KC. BAND
12SQ7 DET.-A.V.C. A.F.
3
12SA7 OSC.-MOD.
40
2nd. I.F. TRIMMER 455 KC.


POINTER
IDLER
IDLER
DRUM
TUNING CORD ASSEMBLY WITH GANG CONDENSER FULLY IN MESH
TENSION SPRING
APPROX. 30" 18LB. DRIVE CORD.
3 TURNS ON TUNING SHAFT
TONE CONT.
VOL. CONT. SHAFT
BAND SWITCH
BAND SWITCH (REAR VIEW)
LOCATING PIN
1st. I.F. TRIMMER 455 KC.
48
46
14
5
13
32
45
51
16
36
30
10
34
35
A
B
C
D
25
6
21
11
49
44
37
19
12
15
29
23
26
24
22
33
7
47
31
20
50
28
43
42
18
27
41
2nd. I.F. TRIMMER 455 KC.

NOTE — PARTS 21 AND 32 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS, SEE WIRING DIAGRAM

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## ALLIED RADIO CORP.

## PARTS LIST

| Illus. No. | Part No. | Part Name | Description |
|---|---|---|---|
| 1 | 20E105 | Coil | Antenna Loop |
| 2 | 20E21 | Coil | 1st I. F. Transformer |
| 3 | 20E22 | Coil | 2nd I. F. Transformer |
| 4 | 20E72 | Coil | Antenna |
| 5 | 20E102 | Coil | Oscillator, Broadcast Band |
| 6 | 20E103 | Coil | Oscillator, Short Wave Band |
| 7 | 2E19 | Coil | R. F. Choke |
| 8 | 24E9 | Condenser | Tuning, 2 gang with pulley |
| 9 | 24E3 | Capacitor | Trimmer, 2-40 MMF (On Loop) |
| 10 | 24E15 | Capacitor | Trimmer, 4 Gang Strip |
| 11 | 24E16 | Capacitor | Padder, 200-600 MMF. |
| 12 | 25E6 | Capacitor | 50-50 Mfd. 150 Volt Dry Electrolytic |
| 13 | 23E216 | Capacitor | Tubular, .05 Mfd.—200 Volt |
| 14 | 23E211 | Capacitor | Tubular, .01 Mfd.—200 Volt |
| 15 | 23E416 | Capacitor | Tubular, .05 Mfd.—400 Volt |
| 16 | 23E411 | Capacitor | Tubular, .01 Mfd.—400 Volt |
| 17 | 23E408 | Capacitor | Tubular, .005 Mfd.—400 Volt |
| 18 | 23E208 | Capacitor | Tubular, .005 Mfd.—200 Volt |
| 19 | 23E411 | Capacitor | Tubular, .01 Mfd.—400 Volt |
| 20 | 23E205 | Capacitor | Tubular, .002 Mfd.—200 Volt |
| 21 | 23E421 | Capacitor | Tubular, .2 Mfd. 400 Volt (Und. App'd Only) |
| 22 | 23E37 | Capacitor | Mica, .00005 Mfd. |
| 23 | 23E39 | Capacitor | Mica, .0001 Mfd. |
| 24 | 23E39 | Capacitor | Mica, .0001 Mfd. |
| 25 | 23E42 | Capacitor | Mica, .00025 Mfd. |
| 26 | 23E42 | Capacitor | Mica, .00025 Mfd. |
| 27 | 27E335 | Resistor | Carbon, 3.3 Megohm, 1/3 Watt |
| 28 | 27E335 | Resistor | Carbon, 3.3 Megohm, 1/3 Watt |
| 29 | 27E474 | Resistor | Carbon, 470,000 Ohm, 1/3 Watt |
| 30 | 27E474 | Resistor | Carbon, 470,000 Ohm, 1/3 Watt |
| 31 | 27E224 | Resistor | Carbon, 220,000 Ohm, 1/3 Watt |
| 32 | 27E224 | Resistor | Carbon, 220,000 Ohm, 1/3 Watt (Und. App'd Only) |
| 33 | 27E223 | Resistor | Carbon, 22,000 Ohm, 1/3 Watt |
| 34 | 27E103 | Resistor | Carbon, 10,000 Ohm, 1/3 Watt |
| 35 | 27E822 | Resistor | Carbon, 8,200 Ohm, 1/3 Watt |
| 36 | 27E151 | Resistor | Carbon, 150 Ohm, 1/3 Watt |
| 37 | 27E102-3 | Resistor | Carbon, 1,000 Ohm, 1 Watt |
| 38 |  | Resistor | 230 Volt Extension Line Cord Used Only in in Models Not Having Common Ground |
| 39 |  | Resistor | 125 Volt Extension Line Cord Used Only in Models Not Having Common Ground |
| 40 | 1E1 | Speaker | Elliptical Shape 4" x 6" |
| 41 | 29E8 | Switch | Band |
| 42 | 28E7 | Resistor | Volume Control with S.P.S.T. Switch |
| 43 | 28E8 | Resistor | Tone Control |
| 44 | 27E101-2 | Resistor | Carbon, 100 Ohm, 1/2 Watt |
| 45 | 22E8 | Transformer | Output, Speaker |
| 46 | 23E211 | Capacitor | Tubular, .01 Mfd., 200 Volt |
| 47 | 23E2000 | Capacitor | Mica, .0021 Mfd. |
| 48 | 27E560 | Resistor | Carbon, 56 Ohm, 1/3 Watt |
| 49 | 27E471 | Resistor | Carbon, 470 Ohm 1/3 Watt |
| 50 | 23E211 | Capacitor | Tubular, .01 Mfd. 200 Volt |
| 51 | 27E470-2 | Resistor | Carbon 47 Ohm, 1/2 Watt |

## MISCELLANEOUS PARTS

| Part No. | Part Name | Description |
|---|---|---|
| 40E1 | Bulb | 6-8 Volt .150 Amp. Dial light, No. 47 |
| 7E100 | Cabinet | Wood Table Model |
| 7E61 | Cabinet Back | For Wood Table Model |
| 65E2 | Dial Cord Spring | Tension Spring |
| 4E1 | Dial Cord | 36" of 18 lb. Drive Cord |
| 68E1 | Dial Shaft | Drive Shaft |
| 19E3 | Dial Shaft Bearing | Bearing for Drive Shaft |
| 12E103-F10 | Dial Shaft Washer | "C"Retainer Washer for Drive Shaft |
| 20E65 | Dial Back Plate | Back Plate Assem. less Calibrated Scale |
| 36E28-1 | Dial Scale | Calibrated Glass Scale |
| 32E4 | Dial Scale Clip | For Mounting Dial Scale |
| 35E13 | Dial Pointer | Dial Indicator |
| 9E5 | Dial Crystal |  |
| 37E21-10 | Knob | Marked "OFF-ON-VOLUME" for Wood Table Cabt. |
| 37E21-11 | Knob | Marked "TONE" for Wood Table Cabt. |
| 37E21-12 | Knob | Marked "TUNING" for Wood Table Cabt. |
| 37E21-13 | Knob | Marked "SW-BC" for Wood Table Cabt. |

## OUTSIDE AERIAL

A 50 TO 75 FOOT AERIAL must be connected to the receiver WHEN TUNING FOR SHORT WAVE STATIONS or when the volume of 538-1620 KC band stations is not satisfactory. Attach this external aerial to the blue lead coming out of the rear of the chassis.

WARNING—DO NOT ATTACH A GROUND TO THE RADIO—ANY EXTERNAL GROUND CONNECTION TO ANY METAL PART OF THE CHASSIS WILL CAUSE A SHORT AND POSSIBLE DAMAGE.

## 5.7 - 18.3 M.C. BAND
## OPERATING INSTRUCTIONS

BE SURE TO ATTACH A REGULAR AERIAL TO BLUE ANTENNA LEAD COMING OUT OF REAR OF CHASSIS WHEN TUNING FOR SHORT WAVE STATIONS.

TURN WAVE BAND SWITCH KNOB to the left hand position. Use section of dial that is calibrated from 5.7 - 18.3 M.C.

MODELS 6B-155, 6B-156
MODEL 5B-171

## ALLIED RADIO CORP.

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

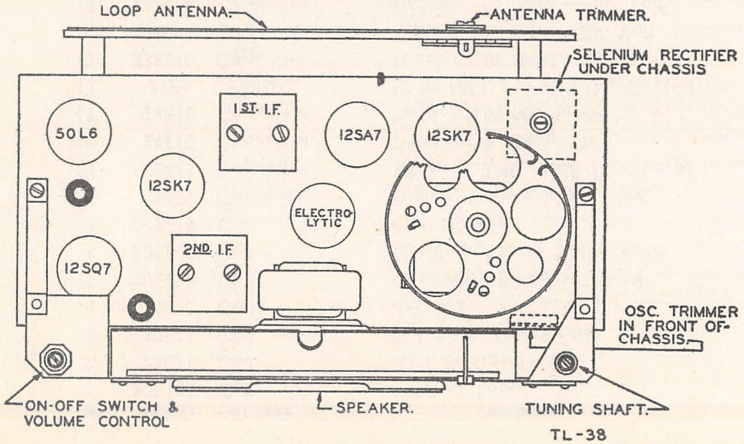
The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

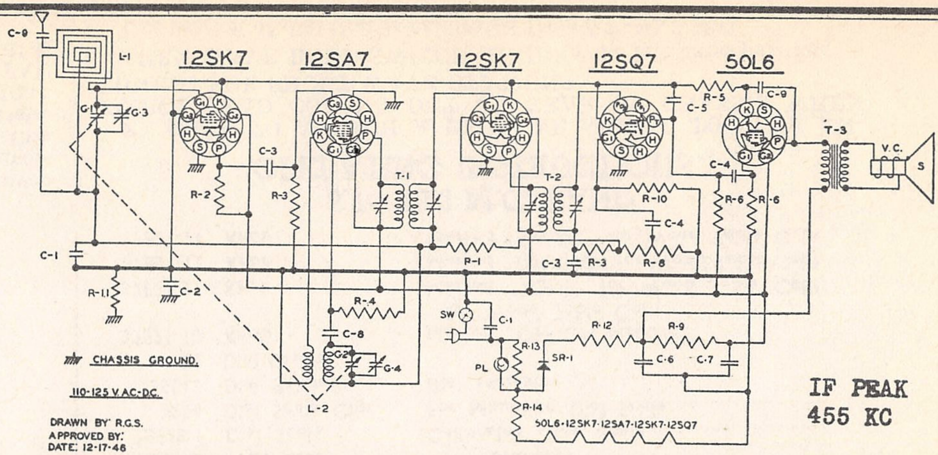
SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

TUBE AND TRIMMER LOCATION.


LOOP ANTENNA
ANTENNA TRIMMER.
SELENIUM RECTIFIER UNDER CHASSIS
50L6
1ST. I.F.
12SA7
12SK7
12SK7
ELECTROLYTIC
12SQ7
2ND. I.F.
OSC. TRIMMER IN FRONT OF CHASSIS
ON-OFF SWITCH & VOLUME CONTROL
SPEAKER.
TUNING SHAFT.

TL-38


C-9
L-1
12SK7
12SA7
12SK7
12SQ7
50L6
G-1
G-3
C-3
R-2
R-3
T-1
T-2
R-10
C-4
R-5
C-5
C-9
T-3
V.C.
S
R-6
R-6
C-1
R-1
C-3
R-3
R-8
R-11
C-2
R-4
C-8
G-2
G-4
L-2
SW
C-1
R-12
R-9
R-13
SR-1
C-6
C-7
PL
R-14
50L6-12SK7-12SA7-12SK7-12SQ7
CHASSIS GROUND.
110-125 V AC-DC.

IF PEAK
455 KC

DRAWN BY: R.G.S.
APPROVED BY:
DATE: 12-17-46

| PART NO. | | DESCRIPTION. | PART NO. | | DESCRIPTION. | PART NO. | | DESCRIPTION. |
|---|---|---|---|---|---|---|---|---|
| IR-23 | R-1 | 3.9 MEG. RESISTOR 1/2W. 20 | MC-5 | C-5 | .0005 MFD MICA. CONDENSER. | GC-2 | G-1<br>G-2 | GANG CONDENSER |
| IR-22 | R-2 | 3900 Ω RESISTOR. 1/2 W. 10 | EC-10 | C-6<br>C-7 | 40MFD<br>40MFD 150V. ELECTROLYTIC | | | |
| IR-10 | R-3 | 47M Ω RESISTOR. 1/2W. 20 | MC-4 | C-8 | .00005MFD. MICA. CONDENSER | TC-7 | G-3 | ANT TRIMMER CONDENSER. |
| IR-9 | R-4 | 22M Ω RESISTOR 1/2 W. 20 | PC-7 | C-9 | .01MFD CONDENSER 400V | TC-6 | G-4 | OSC. TRIMMER CONDENSER. |
| IR-14 | R-5 | 150 Ω RESISTOR 1/2 W. 20 | LO-9 | L-2 | OSC COIL | | SW. | SWITCH ON VOLUME CONTROL |
| IR-11 | R-6 | 470M Ω RESISTOR 1/2 W. 20 | CO-1 | P | LINE CORD. | TU-25 | | 2/12SK7-12SA7-12SQ7<br>50L6 |
| VC-4 | R-8 | 1MEG. VOLUME CONTROL | PB-1 | PL | PILOT LITE #47 | | | |
| IR-25 | R-9 | 2000 Ω RESISTOR. 1 W. 10 | LI-1 | T1 | INPUT I.F TRANSFORMER | | | |
| IR-13 | R-10 | 2.MEG Ω RESISTOR. 1/2W. 20 | LI-2 | T2 | OUTPUT IF TRANSFORMER | WR-4 | R-13<br>R-14 | 30 Ω<br>90 Ω 3W. 5% |
| IR-20 | R-11 | 220M Ω RESISTOR 1/2 W 20 | LL-1 | L1 | LOOP ANTENNA | SR-1 | SR-1 | SELENIUM RECTIFIER |
| IR-35 | R-12 | 75 Ω RESISTOR 2 W. 10 | SPK-5 | T3<br>VC<br>S | SPK TRANSFORMER<br>VOICE COIL<br>PM SPEAKER | | | |
| PC-5 | C-1 | .05 MFD. CONDENSER 400 V. | | | | | | |
| PC-8 | C-2 | .1 MFD. CONDENSER. 400 V. | | | | | | |
| MC-2 | C-3 | .0001MFD. MICA. CONDENSER. | | | | | | |
| PC-10 | C-4 | .005 MFD. CONDENSER. 400 V | | | | | | |

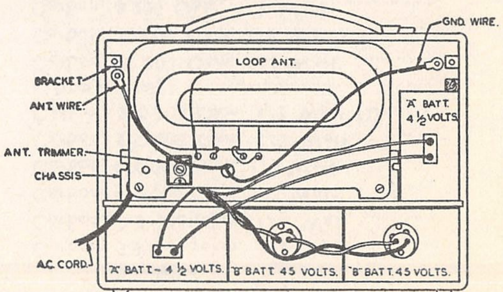
Model
5B171

To replace batteries, loosen and remove the two screws at the upper left and right hand corners of the cabinet back. Remove the back and pull out the plug from each battery. Never pull on the wires connected to the plugs as they may break. Always grasp the plug form between the fingers, or use a flat blade to pry out the plug. Observe with care the position of the batteries and plugs when replacing. Be sure that batteries and plugs are replaced as shown in the "Battery Location" diagram. (Figure No. 1)

After the batteries have been installed, replace the back, making sure that the two washers riveted to the bottom of the back, fit into the slots near the bottom edge of the cabinet. Also make sure that the two wires from the loop antenna are held in place between the top brackets of the cabinet and the back by the two fastening screws.

| Mfgr. | Volts | Type No. |
|---|---|---|
| Burgess | 45 "B" | M30 |
| General | 45 "B" | W30B |
| Bright Star | 45 "B" | 3033 |
| Usalite | 45 "B" | 640 |
| Rayovac | 45 "B" | P7830 |
| Eveready | 45 "B" | 482 |
| Burgess | 4½ "A" | G3 |
| General | 4½ "A" | 3H3 |
| Bright Star | 4½ "A" | 361 |
| Usalite | 4½ "A" | 683 |
| Rayovac | 4½ "A" | P83A |
| Eveready | 4½ "A" | 746 |

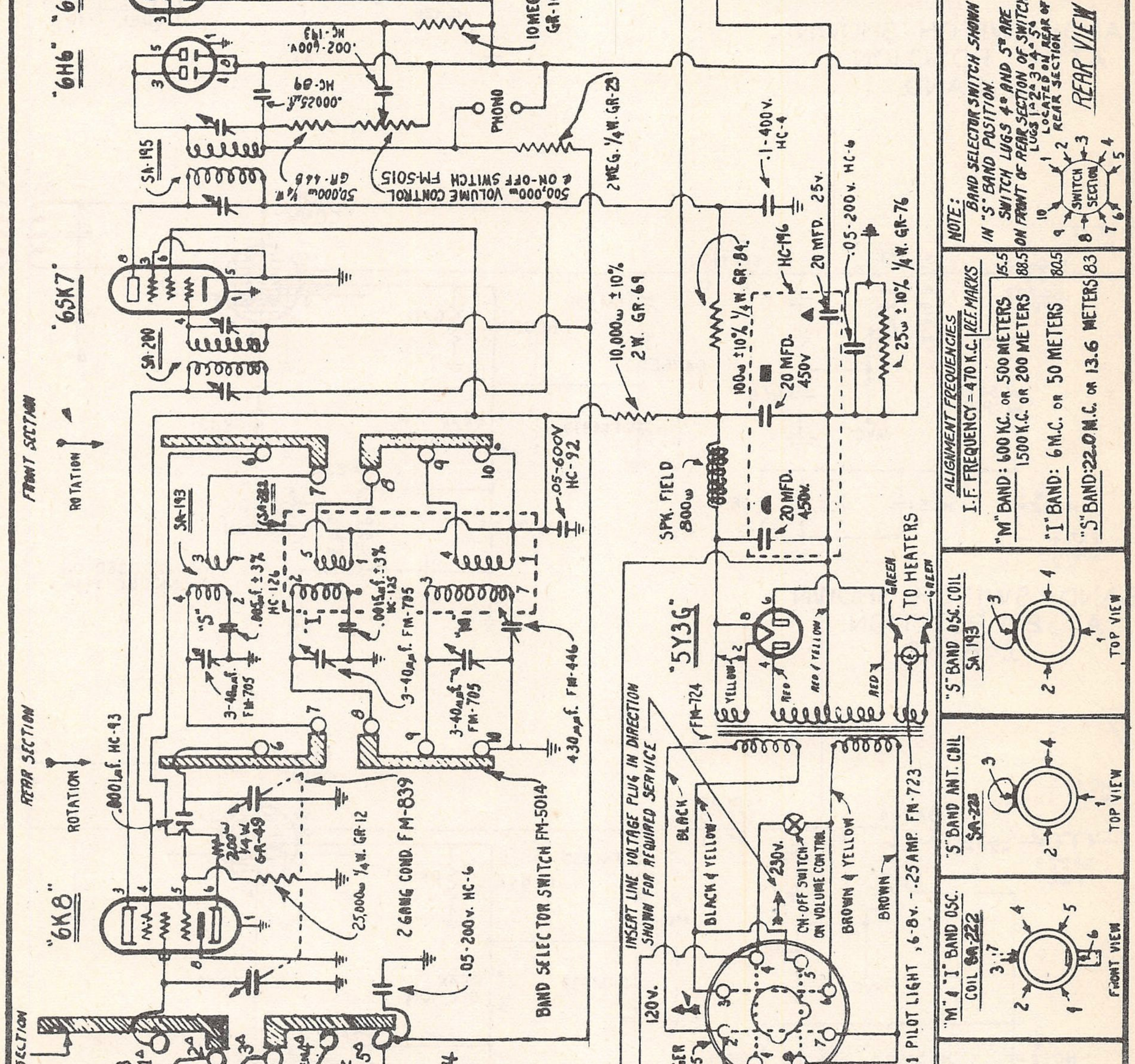
Model 5B171


GND. WIRE.
LOOP ANT.
BRACKET
ANT WIRE
ANT. TRIMMER
CHASSIS
"A" BATT 4½ VOLTS
A.C. CORD
"A" BATT - 4½ VOLTS.
"B" BATT 45 VOLTS.
"B" BATT 45 VOLTS.

BATTERY LOCATION.
FIGURE-1

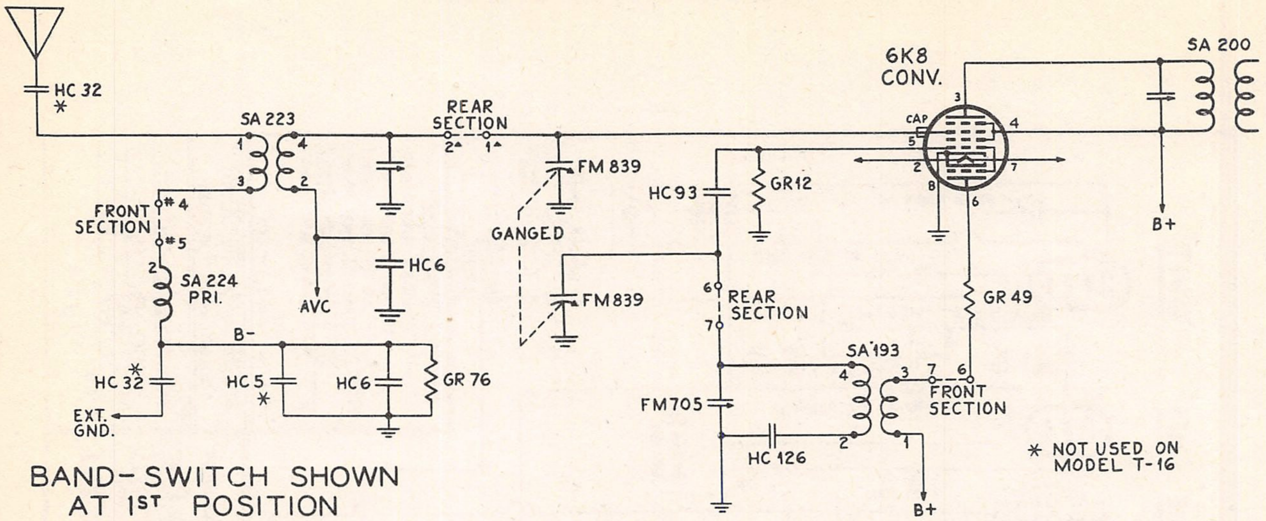
MODEL T-16

# ANDREA RADIO CORP.


ANDREA RADIO CORP.
LONG ISLAND CITY, NEW YORK
NAME: WIRING DIAGRAM "T6" REG.
MODEL NO. "T16"
DR. BY: J.R.
DATE: 12/9/46
PART NO. XD-4
ALIGNMENT FREQUENCIES
I.F. FREQUENCY = 470 K.C.
REF. MARKS
"M" BAND: 600 K.C. OR 500 METERS 15.5
1500 K.C. OR 200 METERS 88.5
"I" BAND: 6 M.C. OR 50 METERS 80.5
"S" BAND: 22.0 M.C. OR 13.6 METERS 83
NOTE: BAND SELECTOR SWITCH SHOWN IN "S" BAND POSITION. SWITCH LUGS 4ª AND 5ª ARE ON FRONT OF REAR SECTION OF SWITCH. LUGS 1ª 2ª 3ª 4ª 5ª LOCATED ON REAR OF REAR SECTION
SWITCH SECTION
REAR VIEW
ALIGNING TRIMMERS LOCATION
"M" BAND OSC. SERIES TRIMMER
"M" BAND OSC. SHUNT TRIMMER
"I" BAND OSC. SHUNT TRIMMER
"S" BAND OSC. SHUNT TRIMMER
"S" BAND ANT. SHUNT TRIMMER
"I" BAND ANT. SHUNT TRIMMER
FRONT OF CHASSIS, TOP VIEW
DRIVE DISC
ALIGNMENT SCALE
WIRE POINTER
CHASSIS
6½" SPK. FM-727
"6V6GT"
"6SF5"
"6H6"
"6SK7"
"6K8"
"5Y3G"
.01-1000V. HC-98
250Ω ±10% 1W. GR-64
FM-5016 TONE CONTROL
.05-600V HC-92
.006-600 HC-60
240,000Ω ¼W. GR-46
10 MEG. ¼W. GR-108
.002-600V. HC-193
.00025μf. HC-89
PHONO
2 MEG. ¼W. GR-23
50,000Ω ¼W. GR-44B
500,000Ω VOLUME CONTROL & ON-OFF SWITCH FM-5015
.1-400V. HC-4
SA-195
SA-200
20 MFD. 25V.
.05-200V. HC-6
25Ω ±10% ¼W. GR-76
HC-196
100Ω ±10% ¼W. GR-84
10,000Ω ±10% 2W. GR-69
20 MFD. 450V
SPK. FIELD 800Ω
FRONT SECTION
ROTATION
REAR SECTION
SA-193
SA-222
.05-600V HC-92
"S"
"I"
"M"
.005μf. ±3% HC-126
.0015μf. ±3% HC-125
3-40μμf. FM-705
3-40μμf. FM-705
430μμf. FM-446
BAND SELECTOR SWITCH FM-5014
.0001μf. HC-43
200Ω ¼W. GR-49
25,000Ω ¼W. GR-12
2 GANG COND. FM-839
.05-200V. HC-6
SA-223
SA-221
LOOP SA-224
RED
BLACK
GREEN
BLUE
BROWN
G
FM-724
INSERT LINE VOLTAGE PLUG IN DIRECTION SHOWN FOR REQUIRED SERVICE
YELLOW
RED
RED & YELLOW
GREEN
TO HEATERS
BLACK
BLACK & YELLOW
BROWN & YELLOW
BROWN
230V.
120V.
ON-OFF SWITCH ON VOLUME CONTROL
1 PILOT LIGHT, 6-8V. -.25 AMP. FM-723
VOLTAGE CHANGER SOCKET FM-725
120V. & 230V. A.C. ONLY
"S" BAND OSC. COIL SA-193 TOP VIEW
"S" BAND ANT. COIL SA-223 TOP VIEW
"M" & "I" BAND OSC. COIL SA-222 FRONT VIEW
"I" BAND ANT. COIL SA-221 BOTTOM VIEW

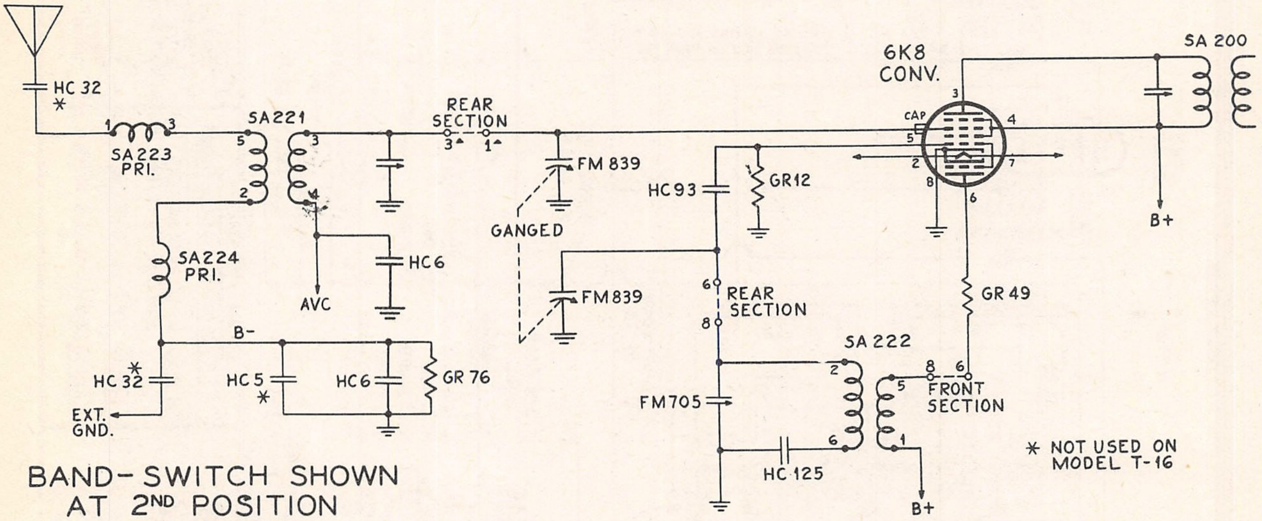
**MODEL T-16**

## ANDREA RADIO CORP.


6K8
CONV.
SA 200
HC 32
SA 223
REAR SECTION
2
1
CAP
FM 839
HC 93
GR12
FRONT SECTION
#4
#5
HC6
GANGED
SA 224 PRI.
AVC
FM839
REAR SECTION
6
7
GR 49
B-
SA 193
B+
HC 32
HC 5
HC 6
GR 76
FM705
FRONT SECTION
EXT. GND.
HC 126

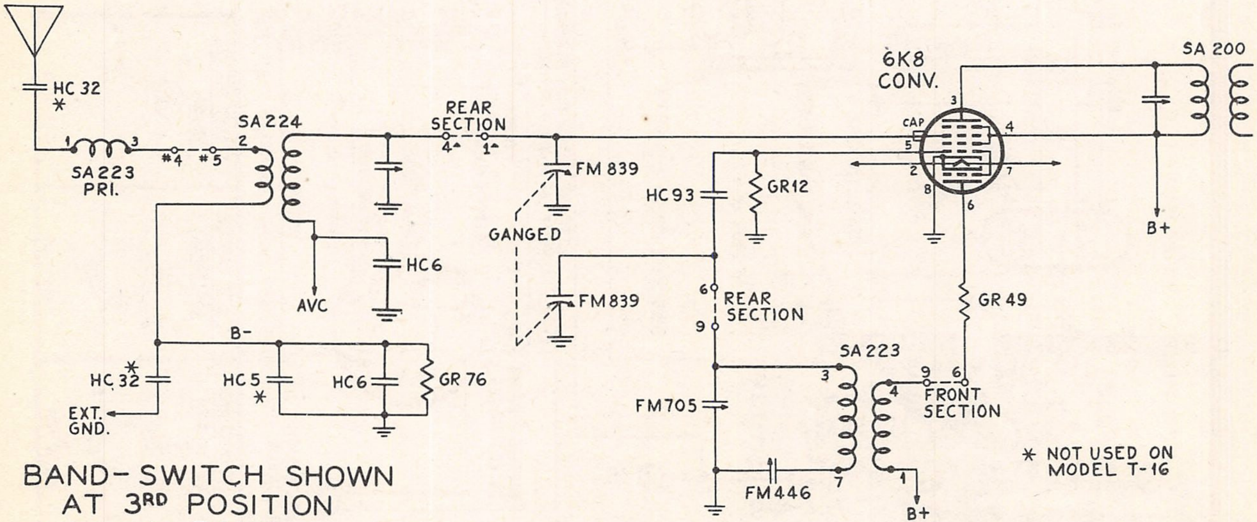
BAND-SWITCH SHOWN
AT 1ST POSITION
S BAND

* NOT USED ON MODEL T-16


6K8
CONV.
SA 200
HC 32
SA 221
SA 223 PRI.
REAR SECTION
3
1
CAP
FM 839
HC 93
GR12
HC6
GANGED
SA224 PRI.
AVC
FM839
REAR SECTION
6
8
GR 49
B-
SA 222
B+
HC 32
HC 5
HC6
GR 76
FM705
FRONT SECTION
EXT. GND.
HC 125

BAND-SWITCH SHOWN
AT 2ND POSITION
I BAND

* NOT USED ON MODEL T-16


6K8
CONV.
SA 200
HC 32
SA 224
SA 223 PRI.
#4
#5
REAR SECTION
4
1
CAP
FM 839
HC 93
GR12
HC6
GANGED
AVC
FM839
REAR SECTION
6
9
GR 49
B-
SA 223
B+
HC 32
HC 5
HC6
GR 76
FM705
FRONT SECTION
EXT. GND.
FM446

BAND-SWITCH SHOWN
AT 3RD POSITION
M BAND

* NOT USED ON MODEL T-16

**FOR OPERATION ON AC - LINE VOLTAGES OF 105-125, 210-240, 50/60 CYCLES**

**WARNING!** Always remove the line plug from the electric outlet before removing the chassis from the cabinet. Also - connect the speaker plug to the receiver before switching on the power. Otherwise, damage will result.

**I. F. REALIGNMENT GENERALLY SUFFICIENT:** As a rule, it is not necessary to readjust the short wave oscillator and antenna shunt and series trimmers unless they have been tampered with, or require replacing. Consequently, careful realignment of the I. F. system is all that requires attention, ordinarily. Before making any adjustments, tune in one particular station and note the quality of reception so that you can check the improvement after the I. F. system has been realigned.

**USE SIGNAL GENERATOR AND OUTPUT VOLTMETER:** For realigning, use a signal generator to supply a modulated carrier of 470, 600, 1,500, 6,000, and 22,000 kc., plus an output voltmeter. Alignment by any other means is not recommended. Your service test generator should be checked frequently for change in calibration by getting a zero beat between the generator and broadcast stations of known frequency.

**SPECIAL NOTES:** Before proceeding to align the antenna and oscillator circuits bear in mind that these circuits control the accuracy of the main tuning dial calibration particularly the oscillator trimmers. As the main dial is a part of the cabinet, servicing of the chassis can be made without the use of this dial by using the reference alignment scale 0 to 100 divisions attached permanently to the gang condenser drive drum.

The table below indicates the reference dial settings for the required alignment frequencies. You will note that the chassis contains a self-tapping screw located just below the gang condenser drum, the purpose of which, is to enable you to wrap a piece of bare wire and thereby form a pointer to the reference scale. Set the pointer at the zero marking on the reference scale with the gang condenser plates fully meshed (all capacity in) after which rotate the drum to the correct reference setting for proper circuit alignment and procedure in accordance with the Band alignment instruction. Remove reference pointer before installing in cabinet.

| ALIGNMENT FREQ. KC. | REFERENCE DIAL SETTING | BAND |
|---|---|---|
| 1,500 | 88.5 | "M" |
| 600 | 15.5 | "M" |
| 6,000 | 80.5 | "I" |
| 22,000 | 83 | "S" |

**NOTES ON REALIGNING THE BANDS:** During the aligning measurements, the output of the signal generator must be kept low so that it will not cause the AVC circuit in the set to function. In other words, when the volume control on the set is turned to maximum, the output should not show more than .5 volt across the voice coil, or 50 milliwatts in the plate circuit of the output tube.

Generally, at frequencies above 7,000 kc., the signal generator frequency will change with each adjustment of the generator output attenuator control. Hence, the receiver must be retuned each time the attenuator is adjusted.

Some generators cause trouble by direct radiation to the set at frequencies above 8 mc. Experience indicates that more accurate alignment is possible when the generator is separated by several feet from the receiver under test, in order to eliminate this direct pickup.

**470-KC. I. F. ALIGNMENT:** Connect the high-potential lead of the signal generator in series with a .1 mfd. condenser to the grid of the 6K8 tube. Set the generator at 470 kc., and adjust the output until a small deflection is obtained in the output meter. Adjust the trimmers condensers on the top of the 1st and 2nd I.F. transformers (see circuit diagram) for maximum deflection on the output meter. After this adjustment has been made, disconnect the generator from the grid of the 6K8 tube. This completes the alignment of the I.F. system.

**"S" BAND ALIGNMENT:**

Connect the high-potential lead from the generator in series with a 400 ohm resistor to the antenna terminal (marked A) on rear of loop, and the low side of the generator to the ground terminal (marked G) on rear of loop. Put the wave band switch at the S position, adjust the generator to 22,000 kc., and the receiver reference scale to 22.0 mc. Vary the S band oscillator shunt trimmer slowly from maximum to minimum. You will hear the signal at two settings of the trimmer, one nearer the minimum capacity (plates open) and one near the maximum capacity (plates closed). The setting near minimum capacity is correct, because the setting near maximum capacity is at the image frequency.

Now adjust the antenna shunt trimmer. During this adjustment, be sure to rock the gang condenser back and forth SLOWLY each time you make an adjustment of the trimmer. As you continue to do this, you will reach a point where further turning of the trimmer screw, while rocking the gang condenser, will not increase the signal response. This is the correct adjustment.

A simple method of determining if the receiver and generator are tuned for correct alignment is as follows:

Set the signal generator at 22,000 kc. and tune the receiver slowly from 21,000 to 23,000 kc. Two signals should be heard, 940 kc. apart. One will be lower in frequency than 22,000 kc. and the other will be higher. The higher frequency, as indicated on the dial, is the correct aligning frequency, and the lower one is the image.

As a further check, leave the receiver tuned to the higher frequency. Very slowly, increase the generator frequency from 22,000 kc. to about 23,000 kc. A signal will be heard near 23,000 kc. if all the settings are correct for alignment. If there is no signal, the original settings were on the image frequency. In that case, you must start again from the beginning, in order to be sure of accurate results.

After you have found the correct settings, the image, or lower, frequency response on the receiver will always sound weaker than the true signal.

**"I" BAND ALIGNMENT:** With the signal generator connected in accordance with the preceding instructions, set the generator at 6,000 kc., turn the wave band switch to the I position, and adjust the gang reference scale to 6 mc., as set forth in the chart. Following the procedure just described, adjust the I band oscillator shunt trimmer for maximum signal response. Next, adjust the I band antenna shunt trimmer. Rock the gang condenser back and forth slowly as you adjust the trimmer, in accordance with the instructions for the S band adjustment. This completes the adjustment for the I band.

**"M" BAND ALIGNMENT:** Replace the 400-ohm resistor in the generator lead by a .00025 mfd. condenser. Set the generator at 1,500 kc., turn the wave band switch to the M position, and set the gang reference scale of the receiver at 1,500 kc., as set forth in the chart. Adjust the M band oscillator shunt trimmer for maximum signal response. Next, adjust the antenna shunt trimmer for maximum response.

This band must be aligned at 600 kc. also. Set the generator accordingly, and tune the receiver to 600 kc., as set forth in the chart. Adjust the M band oscillator series trimmer for maximum response. During this adjustment, be sure to rock the gang condenser for each small change of capacity of the series trimmer. When this adjustment has been completed, recheck the antenna adjustment at 1,500 kc. This completes the adjustment of the M band.

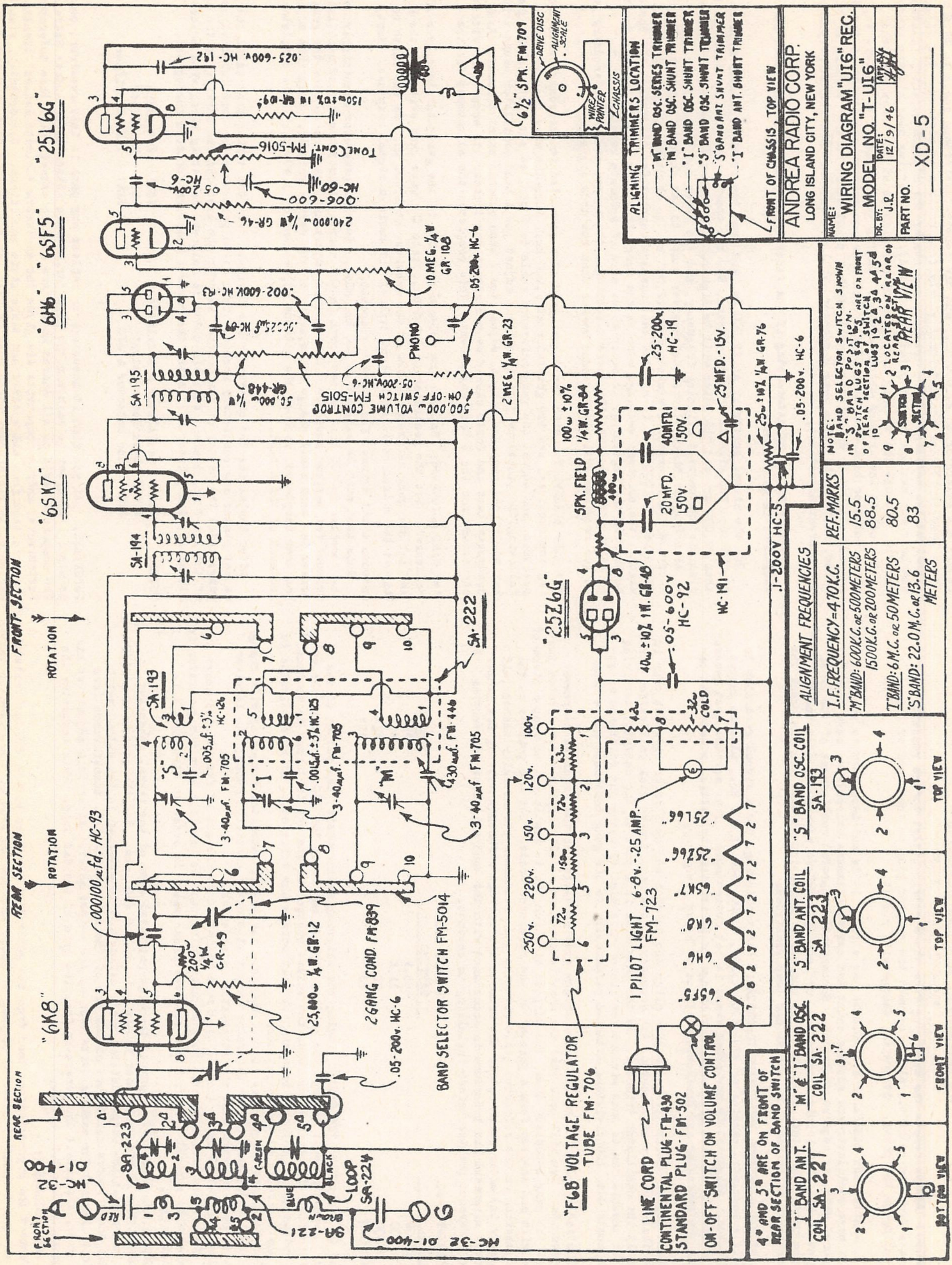
After installing the chassis in the cabinet, turn the tuning knob until the gang condenser plates are completely meshed. Then slide pointer along cord (without opening gang) until the center of the pointer is over the last diamond marking on the left side of the 2.5-7 mc. scale. When the above is followed correctly along with method of alignment, the pointer will match the correct scale calibration throughout.

| TUBES: | | | | |
|---|---|---|---|---|
| 6K8 | Oscillator & Modulator | | 6SF5 | 1st Audio |
| 6V6GT | Beam Power Output | | 5Y3G | Rectifier |
| 6H6 | 2nd Detector & AVC | | 6SK7 | I.F. Amplifier |

**IMPORTANT:** If you find it necessary to replace any part in this receiver, bear this in mind: In order to maintain the high performance standards of Andrea Radio receivers, the component parts on all Andrea models are held to exceedingly close tolerance limits. Furthermore, Andrea components are given the exclusive "Climate Sealed" treatment which protects them from all weather and temperature conditions. Consequently, standard Andrea Radio replacement parts must be used for all service work, for the substitution of ordinary stock items will result in inferior performance.

MODEL T-U16

## ANDREA RADIO CORP.


25L6G
6SF5
6H6
6SK7
6K8
25Z6G
.025-600V. HC-192
150Ω±10% 1W GR-109
6½" SPK. FM-709
DRIVE DISC
ALIGNMENT SCALE
WIRE POINTER
CHASSIS
TONE CONT. FM-5016
.05 200V HC-6
.006-600 HC-60
240,000Ω ½W GR-46
10 MEG. ¼W GR-108
.05-200V. HC-6
.002-600V. HC-193
.00025µf HC-69
PHONO
2 MEG. ¼W GR-23
50,000Ω ¼W GR-48
500,000Ω VOLUME CONTROL & ON-OFF SWITCH FM-5015
.05-200V. HC-6
SA-195
SA-194
.25-200V HC-19
100Ω ±10% ¼W GR-84
40MFD. 150V.
20MFD. 150V.
25MFD.-15V.
25Ω ±10% ¼W GR-76
.05-200V. HC-6
SPK. FIELD
.1-200V HC-5
HC-191
40Ω ±10% 1W GR-40
.05-600V HC-92
FRONT SECTION
ROTATION
REAR SECTION
SA-222
SA-193
.005µf ±3% HC-126
.001µf ±3% HC-125
"S"
"I"
"M"
3-40µµf FM-705
430µµf FM-446
.000100µf HC-93
200Ω ¼W GR-49
2GANG COND FM-839
25,000Ω ¼W GR-12
.05-200V. HC-6
BAND SELECTOR SWITCH FM-5014
SA-223
SA-221
LOOP SA-224
HC-32 DI-400
A
G
RED
BLUE
BROWN
GREEN
BLACK
"F6B" VOLTAGE REGULATOR TUBE FM-706
250V.
220V.
150V.
120V.
100V.
72Ω
150Ω
72Ω
63Ω
42Ω
32 COLD
1 PILOT LIGHT, 6-8V.-.25 AMP. FM-723
LINE CORD
CONTINENTAL PLUG-FM-430
STANDARD PLUG-FM-502
ON-OFF SWITCH ON VOLUME CONTROL
4a AND 5a ARE ON FRONT OF REAR SECTION OF BAND SWITCH
ALIGNING TRIMMERS LOCATION
"M" BAND OSC. SERIES TRIMMER
"M" BAND OSC. SHUNT TRIMMER
"I" BAND OSC. SHUNT TRIMMER
"S" BAND OSC. SHUNT TRIMMER
"S" BAND ANT. SHUNT TRIMMER
"I" BAND ANT. SHUNT TRIMMER
FRONT OF CHASSIS, TOP VIEW
ANDREA RADIO CORP.
LONG ISLAND CITY, NEW YORK
NAME: WIRING DIAGRAM "U16" REC.
MODEL NO. "T-U16"
DR. BY: J.R.
DATE: 12/9/46
PART NO. XD-5
NOTE: BAND SELECTOR SWITCH SHOWN IN "S" BAND POSITION. SWITCH LUGS 4a, 5a ARE ON FRONT OF REAR SECTION OF SWITCH. LUGS 1a, 2a, 3a, 4a, 5a LOCATED ON REAR OF FRONT SECTION.
REAR VIEW
ALIGNMENT FREQUENCIES
I.F. FREQUENCY=470K.C.
REF. MARKS
"M" BAND-600K.C. OR 500 METERS 15.5
1500K.C. OR 200 METERS 88.5
"I" BAND-6M.C. OR 50 METERS 80.5
"S" BAND-22.0M.C. OR 13.6 METERS 83
"S" BAND OSC. COIL SA-193 TOP VIEW
"S" BAND ANT. COIL SA-223 TOP VIEW
"M" & "I" BAND OSC. COIL SA-222 FRONT VIEW
"I" BAND ANT. COIL SA-221 BOTTOM VIEW

# ANDREA RADIO CORP.

100-120-150-220-250 40/60 CYCLES OR DC
FOR OPERATION ON AC OR DC, LINE VOLTAGES OF 100 TO 250

**WARNING!** Always remove the line plug from the electric outlet before removing the chassis from the cabinet. Also - connect the speaker plug to the receiver before switching on the power. Otherwise, damage will result.

**I. F. REALIGNMENT GENERALLY SUFFICIENT:** As a rule, it is not necessary to readjust the short wave oscillator and antenna shunt and series trimmers unless they have been tampered with, or require replacing. Consequently, careful realignment of the I. F. system is all that requires attention, ordinarily. Before making any adjustments, tune in one particular station and note the quality of reception so that you can check the improvement after the I. F. system has been realigned.

**USE SIGNAL GENERATOR AND OUTPUT VOLTMETER:** For realigning, use a signal generator to supply a modulated carrier of 470, 600, 1,500, 6,000, and 22,000 kc., plus an output voltmeter. Alignment by any other means is not recommended. Your service test generator should be checked frequently for change in calibration by getting a zero beat between the generator and broadcast stations of known frequency.

**SPECIAL NOTES:** Before proceeding to align the antenna and oscillator circuits bear in mind that these circuits control the accuracy of the main tuning dial calibration particularly the oscillator trimmers. As the main dial is a part of the cabinet, servicing of the chassis can be made without the use of this dial by using the reference alignment scale 0 to 100 divisions attached permanently to the gang condenser drive drum.

The table below indicates the reference dial settings for the required alignment frequencies. You will note that the chassis contains a self-tapping screw located just below the gang condenser drum, the purpose of which, is to enable you to wrap a piece of bare wire and thereby form a pointer to the reference scale. Set the pointer at the zero marking on the reference scale with the gang condenser plates fully meshed (all capacity in) after which rotate the drum to the correct reference setting for proper circuit alignment and procedure in accordance with the Band alignment instruction. Remove reference pointer before installing in cabinet.

| ALIGNMENT FREQ. KC. | REFERENCE DIAL SETTING | BAND |
|---|---|---|
| 1,500 | 88.5 | "M" |
| 600 | 15.5 | "M" |
| 6,000 | 80.5 | "I" |
| 22,000 | 83 | "S" |

**NOTES ON REALIGNING THE BANDS:** During the aligning measurements, the output of the signal generator must be kept low so that it will not cause the AVC circuit in the set to function. In other words, when the volume control on the set is turned to maximum, the output should not show morethan .5 volt across the voice coil, or 50 milliwatts in the plate circuit of the output tube.

Generally, at frequencies above 7,000 kc., the signal generator frequency will change with each adjustment of the generator output attenuator control. Hence the receiver must be retuned each time the attenuator is adjusted.

Some generators cause trouble by direct radiation to the set at frequencies above 8 mc. Experience indicates that more accurate alignment is possible when the generator is separated by several feet from the receiver under test, in order to eliminate this direct pickup.

**470 KC. I. F. ALIGNMENT:** Connect the high-potential lead of the signal generator in series with a .1 mfd. condenser to the grid of the 6K8 tube. Set the generator at 470 kc., and adjust the output until a small deflection is obtained in the output meter. Adjust the trimmer condensers on the top of the 1st and 2nd I. F. transformers (see circuit diagram) for maximum deflection on the output meter. After this adjustment has been made, disconnect the generator from the grid of the 6K8 tube. This completes the alignment of the I. F. system.

**"S" BAND ALIGNMENT:**

Connect the high-potential lead from the generator in series with a 400 ohm resistor to the antenna terminal (marked A) on rear of loop, and the low side of the generator to the ground terminal (marked G) on rear of loop. Put the wave band switch at the S position, adjust the generator to 22,000 kc., and the receiver to 22.0 mc. Vary the S band oscillator shunt trimmer slowly from maximum to minimum. You will hear the signal at two settings of the trimmer, one nearer the minimum capacity (plates open) and one near the maximum capacity (plates closed). The setting near minimum capacity is correct, because the setting near maximum capacity is at the image frequency.

Now adjust the antenna shunt trimmer. During this adjustment, be sure to rock the gang condenser back and forth slowly each time you make an adjustment of the trimmer. As you continue to do this, you will reach a point where further turning of the trimmer screw, while rocking the gang condenser, will not increase the signal response. This is the correct adjustment.

A simple method of determining if the receiver and generator are tuned for correct alignment is as follows:

Set the signal generator at 22,000 kc., and tune the receiver slowly from 21,000 to 23,000 kc. Two signals should be heard, 940 kc. apart. One will be lower in frequency than 22,000 kc. and the other will be higher. The higher frequency, as indicated on the dial, is the correct aligning frequency, and the lower one is the image.

As a further check, leave the receiver tuned to the higher frequency. Very slowly, increase the generator frequency from 22,000 kc. to about 23,000 kc.

A signal will be heard near 23,000 kc. if all the settings are correct for alignment. If there is no signal, the original settings were on the image frequency. In that case, you must start again from the beginning, in order to be sure of accurate results.

After you have found the correct settings, the image, or lower, frequency response on the receiver will always sound weaker than the true signal.

**"I" BAND ALIGNMENT:** With the signal generator connected in accordance with the preceding instructions, set the generator at 6,000 kc., turn the wave band switch to the I position, and adjust the dial to 6 mc. Following the procedure just described, adjust the I band oscillator shunt trimmer for maximum signal response. Next, adjust the I band antenna shunt trimmer. Rock the gang condenser back and forth slowly as you adjust the trimmer, in accordance with the instructions for the S band adjustment. This completes the adjustment for the I band.

**"M" BAND ALIGNMENT:** Replace the 400-ohm resistor in the generator lead by a .00025 mfd. condenser. Set the generator at 1,500 kc., turn the wave band switch to the M position, and set the dial of the receiver at 1,500 kc. Adjust the M band oscillator shunt trimmer for maximum signal response. Next adjust the antenna shunt trimmer for maximum response.

This band must be aligned at 600 kc. also. Set the generator accordingly, and tune the receiver to 600 kc. Adjust the M band oscillator series trimmer for maximum response. During this adjustment, be sure to rock the gang condenser for each small change of capacity of the series trimmer. When this adjustment has been completed, recheck the antenna adjustment at 1,500 kc. This completes the adjustment of the M band.

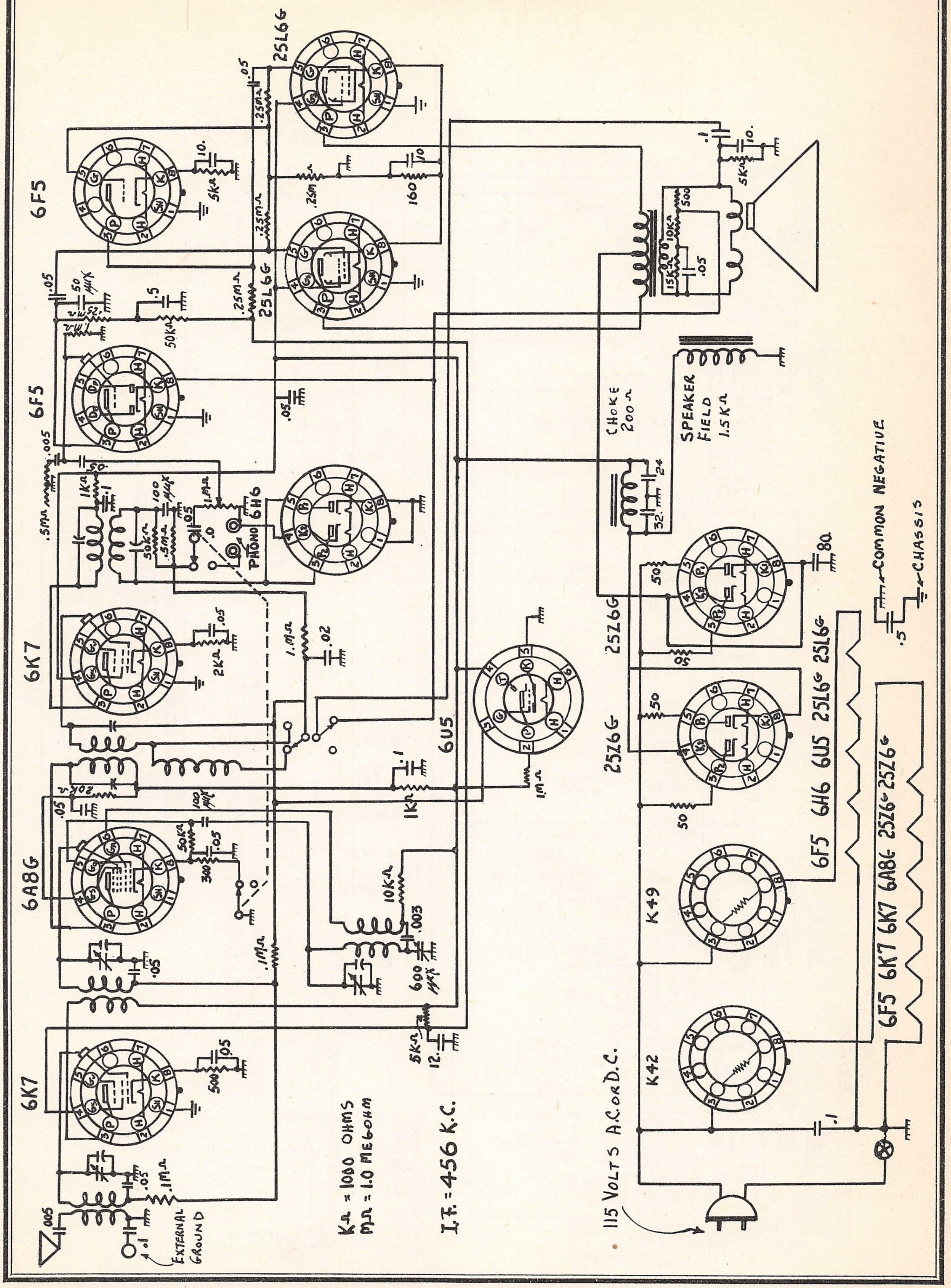
**TUBES:** The following tubes are required for this receiver:

| | | | |
|---|---|---|---|
| 6K8 | Oscillator and Modulator | 25L6G | Beam Power Output |
| 6SK7 | I. F. Amplifier | 25Z6G | Rectifier |
| 6H6 | 2nd Detector and AVC | F6B | Ballast Tube |
| 6SF5 | 1st Audio | | |

**IMPORTANT!** If you find it necessary to replace any part in this receiver, bear this in mind: In order to maintain the high performance standards of Andrea Radio receivers, the components parts on all Andrea models are held to exceedingly close tolerance limits. Furthermore, Andrea components are given the exclusive "Climate Sealed" treatment which protects them from all weather and temperature conditions. Consequently, standard Andrea Radio replacement parts must be used for all service work, for the substitution of ordinary, stock items will result in inferior performance.

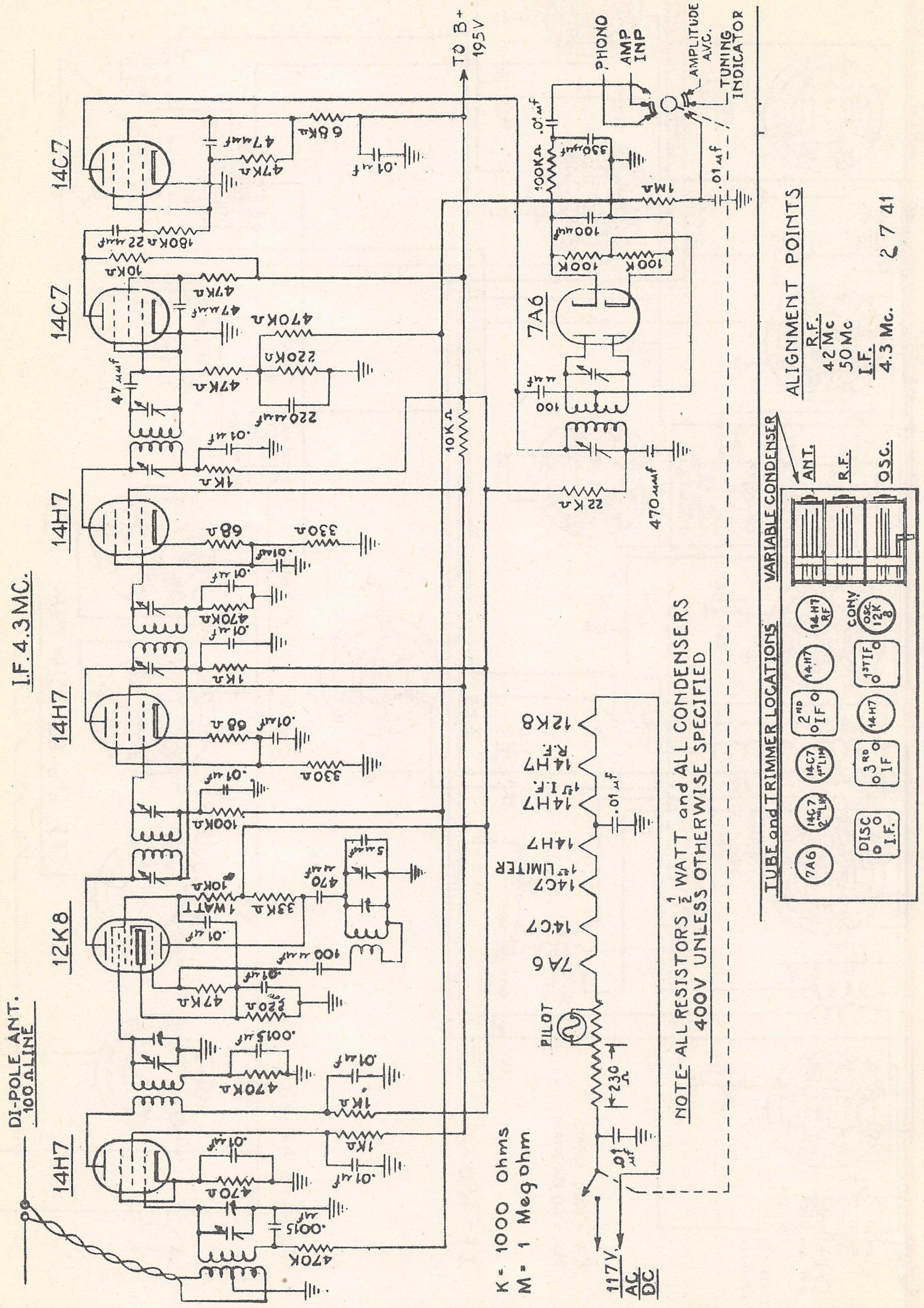
MODEL WQXR

## ANSLEY RADIO CORP.


25L6G
.05
.25MΩ
6F5
10.
5KΩ
.25MΩ
.25MΩ
10
160
.1
10.
5KΩ
500
10KΩ
15
.05
25L6G
.25MΩ
.05
50 MMF
.5
50KΩ
6F5
.05
.005
50.
1KΩ
.1
100 MMF
1.MΩ
.5MΩ
50KΩ
.5MΩ
.05
.0
PHONO
6H6
CHOKE 200Ω
SPEAKER FIELD 1.5KΩ
24
32.
80
COMMON NEGATIVE
CHASSIS
.5
6K7
.05
2KΩ
1.MΩ
.02
25Z6G
50
50
6U5
25Z6G
50
.1
1KΩ
1.MΩ
6F5 6H6 6U5 25L6G 25L6G
6A8G
.05
20KΩ
50KΩ
100 MMF
.05
300
10KΩ
.003
600 MMF
.05
.1MΩ
K49
6K7
.05
500
5KΩ
12.
K42
6F5 6K7 6K7 6A8G 25Z6G 25Z6G
.1
115 VOLTS A.C. or D.C.
KΩ = 1000 OHMS
MΩ = 1.0 MEGOHM
I.F. = 456 K.C.
.005
.1
EXTERNAL GROUND
.05
.1MΩ

**MODEL FM-4, FM Tuner**

## ANSLEY RADIO CORP.


14H7
12K8
14H7
14H7
14C7
14C7
7A6
DI-POLE ANT. 100 Ω LINE
I.F. 4.3 MC.
TO B+ 195V
PHONO
AMP INP
AMPLITUDE A.V.C.
TUNING INDICATOR
470KΩ
470Ω
.0015
.01 μf
1KΩ
.0005 μf
100 μμf
47KΩ
220Ω
10KΩ 1 WATT
33KΩ
470 μμf
5 μμf
100KΩ
68Ω
330Ω
10KΩ
22KΩ
470 μμf
47 μμf
220KΩ
220 μμf
180KΩ
22 μμf
68KΩ
100KΩ
100 μμf
1MΩ
PILOT
230 Ω
117V. AC DC
12K8
14H7 R.F.
14H7 1st I.F.
14H7
14C7 1st LIMITER
14C7
7A6
TUBE and TRIMMER LOCATIONS
VARIABLE CONDENSER
ANT.
R.F.
OSC.
7A6
14C7 2nd LIM
14C7 1st LIM
14H7
14H7 RF
DISC I.F.
3RD I.F
2ND I.F
1ST I.F
14H7
CONV OSC 12K 8

K = 1000 Ohms
M = 1 Megohm

NOTE- ALL RESISTORS ½ WATT and ALL CONDENSERS 400V UNLESS OTHERWISE SPECIFIED

ALIGNMENT POINTS

R.F.
42 Mc
50 Mc
I.F.
4.3 Mc.

2 7 41

# ANSLEY RADIO CORP.

## Replacement Parts
## The F.M. Tuner - Model F.M. 4

| Req. | Description | Part No. | List Price |
|---|---|---|---|
| 3 | I.F. Transformer 4.3 M.C. | 8.21A | 1.50 |
| 1 | Discriminator Transformer 4.3 M.C. | 8.22A | 5.00 |
| 1 | Antenna Coil | 28.39A | 1.00 |
| 1 | Oscillator Coil | 28.41A | 1.00 |
| 1 | R.F. Coil | 28.40 | 1.00 |
| 1 | Pilot Bulb 12-100 M.A. | 18.06 | .65 |
|  | ( Dial Assembly | 25.63) |  |
|  | ( Flexible Connecting Shaft | ) |  |
|  | ( Flexible Casing | ) | 7.50 |
|  | ( Hardware Shaft and Casing | ) |  |
| 1 | On-Off Switch | 16.12 | 1.60 |

### Condensers

| Req. | Description | Part No. | List Price |
|---|---|---|---|
| 1 | 3 Section Variable | 6.87A | 6.00 |
| 17 | .01 MFD 400 volt P.T.C. | 7.76 | .15 |
| 2 | .0015 MFD Mica MW | 6.88 | .15 |
| 2 | .0005 MFD Mica MW | 6.10 | .15 |
| 1 | .00025 MFD Mica MO | 6.47 | .15 |
| 2 | .0001 MFD Mica MO | 6.08 | .15 |
| 1 | .00033 MFD Mica MO | 6.89 | .15 |
| 1 | .000022 MFD Mica MO | 6.90 | .15 |
| 3 | .00005 MFD Mica MO | 6.70 | .15 |
| 1 | .0001 MFD Silver Mica MO | 6.91 | .35 |
| 1 | 5 MMF Sprague Type 3 Liquid Dielectric Cond. | 6.92 | .50 |

### Resistors

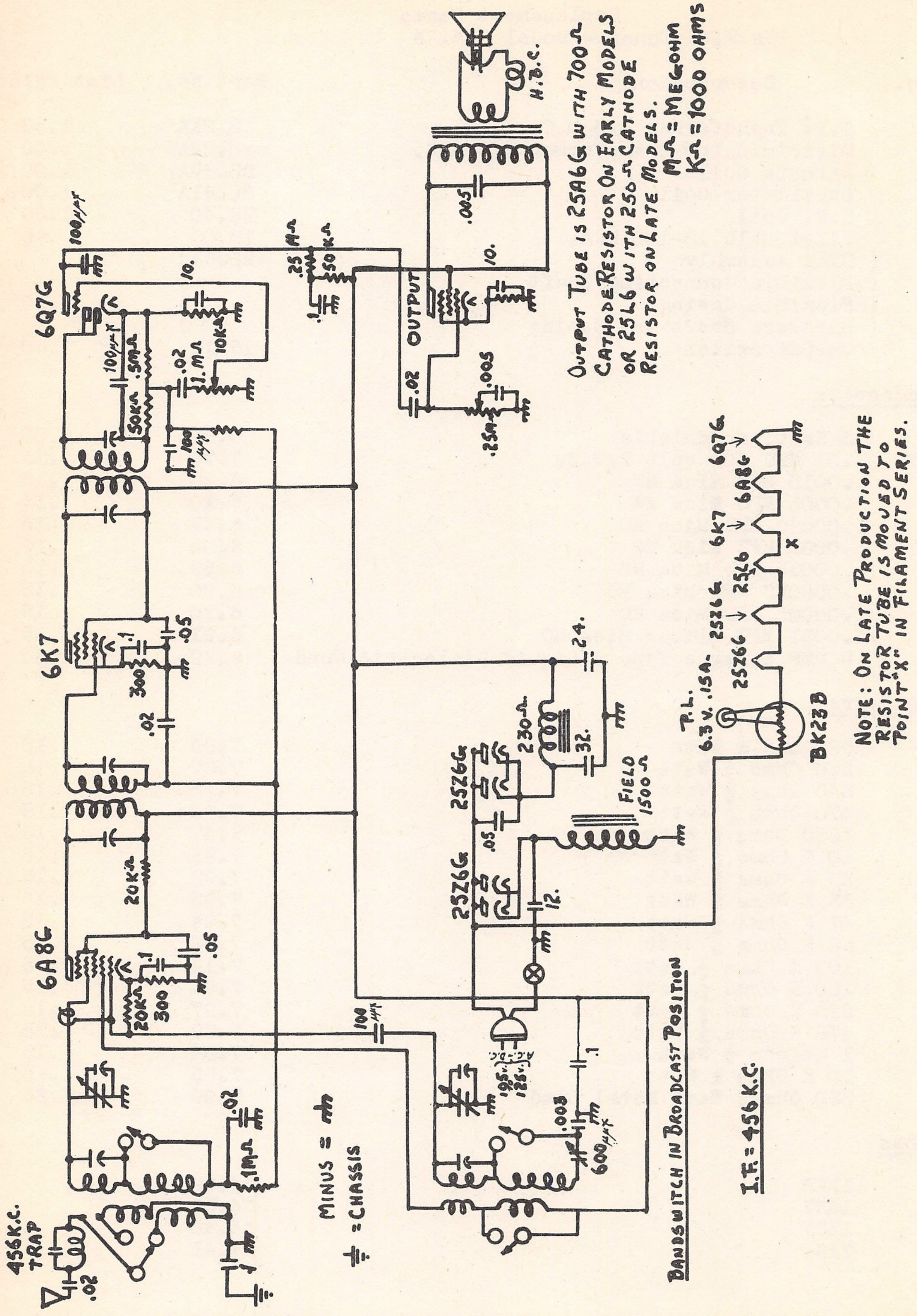
| Req. | Description | Part No. | List Price |
|---|---|---|---|
| 2 | 68 Ohms ½ Watt | 7.89 | .15 |
| 2 | 220 Ohms ½ Watt | 7.67 | .15 |
| 2 | 330 Ohms ½ Watt | 7.73 | .15 |
| 1 | 470 Ohms ½ Watt | 7.90 | .15 |
| 4 | 1000 Ohms ½ Watt | 7.47 | .15 |
| 2 | 10 K Ohms ½ Watt | 7.91 | .15 |
| 1 | 22 K Ohms ½ Watt | 7.92 | .15 |
| 1 | 33 K Ohms ½ Watt | 7.93 | .15 |
| 4 | 47 K Ohms ½ Watt | 7.94 | .15 |
| 1 | 68 K Ohms ½ Watt | 7.95 | .15 |
| 4 | 100 K Ohms ½ Watt | 7.14 | .15 |
| 1 | 180 K Ohms ½ Watt | 7.96 | .15 |
| 1 | 220 K Ohms ½ Watt | 7.97 | .15 |
| 4 | 470 K Ohms ½ Watt | 7.98 | .15 |
| 1 | 1 Megohm ½ Watt | 7.34 | .15 |
| 1 | 10 K Ohms 1 Watt | 7.59 | .15 |
| 1 | 230 Ohm 5 Watt Metal Clad | 7.99 | 1.25 |

### Tubes

| Req. | Description | Part No. | List Price |
|---|---|---|---|
| 1 | 12K8 | 34.38 |  |
| 3 | 14H7 | 34.39 |  |
| 2 | 14C7 | 34.40 |  |
| 1 | 7A6 | 34.41 |  |

MODELS 677,678

## ANSLEY RADIO CORP.


6A8G
6K7
6Q7G
OUTPUT
25Z6G
25Z6G
BK23B
T.L.
6.3 V. .15A.
FIELD
1500Ω
H.B.C.
456K.C.
TRAP
.02
1MΩ
20KΩ
300
.05
.1
100 μμf
600 μμf
.003
20KΩ
.02
300
.1
.05
100 μμf
50KΩ
.5MΩ
1MΩ
10KΩ
.02
10.
100 μμf
.25MΩ
50KΩ
.1
.02
.25MΩ
.005
10.
.005
24.
230Ω
32.
.05
12.
19.5 V.
125 V.
D.C.
A.C.
25Z6G
25L6
6K7
6A8G
6Q7G
X
MINUS =
= CHASSIS

OUTPUT TUBE IS 25A6G WITH 700Ω CATHODE RESISTOR ON EARLY MODELS OR 25L6 WITH 250Ω CATHODE RESISTOR ON LATE MODELS.

MΩ = MEGOHM

KΩ = 1000 OHMS

NOTE: ON LATE PRODUCTION THE RESISTOR TUBE IS MOVED TO "POINT "X"" IN FILAMENT SERIES.

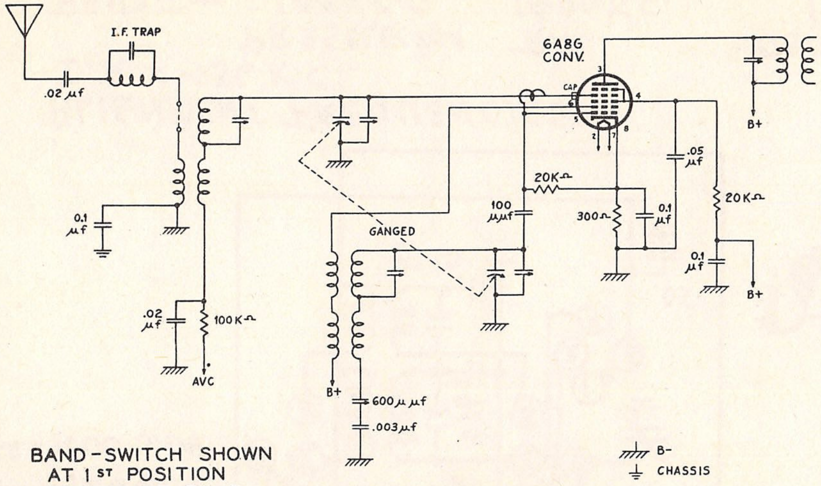
BANDSWITCH IN BROADCAST POSITION

I.F. = 456 K.C.

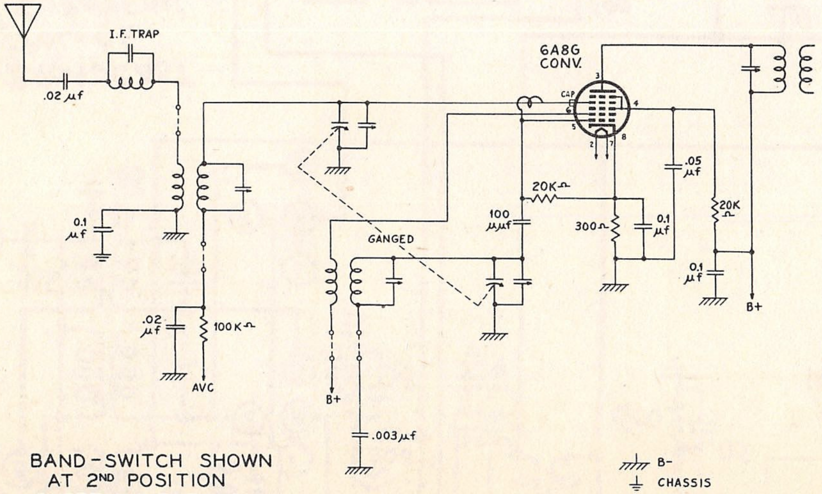
# ANSLEY RADIO CORP.

**MODELS 677, 678**
**MODEL 5111**

## MODELS 677, 678

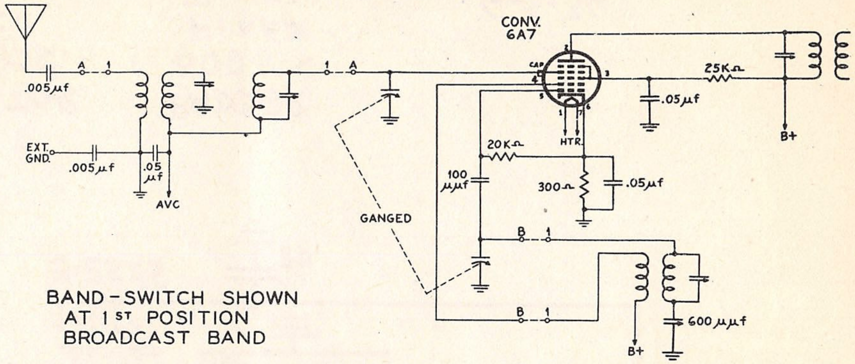

I.F. TRAP
.02 µf
0.1 µf
.02 µf
100 KΩ
AVC
6A8G CONV.
CAP
20KΩ
100 µµf
300Ω
0.1 µf
.05 µf
20KΩ
0.1 µf
B+
B+
B+
GANGED
600 µµf
.003 µf
B-
CHASSIS

BAND-SWITCH SHOWN
AT 1st POSITION
BROADCAST BAND

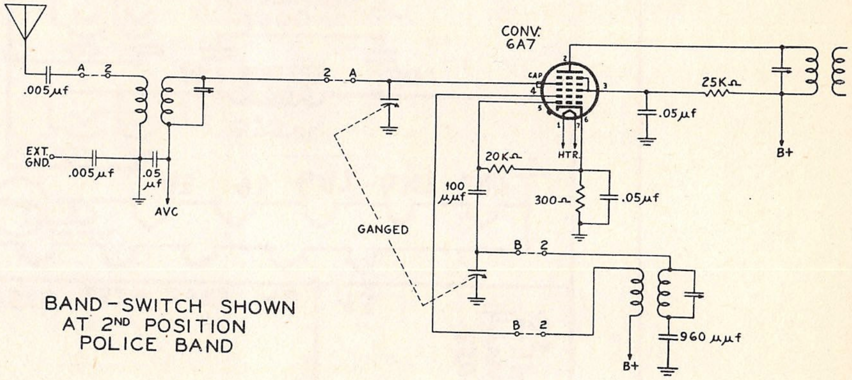

I.F. TRAP
.02 µf
0.1 µf
.02 µf
100 KΩ
AVC
6A8G CONV.
CAP
20KΩ
100 µµf
300Ω
0.1 µf
.05 µf
20K Ω
0.1 µf
B+
B+
GANGED
.003 µf
B-
CHASSIS

BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND

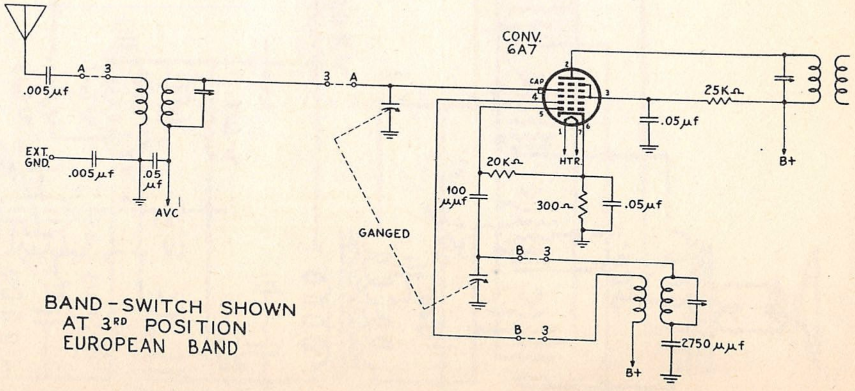
## MODEL 5111


.005 µf
A 1
1 A
EXT. GND.
.005 µf
.05 µf
AVC
CONV. 6A7
CAP
HTR
25KΩ
.05 µf
B+
20KΩ
100 µµf
300Ω
.05 µf
GANGED
B 1
B 1
600 µµf
B+

BAND-SWITCH SHOWN
AT 1st POSITION
BROADCAST BAND


.005 µf
A 2
2 A
EXT. GND.
.005 µf
.05 µf
AVC
CONV. 6A7
CAP
HTR
25KΩ
.05 µf
B+
20KΩ
100 µµf
300Ω
.05 µf
GANGED
B 2
B 2
960 µµf
B+

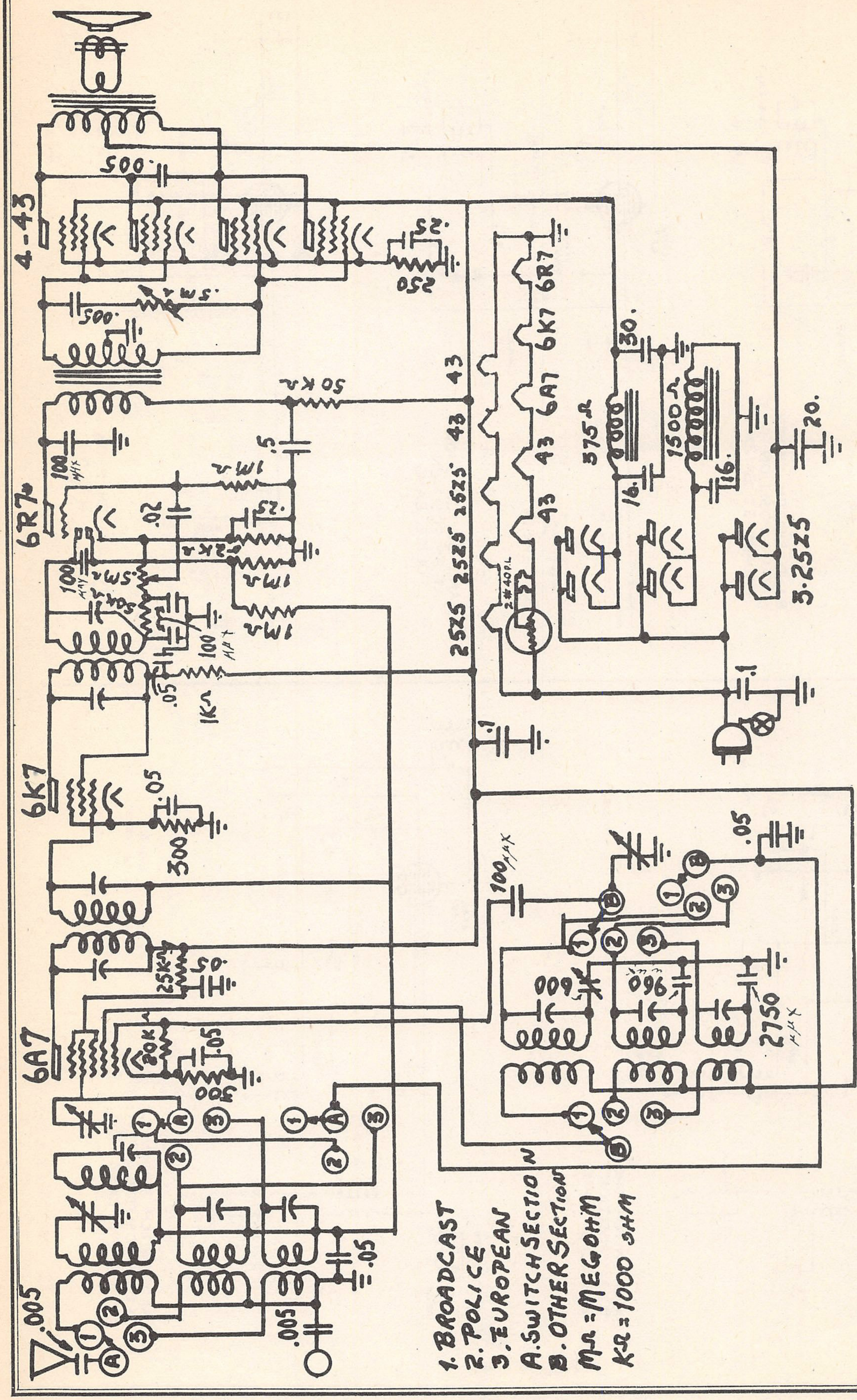
BAND-SWITCH SHOWN
AT 2ND POSITION
POLICE BAND


.005 µf
A 3
3 A
EXT. GND.
.005 µf
.05 µf
AVC
CONV. 6A7
CAP
HTR
25KΩ
.05 µf
B+
20KΩ
100 µµf
300Ω
.05 µf
GANGED
B 3
B 3
2750 µµf
B+

BAND-SWITCH SHOWN
AT 3RD POSITION
EUROPEAN BAND

MODEL 5111

## ANSLEY RADIO CORP.


4-43
.005
.25
250
.5M
.005
6R7
100 μμf
50 KΩ
.5
1MΩ
.02
.25
2 KΩ
1MΩ
1MΩ
.5MΩ
50KΩ
100 μμf
100 μμf
.05
1KΩ
6K7
.05
300
25KΩ
.05
6A7
30K
.05
300
.005
.05
.005
43
2525 2525 43
43 43 6A7 6K7 6R7
2#40PL
30.
375Ω
1500Ω
16.
16.
20.
3-25Z5
.1
.1
.05
100 μμf
600
960 μμf
2750 μμf
1
2
3
A
B

1. BROADCAST
2. POLICE
3. EUROPEAN
A. SWITCH SECTION
B. OTHER SECTION
MΩ = MEGOHM
KΩ = 1000 OHM

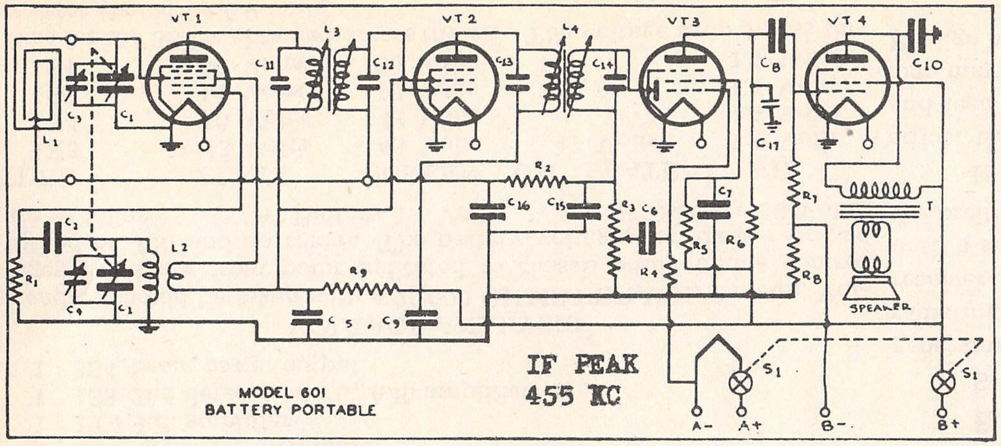
6-1-36

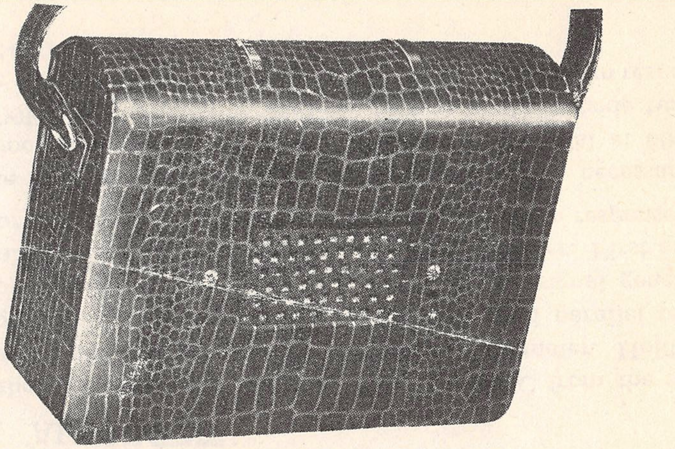
ALIGNMENT FREQUENCIES:
I.F. = 456 K.C.

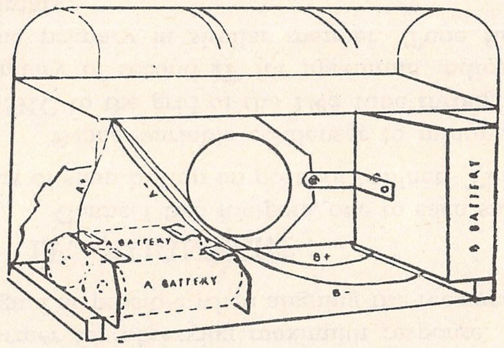
|  | PRESELECTOR | R.F. | OSCILLATOR | PADDER |
|---|---|---|---|---|
| BAND I → | 1400 K.C. | 1400 K.C. | 1400 K.C. | 600 K.C |
| " 2 → | NONE | 4 Mc. | 4 Mc. | FIXED |
| " 3 → | NONE | 15 Mc. | 15 Mc. | FIXED |

**MODEL 601**

# ARC RADIO CORP.


VT 1
VT 2
VT 3
VT 4
L1
L2
L3
L4
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
R1
R2
R3
R4
R5
R6
R7
R8
R9
T
SPEAKER
S1
A-
A+
B-
B+
IF PEAK
455 KC
MODEL 601
BATTERY PORTABLE




A BATTERY
A BATTERY
B BATTERY
B+
B-

Cut-Away View

Showing Batteries

Placed in Cabinet

| Quantity | Item** | Part No. | Description | Price |
|---|---|---|---|---|
| 1. | c1 | 601-5 | Two Gang Variable Condenser | $2.35 |
| 2. | c2, c17 | 601-43 | 50 MMF Condenser | .20 each |
| 2. | *c3, c4 | Part of 601-5 | Trimmers, Part of Variable Condenser | 0 |
| 1. | c15 | 601-42 | .00025 Tubular Condenser | .20 |
| 3. | c6, c8, c10 | 601-41 | .002MFD, 200 Volt Tubular Condenser | .20 each |
| 3. | c7, c5, c16 | 601-44 | .05MFD. 200 Volt Tubular Condenser | .20 each |
| 1. | c9 | 601-10 | 8MFD. 150 Volt Dry Electrolytic Condenser | .50 |
| 4. | *c11, c12, c13, c14 | 601-3, 3A | Part of I.F. Transformers | 0 |
| 1. | L1. | 601-8 | Loop Antenna Assembly | .85 |
| 1. | L2. | 601-9 | Oscillator Coil | .50 |
| 1. | L3. | 601-3 | Double tuned iron core First I.F. Transformer | .95 |
| 1. | L4. | 601-3A | Double Tuned Iron Core Second I.F. Transformer | .95 |
| 1. | T. | Part of 601-2 | Output Transformer | .95 |
| 1. | R1. | 601-16 | 100,000 ohm ¼ Watt Carbon Resistor | .15 |
| 1. | R2. | 601-17 | 2.2 Megohm ¼ Watt Carbon Resistor | .15 |
| 1. | R3. | 601-6 | 1 Megohm Volume Control with S1 | 1.05 |
| 1. | R4. | 601-18 | 10 Megohm ¼ Watt Carbon Resistor | .15 |
| 1. | R5. | 601-19 | 4.7 Megohm ¼ Watt Carbon Resistor | .15 |
| 1. | R6. | 601-20 | 1 Megohm ¼ Watt Carbon Resistor | .15 |
| 1. | R7. | 601-21 | 3 Megohm ¼ Watt Carbon Resistor | .15 |
| 1. | R8. | 601-22 | 820 Ohm ½ Watt Carbon Resistor | .15 |
| 1. | R9. | 601-23 | 5000 Ohm ½ Watt Carbon Resistor | .15 |
| 1. | *S1. | Part of 601-6 | Double Pole Single Throw Switch | 0 |
| 1. | V.T.1 | 601-55 | 1R5 Tube | 2.20 |
| 1. | V.T.2 | 601-54 | 1T4 Tube | 2.20 |
| 1. | V.T.3 | 601-56 | 1S5 Tube | 2.20 |
| 1. | V.T.4 | 601-4 | 3S4 Tube | 2.20 |
| 1. | Speaker | 601-2 | 4" Permanent Magnet Dynamic Speaker 1 oz. Alnico No.5 | 3.00 |

*NOT SUPPLIED SEPARATELY.

NOTE: Nipple end of "A" batteries go to A+.

Snap back cover in proper place. Set will not operate with cover open.

Current drain ............................................................A Battery-0.220 Amps.
B Battery-0.008 Amps.
Frequency Range..........................................................1600 KC to 550 KC

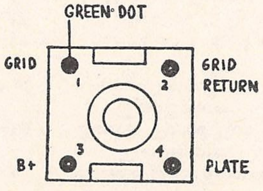
### GENERAL NOTES

1. Batteries: The model No. 601 is designed to house the complete set of batteries within the cabinet. The battery complement should be as follows:

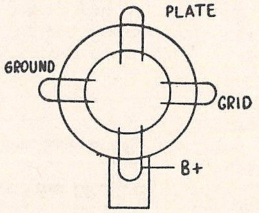
| Type Battery | No. Req. | Eveready Part No. | Burgess Part No. | Ray-O-Vac Part No. |
|---|---|---|---|---|
| 1½ Volt "A" | 2 | No. 950 | No. 2R | No. 2LP |
| 67½ Volt "B" | 1 | No. 467 | No. XX 45 | No. 4367 |

2. The lug connections for the I.F. transformers and oscillator coil are as follows:

   1. Grid (green dot)
   2. Grid return
   3. Plate
   4. B+



Oscillator Coil



3. If replacements are made in the R.F. section of the circuit, the receiver should be carefully re-aligned.
4. The self-contained loop antenna has directional characteristics. It is important therefore, once the station is tuned in, that the cabinet be rotated on its base, back and forth, through a quarter of a circle (90°) and left at the position where the station is received with maximum volume.

### TUBE DATA

The tube complement is as follows:

| | | |
|---|---|---|
| 1 | 1R5 | oscillator modulator |
| 1 | 1T4 | I.F. amplifier |
| 1 | 1S5 | 2nd detector, AVC, A.F. amplifier |
| 1 | 3S4 | beam power output |

### VOLTAGE ANALYSIS

Reading should be taken with a 20,000 OHMS-PER-VOLT meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings are as follows: "A" Battery 1.4 Volts. "B" Battery 60 Volts.

| TUBE | PLATE | SCREEN | OSC. PLATE | FIL. |
|---|---|---|---|---|
| 1R5 | 43 Volts | 43 Volts | 43 Volts | 1.4 Volts |
| 1T4 | 60 Volts | 43 Volts | | 1.4 Volts |
| 1S5 | 14 Volts | 10 Volts | | 1.4 Volts |
| 3S4 | 60 Volts | 60 Volts | | 1.4 Volts |

Bias for the 3S4 is obtained across the R8. The voltage drop across this resistor should be 6.9 volts.

## LOCATION OF COILS AND ADJUSTMENTS

The oscillator coil is located beneath the chassis. The loop is mounted inside the cover with the connection of the loop soldered to snaps on the cover. The trimmers for oscillator coil and loop are mounted on the variable condenser. The IF is permeability tuned, and the slugs are reached from top and bottom of the IF transformer.

The IF transformers are located in cans mounted on top of the chassis. The first IF transformer No. 1455-1R is at the rear right of the chassis. The second IF transformer No. 1455-6 is to the front left of the variable condenser.

NOTE: The top iron core slug is the secondary of each transformer.

A signal generator with frequencies of 455 & 1400 KC is required. An output meter should be used across the voice coil or output transformer for observing maximum response. Always use as weak a test signal as possible when aligning the receiver.

## I.F. ALIGNMENT

Connect two jumpers, one to each snap button on cover to other part of snap button on posts of cabinet. This connects the loop.

Swing variable condenser to minimum capacity position. Feed 455KC to the grid of the 1R5 tube through a .01 condenser. Tune secondary of second IF for maximum indication of output meter, then tune primary in similar manner. Tune first IF secondary and then primary.

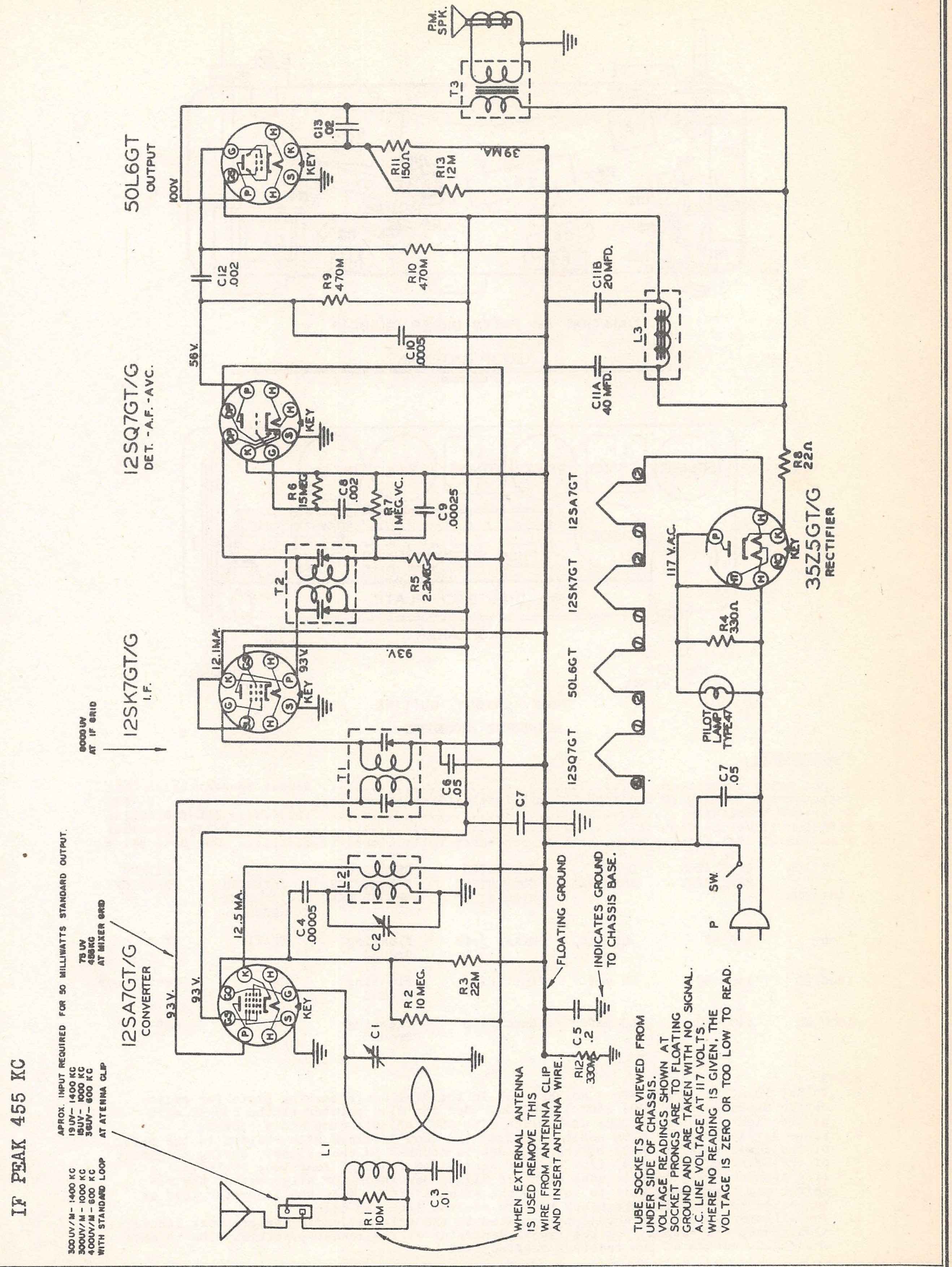
## R.F. ALIGNMENT

Set the dial pointer at 1400KC. Feed 1400 KC from the signal generator into a loop of wire about 12 inches in diameter. Hold this radiating loop approximately one foot away from and parallel to the receiver loop antenna and advance the output of the signal generator until a suitable deflection is obtained on the output meter. First adjust the oscillator and then the antenna trimmer for maximum response.

If the loop antenna has been replaced it may be necessary to adjust the loop inductance. Align at 1400KC. Set the dial at 600KC and feed 600KC to the antenna lead. A portion of the outside turn of loop may be swung to either side of the center to give maximum response. Realign at 1400 KC.

## NOBLITT-SPARKS INDUSTRIES INC.

**MODELS 552N,552AN 555,555A**


IF PEAK 455 KC
12SA7GT/G CONVERTER
12SK7GT/G I.F.
12SQ7GT/G DET.-A.F.-AVC.
50L6GT OUTPUT
35Z5GT/G RECTIFIER
8000UV AT IF GRID
75UV 455KC AT MIXER GRID
93V.
12.5MA.
12.1MA.
56V.
100V.
39MA.
117 V.A.C.
P.M. SPK.
T1
T2
T3
L1
L2
L3
R1 10M
R2 10 MEG.
R3 22M
R4 330Ω
R5 2.2MEG.
R6 15MEG.
R7 1MEG.VC.
R8 22Ω
R9 470M
R10 470M
R11 150Ω
R12 330M
R13 12M
C1
C2
C3 .01
C4 .00005
C5 .2
C6 .05
C7 .05
C8 .002
C9 .00025
C10 .0005
C11A 40 MFD.
C11B 20 MFD.
C12 .002
C13 .02
12SQ7GT
50L6GT
12SK7GT
12SA7GT
PILOT LAMP TYPE 47
SW.
P
KEY
FLOATING GROUND

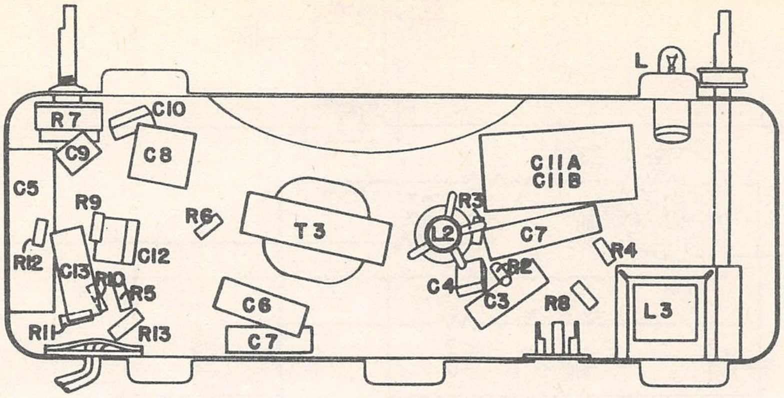
APROX. INPUT REQUIRED FOR 50 MILLIWATTS STANDARD OUTPUT.

300UV/M - 1400 KC — 19UV - 1400 KC
300UV/M - 1000 KC — 15UV - 1000 KC
400UV/M - 600 KC — 36UV - 600 KC
WITH STANDARD LOOP — AT ATENNA CLIP

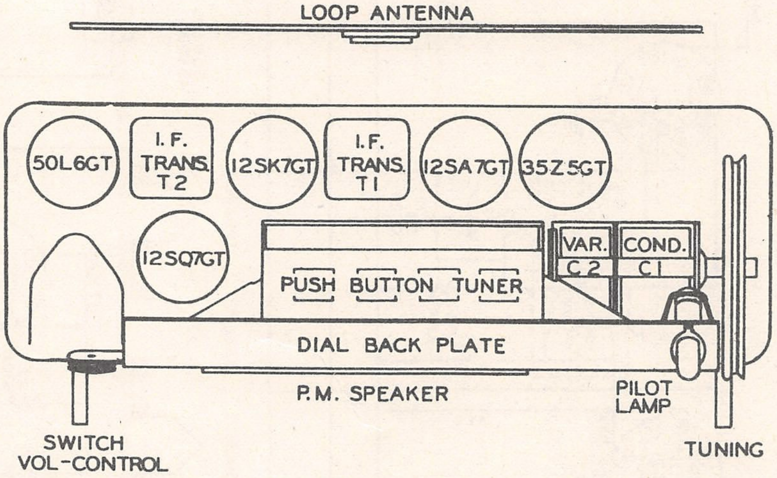
WHEN EXTERNAL ANTENNA IS USED REMOVE THIS WIRE FROM ANTENNA CLIP AND INSERT ANTENNA WIRE.

INDICATES GROUND TO CHASSIS BASE.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL.
A.C. LINE VOLTAGE AT 117 VOLTS.
WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.


L
R7
C10
C9
C8
C5
R9
R6
T3
R3
C11A
C11B
L2
C7
R4
R12
C13
R10
C12
R5
C4
R2
C3
R8
L3
C6
C7
R11
R13

LOCATION OF PARTS UNDER CHASSIS


LOOP ANTENNA
50L6GT
I. F. TRANS. T2
12SK7GT
I.F. TRANS. T1
12SA7GT
35Z5GT
12SQ7GT
VAR. C2
COND. C1
PUSH BUTTON TUNER
DIAL BACK PLATE
P.M. SPEAKER
PILOT LAMP
SWITCH VOL-CONTROL
TUNING

TUBE LAYOUT OUTLINE

## ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection ...................................... Across Speaker Voice Coil
Output meter reading to indicate 200 milliwatts (Standard output) .............. .8 Volt
Generator Modulation ................................................. 30% 400 cycles
Position of Volume Control ........................................... Fully clockwise
Position of dial pointer with variable condenser fully closed ............ See Note below

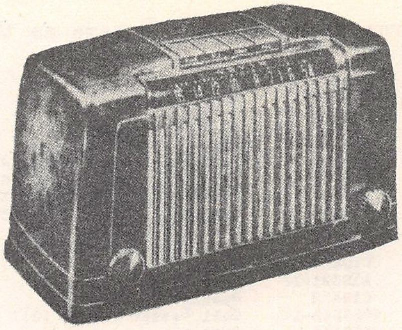
| POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION HIGH SIDE | GENERATOR CONNECTION GROUND LEAD | ADJUST TRIMMERS IN ORDER SHOWN | TRIMMER FUNCTION |
|---|---|---|---|---|---|---|
| Open | 455 KC | .05 mfd. | Mixer grid | Floating Ground | T2-T1 | IF |
| 1400 KC | 1400 KC | 50 mmf. | Ant. Clip | Floating Ground | C2 | Oscillator |
| 1400 KC | 1400 KC | 50 mmf. | Ant. Clip | Floating Ground | C1 | Ant. |

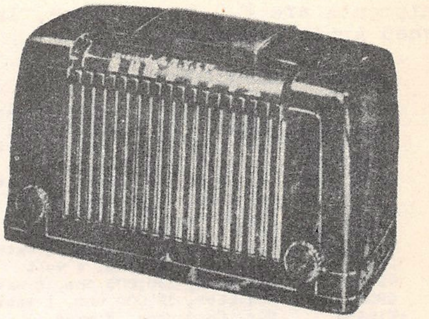
NOTES:

1. To Set Pointer: There are 4 notches cut in the dial scale backing plate for calibration marks at 540; 600; 1400 & 1620 KC. Set the dial pointer at the 540 KC mark at the right-hand end of the dial plate with the variable completely closed.
2. Place set loop in the same position and at the same distance with respect to the back of the chassis as it would be when the set is mounted in the cabinet, during alignment of the RF stage. (1 7/16" from back of chassis to front of long loop strip).
3. If a standard test loop is used with the Signal Generator for alignment of the receiver the black wire will be left in the antenna clip. When the generator lead is connected to ant. clip the black wire is removed from the clip.
4. The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the A.V.C. action of the receiver ineffective.

**MODELS 552N, 552AN**
**555, 555A**

# NOBLITT-SPARKS INDUSTRIES INC.





**FREQUENCY RANGE**

| | |
|---|---|
| Broadcast | 540-1600 kc |
| IF | 455 kc |

**TUBES & FUNCTIONS**

| | |
|---|---|
| 12SA7 | Mixer-oscillator |
| 12SK7 | IF Amp. |
| 12SQ7GT | DET-AVC-AF |
| 50L6GT | Output |
| 35Z5GT | Rectifier |

**POWER SUPPLY**

105-125 Volts AC-DC, 35 Watts

**POWER OUTPUT**

| | |
|---|---|
| Undistorted | 1.1 Watts |
| Maximum | 2.4 Watts |
| Plate load | 2000 ohms |

**LOUD SPEAKER**

Type: Permanent magnet
Size: 4 inch
Voice coil impedance ............. 3.2 ohms

**CHASSIS FEATURES**

Automatic Volume Control
Built-in Loop
Underwriters' Listed

**OPERATING CONTROLS**

1. Left knob .......... ON-OFF Sw. & Volume
2. Right knob .................... Tuning

**PHYSICAL DIMENSIONS**

| | |
|---|---|
| Length | 11¼ inches |
| Height | 6⅜ inches |
| Depth | 6⅜ inches |

Models 552N and 555 are in walnut cabinets. Models 552AN and 555A are in ivory cabinets. Models 555 and 555A have push buttons. Models 552N and 552AN do not have push buttons.

THE HEATER CIRCUIT.

The heaters of all of the tubes are connected in series, accordingly if one tube burns out the others will not light. It is necessary to replace only the burned out tube, the others will then light. The burned out tube can be located through the fact that the full line voltage will appear across its heater prongs.

To obtain best results always rebalance receiver after replacing tubes.

POSITION OF POWER CORD PLUG.

On AC, the power cord plug should be tried in both its possible positions in the receptacle, and left in the position that gives least hum. On DC, the receiver will work in only one position of the plug in its receptacle.

THE ANTENNA.

This receiver has a built-in loop which gives satisfactory reception in most locations. If the receiver is located some distance from a broadcasting station, or where the electrical interference is high, an outside antenna will improve reception. The Black wire should be removed from the antenna clip before the antenna is connected.

This receiver is designed to operate without a ground connection and no attempt should be made to use one.

CIRCUIT CHANGES.

On some sets C4 condenser is connected from Plate to Screen Grid instead of from Plate to Cathode of the output tube.

C-10, .05 uf condenser from screen grid of 12SA7 tube to chassis was added after the start of production to prevent oscillation.

**MODELS 552N,552AN**
**555,555A**

# NOBLITT-SPARKS INDUSTRIES INC.

Replacement parts should be ordered by Arvin part number, description and model number of receiver from your Arvin Distributor. The Distributor will order direct from the factory, except in the case of tubes, which should be obtained through regular tube distribution channels.

Parts shipments are F.O.B. Columbus, Indiana. Terms of sale are the same as those applying to finished Arvin products.

| REF. NO. | PART NO. | DESCTIPTION | LIST PRICE |
|---|---|---|---|
| R1 | C20060-103 | Resistor, 10,000 ohm, ½ watt | .10 |
| R2 | C20060-106 | Resistor, 10 megohm, ½ watt | .10 |
| R3 | C20060-223 | Resistor, 22,000 ohm, ½ watt | .10 |
| R4 | C20060-331 | Resistor, 330 ohm, ½ watt | .10 |
| R5 | C20060-225 | Resistor, 2.2 megohm, ½ watt | .10 |
| R6 | C20060-156 | Resistor, 15 megohm, ½ watt | .10 |
| R7 | C19389 | Volume Control & Switch | 1.00 |
| R8 | C20060-220 | Resistor, 22 ohm, ½ watt | .10 |
| R9,R10 | C20060-474 | Resistor, .47 megohm, ½ watt | .10 |
| R11 | C20060-151 | Resistor, 150 ohm, ½ watt | .10 |
| R12 | C20060-334 | Resistor, 330,000 ohm, ½ watt | .10 |
| R13 | C20070-123 | Resistor, 12,000 ohm, 1 watt | .15 |
| C1,C2 | *E19359 | Var. Condenser, 2 gang | 8.00 |
|  | **C19840 | Var. Condenser, 2 gang | 3.65 |
| C3 | C20068-103 | Condenser, .01 uf, 400 V. | .25 |
| C4 | C20065-500 | Condenser, .00005 uf, 500 V. | .25 |
| C5 | A19765 | Condenser, .2 uf, 400 V. | .35 |
| C6 | C20067-503 | Condenser, .05 uf, 200 V. | .25 |
| C7 | C20068-503 | Condenser, .05 uf, 400 V. | .25 |
| C8,C12 | C20068-202 | Condenser, .002 uf, 400 V. | .20 |
| C9 | C20065-251 | Condenser, .00025 uf, 500 V. | .25 |
| C10 | C20065-501 | Condenser, .0005 uf, 500 V. | .40 |
| C11A,C11B | A19360 | Elect. Cond., 40-20 uf, 150 V. | 1.25 |
| C13 | C20068-203 | Condenser, .02 uf, 400 V. | .25 |
| L1 | AC19207-1 | Ant. Loop Assy. | 1.50 |
| L2 | AC19354-1 | Osc. Coil | .60 |
| L3 | AC19357-1 | Iron Core "B" Choke | 1.00 |
| T1 | AC19355-1 | 1st I. F. Coil | 1.95 |
| T2 | AC19356-1 | 2nd I. F. Coil | 1.95 |
| T3 | AC19358-1 | Output Transformer | 1.25 |
| Spk. | C19393 | 4". P. M. Speaker | 4.25 |
| P | B20064-3 | Line Cord & Plug Assy | 1.00 |
|  | E19301 | Cabinet, Walnut (Model 555) | 5.00 |
|  | E19302 | Cabinet, Ivory (Model 555A) | 5.50 |
|  | E19303 | Cabinet, Walnut (Model 552N) | 5.00 |
|  | E19304 | Cabinet, Ivory (Model 552AN) | 5.50 |
|  | A19401 | Dial Crystal Mtg. Clip | .05 |
|  | A19410 | Ant. Loop Retainer Brkt. | .05 |
|  | C19408 | Dial | 1.00 |
|  | A19391-1 | Knob, Walnut | .20 |
|  | C19422 | Speaker Baffle | .15 |
|  | *C19348-1 | Call Letter Sheets (3) | .50 |
|  | A19414 | Carton | .80 |
|  | A19391-2 | Knob, Ivory | .20 |
|  | *A19276 | P. B. Knobs, Walnut | .25 |
|  | *A19275 | P. B. Knobs, Ivory | .30 |
|  | *A19346 | P. B. Knob Shaft | .05 |
|  | A19344-3 | Idler Pulley | .05 |
|  | A19344-2 | Idler Pulley | .05 |
|  | A19364 | Dial Pointer | .15 |
|  | A19205 | Capacitor Mtg. Clip | .10 |
|  | A20149-2 | Dial Cord Spring | .10 |
|  | A19361 | Hair Pin Clip | .05 |
|  | A19132 | Dial Drive Cord | .10 |
|  | A19351 | Dial Light Bulb | .20 |
|  | A18254-1 | Tube Sockets | .15 |
|  | A19233-1 | Tube Sodkets | .15 |
|  | A19234 | Ant. Loop Socket | .10 |
|  | A19396 | Dial Light Socket Assy. | .35 |
|  | AA19423-1 | Tuning Shaft Assy. | .25 |
|  | A19252 | Ant. Conn. Plug | .10 |

* used only on 555 and 555A. ** used only on 552N and 552AN.

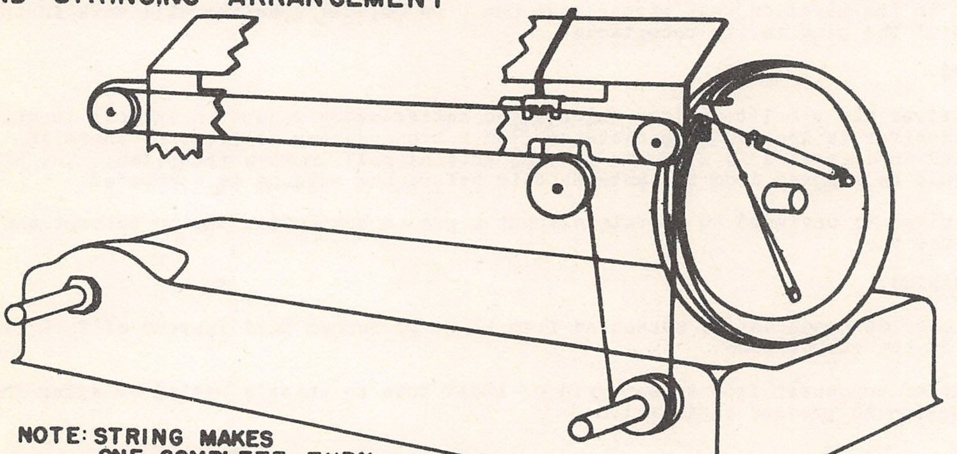
## INSTRUCTIONS FOR SETTING UP PUSH BUTTONS:

Allow the receiver to remain on for ten to fifteen minutes before making the push button adjustments.

Each of the push buttons should be set to a desired station in the following manner:

1. Make a list of the four local stations for which push button tuning is desired and punch out the corresponding call letters from the call letter sheets.
2. Lift each button and insert a call letter tab into the slot at the side of the button, centering it in the front opening.
3. Lift a push button and insert a screw driver in the slotted screw head just below the button. Press down and loosen the locking screw by turning it to the left about two turns.
4. While holding the screw all the way down with the screw driver, tune in the desired station by hand with the tuning knob. Turning the tuning knob back and forth slightly either side of the station while holding the screw down will help to obtain a precise setting.
5. Tighten the screw, keeping it pushed all the way down while tightening it.
6. Check for accuracy by moving the pointer off the station about an inch and retuning it by depressing the push button set up for that station. If the setting is not accurate, repeat the foregoing procedure.
7. Follow the same procedure for each of the remaining buttons.
8. Should you desire to change your selection of stations, the old call letters can be removed from the buttons by pushing them out with a penknife, nail file or eraser on a pencil and repeating steps 3 to 8.

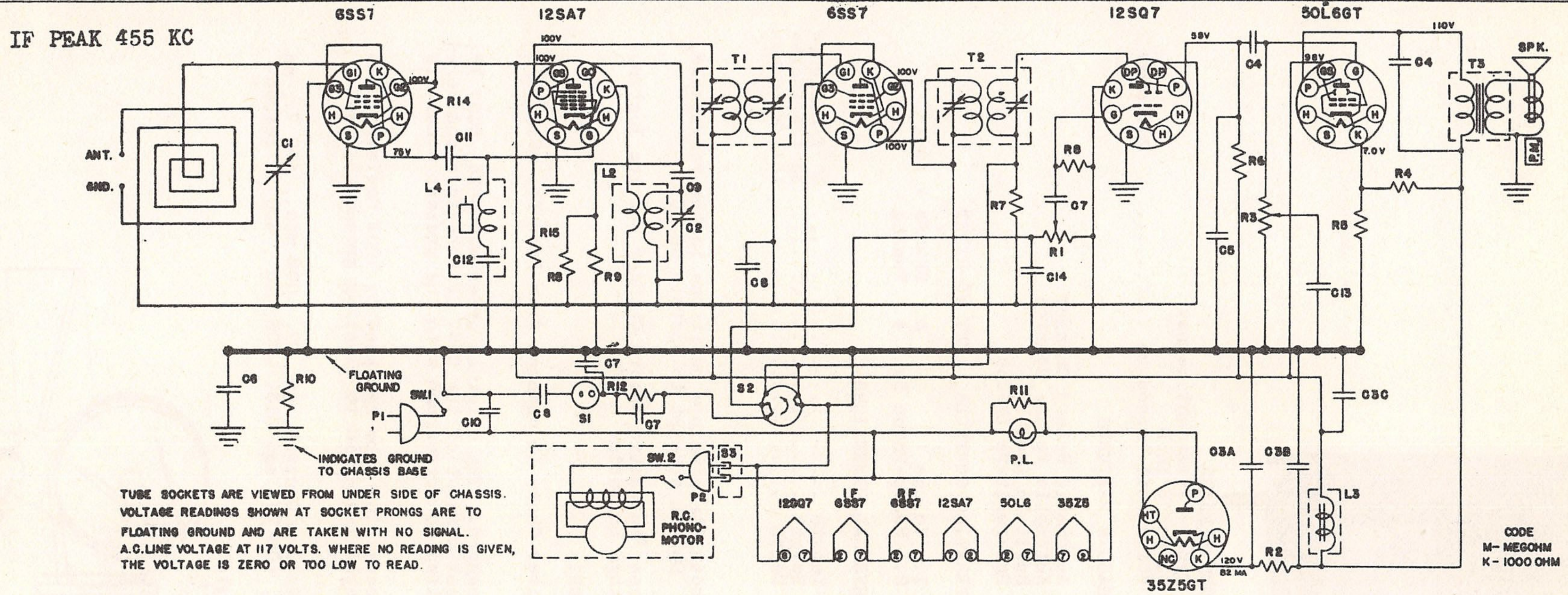
## DIAL CORD STRINGING ARRANGEMENT



NOTE: STRING MAKES
ONE COMPLETE TURN
AROUND TUNING SHAFT &
CONDENSER PULLEY

## MODEL 665

# NOBLITT-SPARKS INDUSTRIES INC.


IF PEAK 455 KC
6SS7
12SA7
6SS7
12SQ7
50L6GT
35Z5GT
ANT.
GND.
C1
R14
C11
L4
C12
R15
R8
R9
L2
C9
C2
T1
T2
C8
R7
C7
R1
C14
R6
R3
C5
C4
R5
C13
R4
T3
SPK.
C6
R10
FLOATING GROUND
INDICATES GROUND TO CHASSIS BASE
SW.1
P1
C10
S1
R12
S2
R11
P.L.
SW.2
S3
P2
R.C. PHONO-MOTOR
12SQ7
IF 6SS7
RF 6SS7
12SA7
50L6
35Z5
C3A
C3B
C3C
L3
R2
100V
75V
98V
110V
7.0V
120V
82 MA
CODE
M - MEGOHM
K - 1000 OHM
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL.
A.C. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

Replacement parts should be ordered by Arvin part number, description and model number of receiver from your Arvin Distributor. The Distributor will order direct from the factory, except in the case of tubes, which should be obtained through regular tube distribution channels.

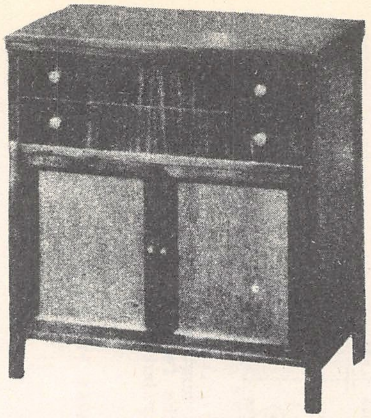
Parts shipments are F.O.B. Columbus, Indiana. Terms of sale are the same as those applying to finished Arvin products.

| REF. NO. | PART NO. | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| R1 | C19582 | Volume Control - 1 meg. | .75 |
| R2 | C20060-150 | Resistor, 15 ohm | .10 |
| R3 | C19946 | Tone Control & Switch | 1.00 |
| R4 | C20070-123 | Resistor, 12,000 ohm - 1 W. | .15 |
| R5 | C20060-151 | Resistor, 150 ohm | .10 |
| R6 | C20060-474 | Resistor, .47 meg. | .10 |
| R7 | C20060-225 | Resistor, 2.2 meg. | .10 |
| R8 | C20060-156 | Resistor, 15 meg., ¼ W. | .10 |
| R9 | C20060-223 | Resistor, 22,000 ohm | .10 |
| R10 | C20060-334 | Resistor, 330,000 ohm | .10 |
| R11 | C20060-331 | Resistor, 330 ohm | .10 |
| R12 | C20060-224 | Resistor, .22 meg. | .10 |
| R13 | C20060-105 | Resistor, 1 megohm | .10 |
| R14 | C20060-222 | Resistor, 2200 ohm, ¼ W. | .10 |
| R15 | C20060-104 | Resistor, 100,000 ohm, ¼ W. | .10 |
| C1, C2 | C19584 | Var. Condenser, 2 gang | 3.75 |
| C3C |  | Elect. Cond., 40 uf, 150 V. |  |
| C3B | A19780 | Elect. Cond., 20 uf, 150 V. | 1.25 |
| C3A |  | Elect. Cond., 10 uf, 150 V. |  |
| C4 | C20068-103 | Condenser, Paper, .01 uf, 400 V. | .20 |
| C5 | C20065-501 | Condenser, .0005 uf, 500 V. | .25 |
| C6 | A19765 | Condenser, .2 uf, 400 V. | .45 |
| C7 | C20068-202 | Condenser, Paper, .002 uf, 400 V. | .20 |
| C8 | C20067-503 | Condenser, .05 uf, 200 V. | .25 |
| C9 | C20065-500 | Condenser, Mica, .00005 uf, 500 V. | .25 |
| C10 | C20068-503 | Condenser, .05 uf, 400 V. | .25 |
| C11 | C20065-102 | Condenser, Mica, .001 uf, 500 V. | .60 |
| C12 | A21040 | Condenser, .00003 uf, 500 V. | .25 |
| C13 | C20068-502 | Condenser, .005 uf., 400 V. | .25 |
| C14 | C20065-251 | Condenser, .00025 uf, 600 V. | .25 |
| L1 | AE19943-1 | Ant. Loop Assy. | 2.00 |
| L2 | AC19586-1 | Osc. Coil | .60 |
| L3 | AC21073-1 | Choke, Iron Core | 1.00 |
| L4 | AC21039-1 | Wave Trap | 1.00 |
|  |  | Lid, Cabinet | 15.00 |
|  |  | Hinges (each) | .30 |
|  |  | Drawer Pulls (each) | .30 |
| T1 | AC19587-1 | 1st I. F. Coil | 1.95 |
| T2 | AC19588-1 | 2nd I. F. Coil | 1.95 |
| T3 | AC19591-1 | Output Transformer | 1.50 |
|  | A19344-5 | Idler Pulley | .05 |
|  | A19889 | Dial Pointer | .20 |
|  | C19890 | Dial Glass | .75 |
|  | A19132 | Dial Drive Cord | .10 |
|  | A19295 | Dial Drive Spring | .05 |
|  | A19205-4 | Capacitor Mtg. Clip | .10 |
|  | A19234 | Ant. Loop Socket | .10 |
| S1 | A19552 | Socket, One-Prong | .15 |
| S2 | C19580 | Phono-Radio-Switch | 1.00 |
| S3 | A19551 | Socket, Phono-Motor | .40 |
|  | A19579 | Socket, Speaker | .15 |
|  | A19553 | Socket, Insulator | .05 |
|  | A19268 | Dial Lamp Socket | .35 |
| PL | A19351 | Dial Lamp | .20 |
|  | AA19593-1 | Tuning Shaft & Pulley Assy. | .50 |
| P1 | B20064-10 | Line Cord & Plug Assy. | 1.00 |
| P2 | A19556 | Plug, A. C. | .50 |
|  | R19869 | Cabinet & Carton | 90.00 |
|  | AE19645 | Record Changer | 40.00 |
|  | A19850 | Needle, Semi-Permanent | 1.00 |
|  | C19881 | Escutcheon | 1.50 |
|  | C19948 | Knob-Volume | .20 |
|  | C19949 | Knob-Tuning | .20 |
|  | C19950 | Knob-Phono-Radio | .20 |
|  | C19951 | Knob-Tone Control | .20 |
|  | A19554 | Plug, One Prong | .10 |
|  | D19882 | Speaker, 8" P. M. | 7.50 |
|  | A20040-11 | Felt Washer | .05 |
|  | A19885 | Carton w/filler | 3.50 |
|  | A19711 | Operating Instructions | .05 |
|  | A19252 | Ant. Connector Plug | .10 |
|  |  | Record Compartment Door | 8.00 |
|  |  | Lid Support | .75 |

RECORD CHANGER: General Instrument Model 205, RCD. CH. P.15-5

MODEL 665

## NOBLITT-SPARKS INDUSTRIES INC.



**FREQUENCY RANGE**

| | |
|---|---|
| Broadcast | 540-1600 kc |
| IF | 455 kc |

**TUBES & FUNCTIONS**

| | |
|---|---|
| 6SS7 | RF Amp. |
| 12SA7 | Mixer-oscillator |
| 6SS7 | IF Amp. |
| 12SQ7GT | DET-AVC-AF |
| 50L6GT | Output |
| 35Z5GT | Rectifier |

**POWER SUPPLY**

105-125 Volts AC , 55 Watts

**POWER OUTPUT**

| | |
|---|---|
| Undistorted | 1 Watt |
| Maximum | 2.2 Watts |
| Plate load | 2000 ohms |

**LOUD SPEAKER**

Type: Permanent magnet
Size: 8 inch

| | |
|---|---|
| Voice coil impedance | 3.2 ohms |

**CHASSIS FEATURES**

Automatic Record Changer
Automatic Volume Control
Built-in Loop
Underwriters Listed

**OPERATING CONTROLS, LEFT TO RIGHT**

1. Volume
2. Radio-Phono Sw.
3. ON-OFF - TONE
4. Tuning

**PHYSICAL DIMENSIONS**

| | |
|---|---|
| Length | 30 1/2 inches |
| Height | 33 1/4 inches |
| Depth | 16 1/2 inches |

**SERVICE HINTS AND CIRCUIT CHANGES**

On AC, the power cord plug should be tried in both its possible positions in the receptacle, and left in the position that gives least hum. Do not attempt to operate on DC.

For service information on the record changer see "Automatic Record Changer Service Instructions, Model 205", which should be filed with this bulletin.

**CIRCUIT CHANGES MADE SINCE THE START OF PRODUCTION.**

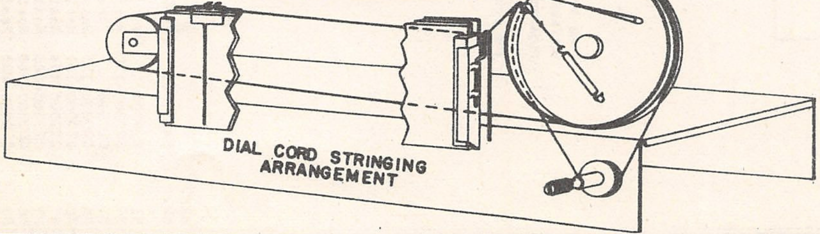
1. C3B and C3C have been interchanged, and Filter Choke L3 changed from Part No. AC19589-1 to AC21073-1 to reduce hum.

2. The filament string arrangement has been changed. The original order was 35Z5; 6SS7 IF; 12SA7; 6SS7 RF; 50L6; and 12SQ7. If frequent burnout of the 6SS7 IF tube is encountered on these sets, the filaments should be rewired to correspond with the present Schematic Diagram.

3. 1 Megohm Resistor, R13 in grid circuit of converter tube replaced by 100M Resistor, R15 to eliminate hum modulation. R15 is connected from grid to floating ground, R13 was connected from grid to AVC.

4. Condensers C5, .0005 mfd., 500 V., across Volume Control, and C7, .002 mfd., 400 V., on Tone Control, replaced by C14, .00025 mfd., 600 V., and C13, .005 mfd., 400 V. respectively, to improve tone quality.

NOTE: STRING MAKES ONE COMPLETE
TURN AROUND TUNING SHAFT
PULLEY, & CONDENSER PULLEY.



DIAL CORD STRINGING ARRANGEMENT

## ALIGNMENT PROCEDURE

PRELIMINARY.

| | |
|---|---|
| Output meter connection | Across loudspeaker voice coil |
| Output meter reading to indicate 200 milliwatts (standard output) | .8 volts |
| Dummy antenna value to be used in series with generator output | See chart below |
| Connection of generator output lead | See chart below |
| Connection of generator ground lead | Floating ground |
| Generator modulation | 30% 400 cycles |
| Position of Volume Control | Fully clockwise |
| Position of dial pointer with variable fully closed | Last rectangular mark at left edge of dial |

Place the set loop in the same position with respect to the chassis, and the same distance from the chassis, as it would be with the set mounted in the cabinet.

| Position of Variable | Frequency of Generator | Dummy Antenna | Generator Output Connection | Trimmers adjusted in Order Shown for *Max. Output | Function of Trimmer |
|---|---|---|---|---|---|
| Open | 455 | .05 mfd. | 12SA7 Grid (Stator of rear section of variable condenser) | Top of 2nd & 1st IF Trans. | IF |
| Open | 455 | .05 mfd. | RF Grid | *Adj. L4 for min. output | Wave Trap |
| 1400 | 1400 | .00005 mfd. | Antenna connection on back of loop | C2; C1, trimmers on Front & Rear sections of Variable Condenser | Osc. Ant. |
| 600 | 600 | .00005 mfd. | Antenna connection on back of loop | **Adj. antenna section plates of variable cond. for Max. output | Antenna |

If a standard test loop is used with the signal generator for alignment of the receiver, the approximate sensitivities should be 350 uv/m and 250 uv/m or less at 600 Kc and 1400 Kc respectively.

Approximate stage by stage sensitivities for 200 Milliwatt output.

| | | | |
|---|---|---|---|
| IF. - 455 Kc. | 2600 uv | Mixer 1000 Kc. | 75 uv |
| Mixer 455 Kc. | 60 uv | Antenna 1400 Kc. | 70 uv |

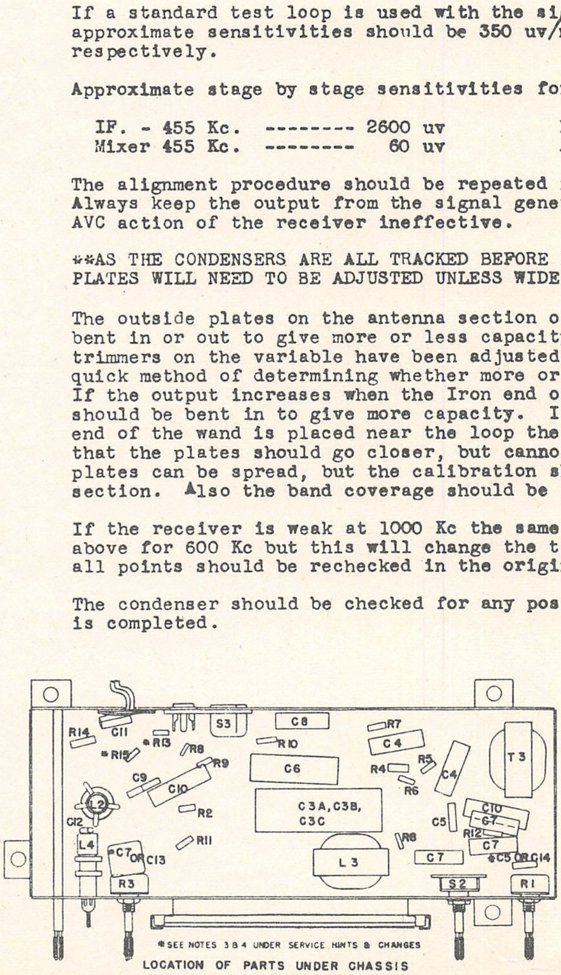
The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

**AS THE CONDENSERS ARE ALL TRACKED BEFORE LEAVING THE FACTORY IT IS NOT PROBABLE THAT THE PLATES WILL NEED TO BE ADJUSTED UNLESS WIDE VARIATIONS IN TUBES ARE ENCOUNTERED.

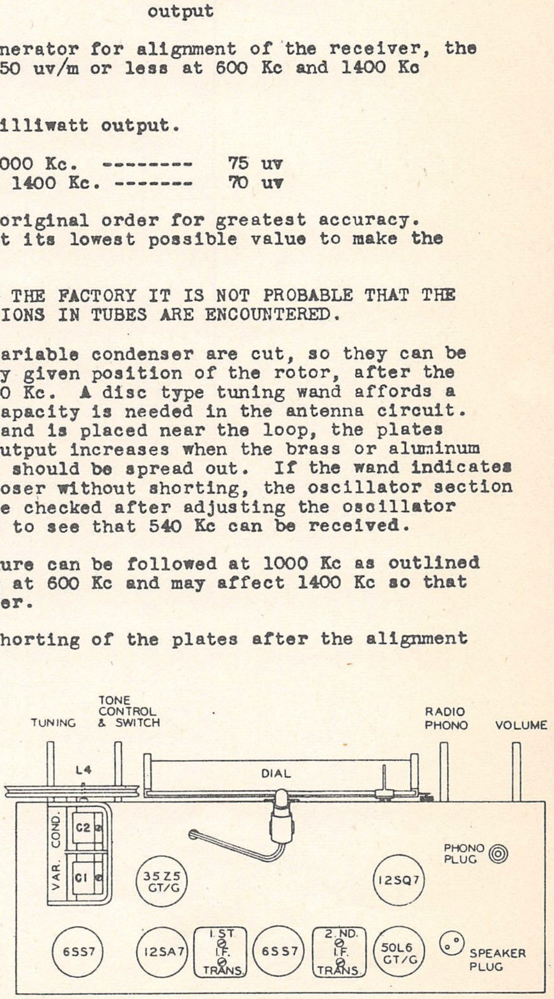
The outside plates on the antenna section of the variable condenser are cut, so they can be bent in or out to give more or less capacity at any given position of the rotor, after the trimmers on the variable have been adjusted at 1400 Kc. A disc type tuning wand affords a quick method of determining whether more or less capacity is needed in the antenna circuit. If the output increases when the Iron end of the wand is placed near the loop, the plates should be bent in to give more capacity. If the output increases when the brass or aluminum end of the wand is placed near the loop the plates should be spread out. If the wand indicates that the plates should go closer, but cannot go closer without shorting, the oscillator section plates can be spread, but the calibration should be checked after adjusting the oscillator section. Also the band coverage should be checked to see that 540 Kc can be received.

If the receiver is weak at 1000 Kc the same procedure can be followed at 1000 Kc as outlined above for 600 Kc but this will change the tracking at 600 Kc and may affect 1400 Kc so that all points should be rechecked in the original order.

The condenser should be checked for any possible shorting of the plates after the alignment is completed.



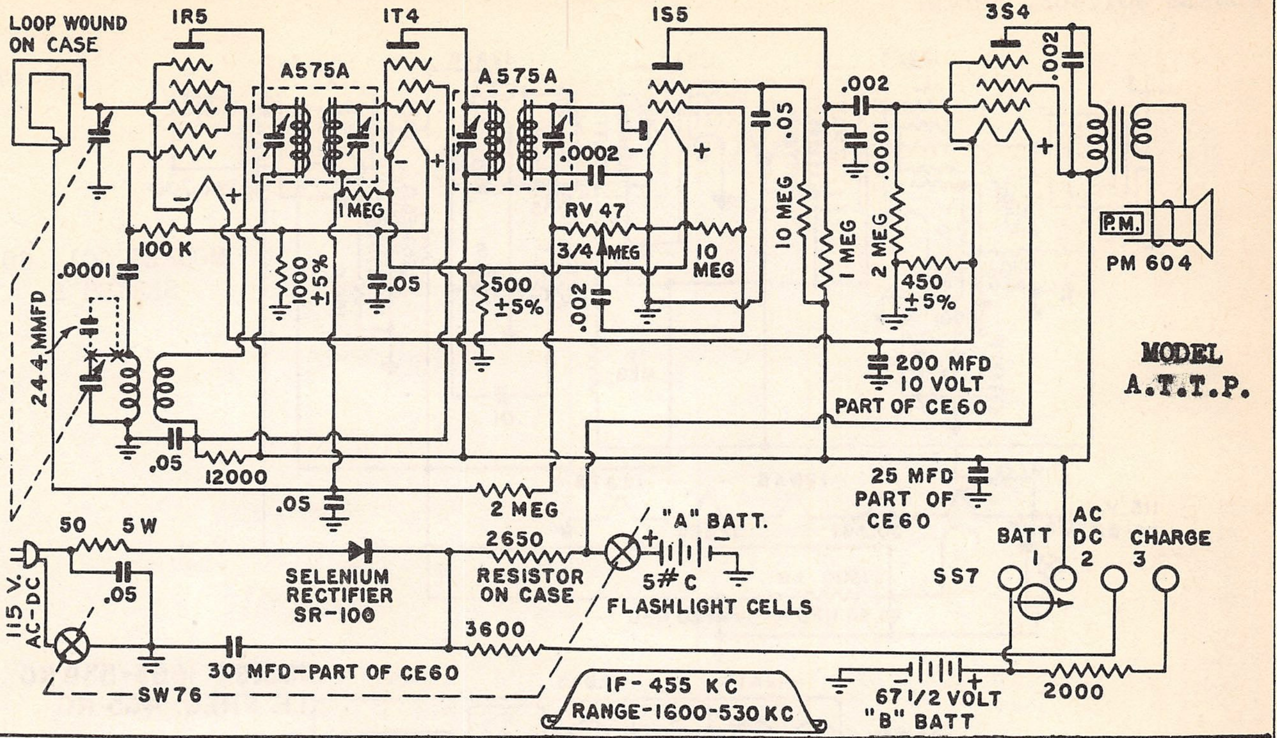
LOCATION OF PARTS UNDER CHASSIS



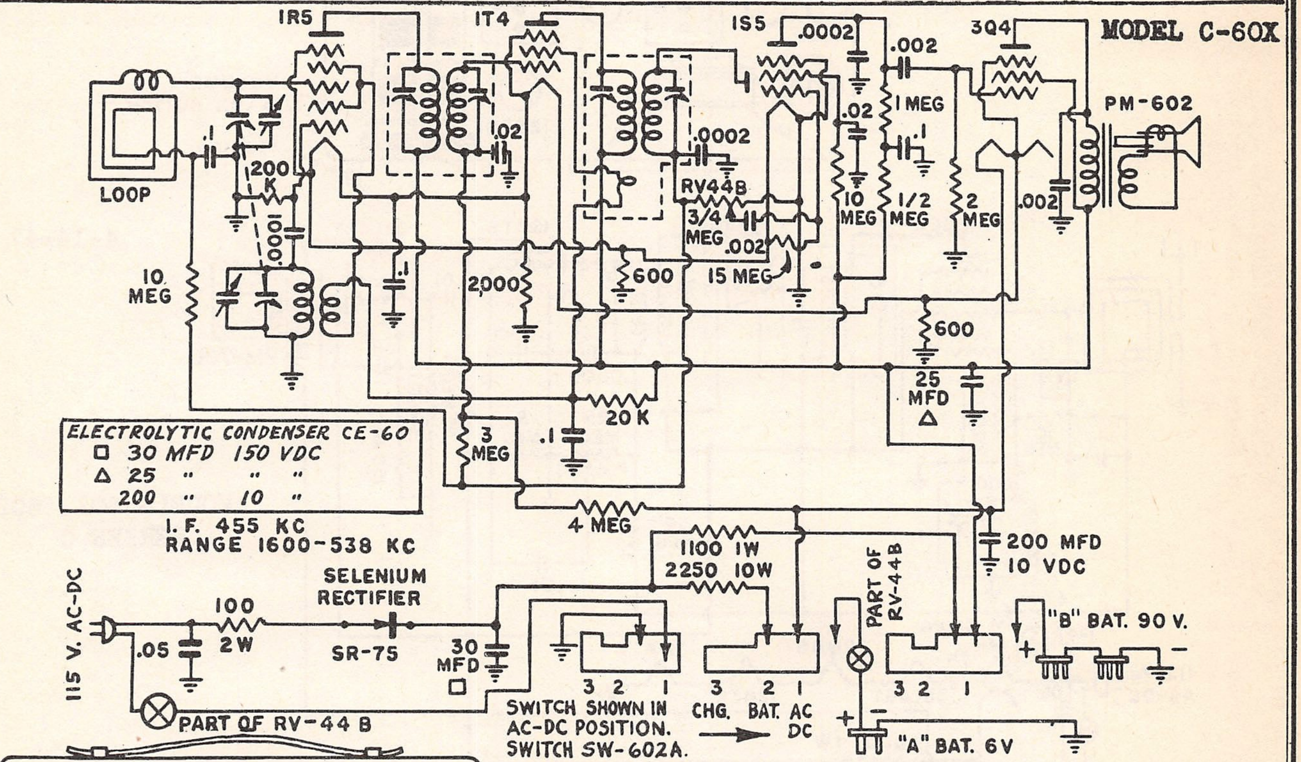
TUBE LAYOUT OUTLINE

## AUTOMATIC RADIO MFG. CO., INC.

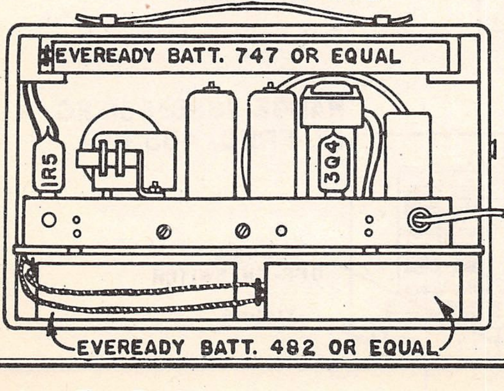
**MODEL A.T.T.P. MODEL C-60X**

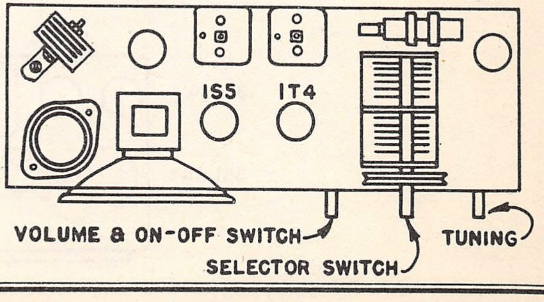

LOOP WOUND ON CASE
1R5
1T4
1S5
3S4
A575A
A575A
.002
.05
.0001
.002
.0002
1 MEG
RV 47
3/4 MEG
10 MEG
10 MEG
1 MEG
2 MEG
100 K
.0001
1000 ±5%
.05
500 ±5%
.002
450 ±5%
P.M.
PM 604
24.4 MMFD
200 MFD 10 VOLT PART OF CE60
.05
12000
.05
2 MEG
25 MFD PART OF CE60
50 5 W
115 V. AC-DC
.05
SELENIUM RECTIFIER SR-100
2650 RESISTOR ON CASE
"A" BATT.
5# C FLASHLIGHT CELLS
BATT 1
AC DC 2
CHARGE 3
SS7
3600
30 MFD-PART OF CE60
SW76
IF-455 KC RANGE-1600-530 KC
67 1/2 VOLT "B" BATT
2000

**MODEL A.T.T.P.**


1R5
1T4
1S5
3Q4
.0002
.002
PM-602
LOOP
200 K
.02
.0002
1 MEG
.02
RV44B
3/4 MEG
.002
15 MEG
10 MEG
1/2 MEG
2 MEG
.002
.0001
10 MEG
.1
2,000
600
600
25 MFD △
20 K
3 MEG
.1
4 MEG
ELECTROLYTIC CONDENSER CE-60
□ 30 MFD 150 VDC
△ 25 " "
200 " 10 "
I. F. 455 KC RANGE 1600-538 KC
1100 1W
2250 10W
200 MFD 10 VDC
115 V. AC-DC
.05
100 2W
SELENIUM RECTIFIER SR-75
30 MFD □
PART OF RV-44B
"B" BAT. 90 V.
3 2 1
3 2 1
3 2 1
SWITCH SHOWN IN AC-DC POSITION. SWITCH SW-602A.
CHG. BAT. AC DC
"A" BAT. 6V
PART OF RV-44 B

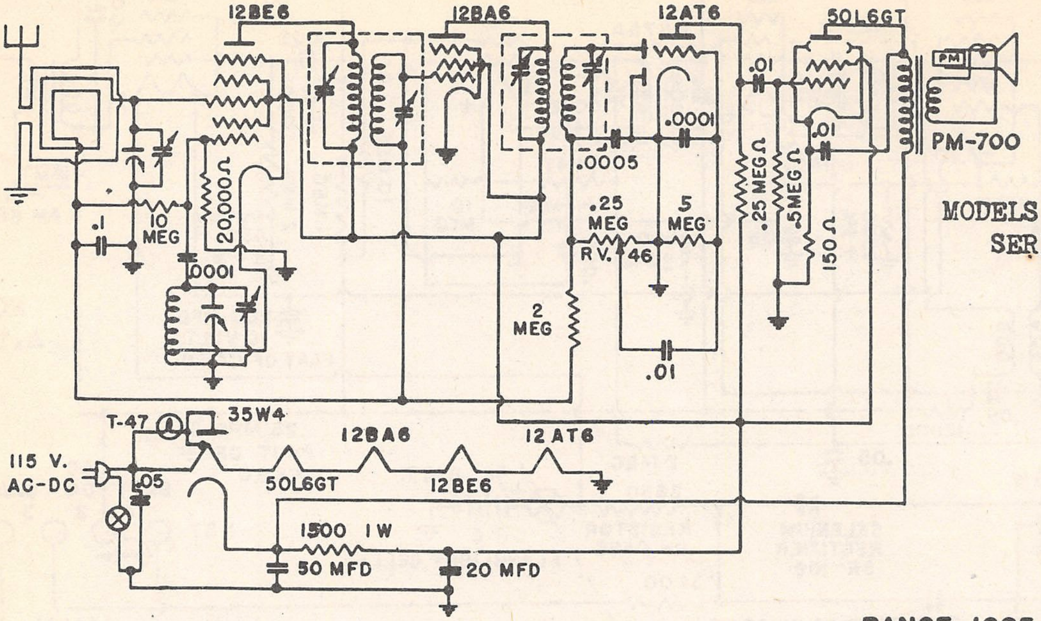
**MODEL C-60X**


EVEREADY BATT. 747 OR EQUAL
1R5
3Q4
EVEREADY BATT. 482 OR EQUAL


3Q4
1R5
1S5
1T4
VOLUME & ON-OFF SWITCH
TUNING
SELECTOR SWITCH

MODELS 601,602, Series B
MODELS 601,602, Series C

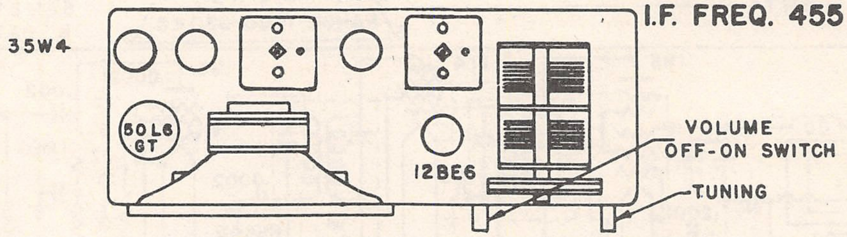
## AUTOMATIC RADIO MFG. CO., INC.

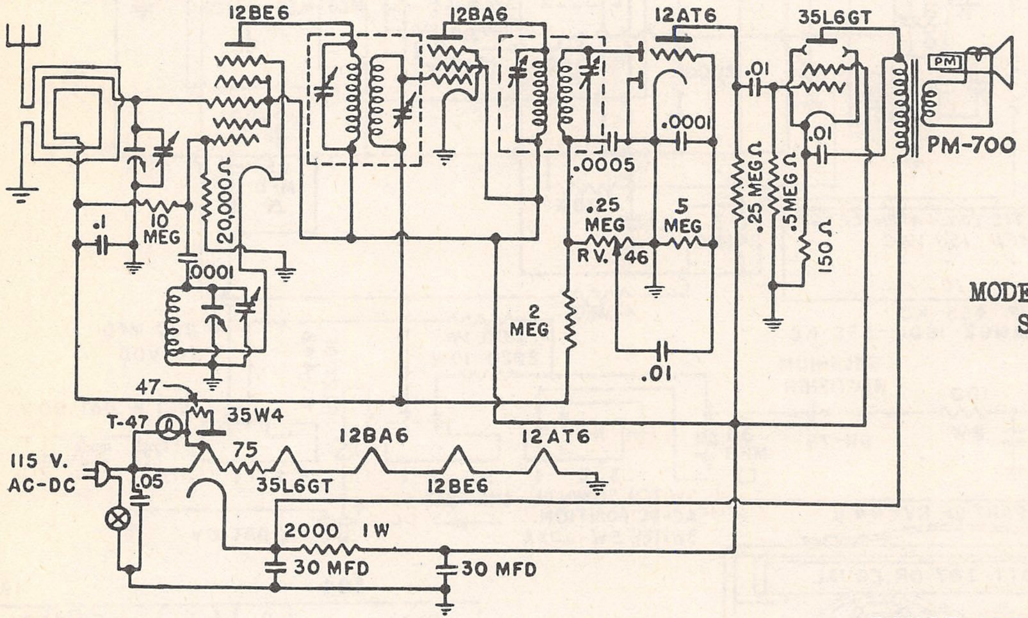

12BE6
12BA6
12AT6
50L6GT
PM
PM-700
.01
.0001
.0005
.25 MEG
5 MEG
R.V. 46
2 MEG
.01
.25 MEG Ω
.5 MEG Ω
150 Ω
.1
10 MEG
20,000 Ω
.0001
T-47
35W4
115 V. AC-DC
.05
12BA6
12AT6
50L6GT
12BE6
1500 1W
50 MFD
20 MFD

2-8-47

MODELS 601, 602
SERIES B

RANGE 1685-538 KC
I.F. FREQ. 455 KC

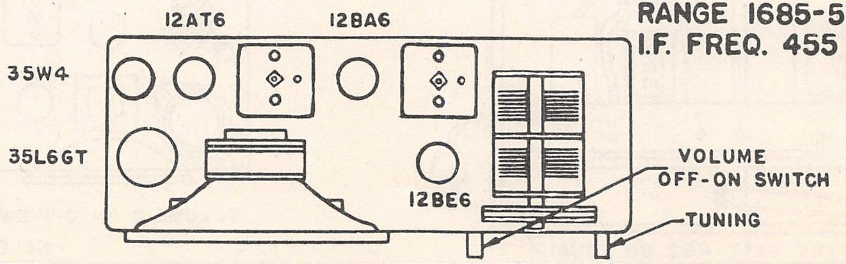

12AT6
12BA6
35W4
50L6 GT
12BE6
VOLUME
OFF-ON SWITCH
TUNING


12BE6
12BA6
12AT6
35L6GT
PM
PM-700
.01
.0001
.0005
.25 MEG
5 MEG
R.V. 46
2 MEG
.01
.25 MEG Ω
.5 MEG Ω
150 Ω
.1
10 MEG
20,000 Ω
.0001
47
T-47
35W4
115 V. AC-DC
.05
75
12BA6
12AT6
35L6GT
12BE6
2000 1W
30 MFD
30 MFD

4-14-47

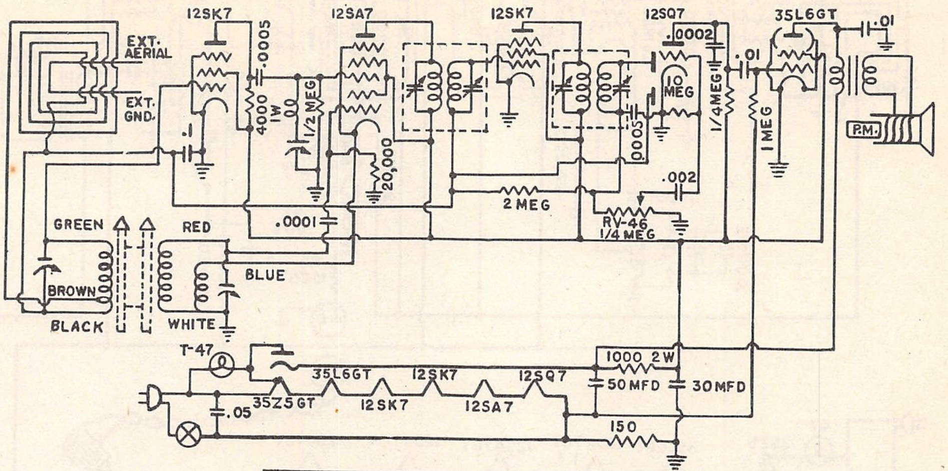
MODELS 601, 602
SERIES C

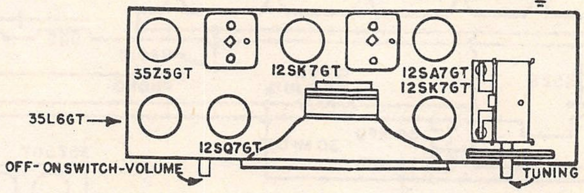
RANGE 1685-538 KC
I.F. FREQ. 455 KC


12AT6
12BA6
35W4
35L6GT
12BE6
VOLUME
OFF-ON SWITCH
TUNING

## AUTOMATIC RADIO MFG. CO., INC.

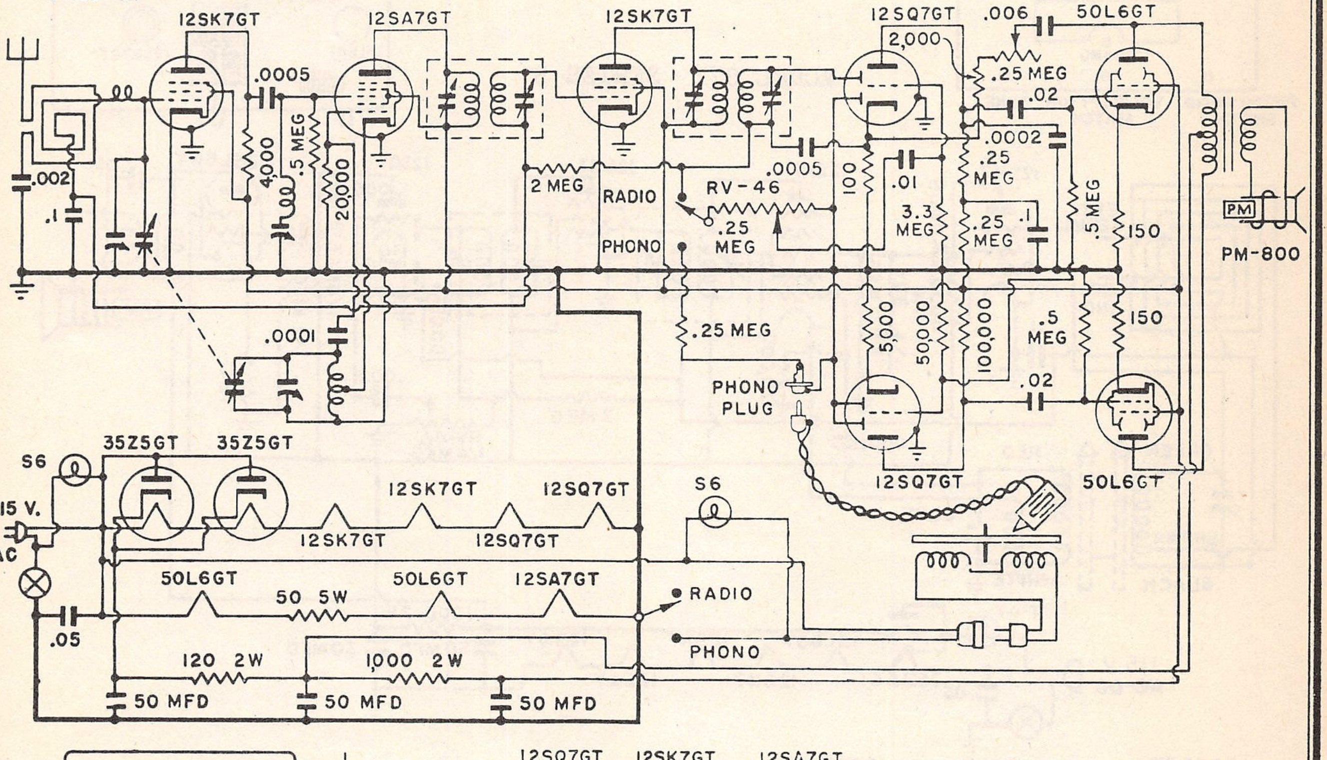
MODEL 620
MODEL F-790

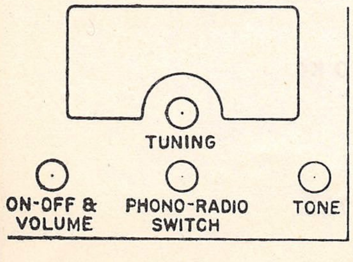

12SK7
12SA7
12SK7
12SQ7
35L6GT
EXT. AERIAL
EXT. GND.
.0005
4000 1W
1/2 MEG
20,000
.1
.0002
10 MEG
.0005
1/4 MEG
.01
1 MEG
P.M.
2 MEG
.002
RV-46 1/4 MEG
.0001
GREEN
RED
BROWN
BLUE
BLACK
WHITE
T-47
35L6GT
12SK7
12SQ7
35Z5GT
12SK7
12SA7
.05
1000 2W
50 MFD
30 MFD
150

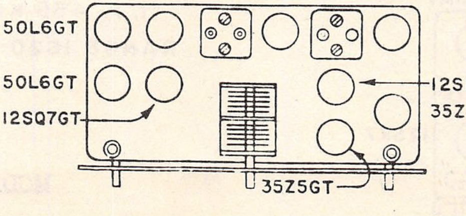

35Z5GT
12SK7GT
12SA7GT
12SK7GT
35L6GT
12SQ7GT
OFF-ON SWITCH-VOLUME
TUNING

MODEL 620

2-18-47


12SK7GT
12SA7GT
12SK7GT
12SQ7GT
50L6GT
.0005
.002
.1
4000
.5 MEG
20,000
2 MEG
RADIO
PHONO
RV-46
.25 MEG
.0005
100
.01
3.3 MEG
2,000
.006
.25 MEG
.02
.0002
.25 MEG
.25 MEG
.1
.5 MEG
150
PM
PM-800
.0001
.25 MEG
PHONO PLUG
5,000
50,000
100,000
.5 MEG
150
.02
12SQ7GT
50L6GT
S6
35Z5GT
35Z5GT
115 V. AC
12SK7GT
12SQ7GT
12SK7GT
12SQ7GT
50L6GT
50 5W
50L6GT
12SA7GT
.05
120 2W
1000 2W
50 MFD
50 MFD
50 MFD
S6
RADIO
PHONO


TUNING
ON-OFF & VOLUME
PHONO-RADIO SWITCH
TONE


12SQ7GT
12SK7GT
12SA7GT
50L6GT
50L6GT
12SQ7GT
12SK7GT
35Z5GT
35Z5GT

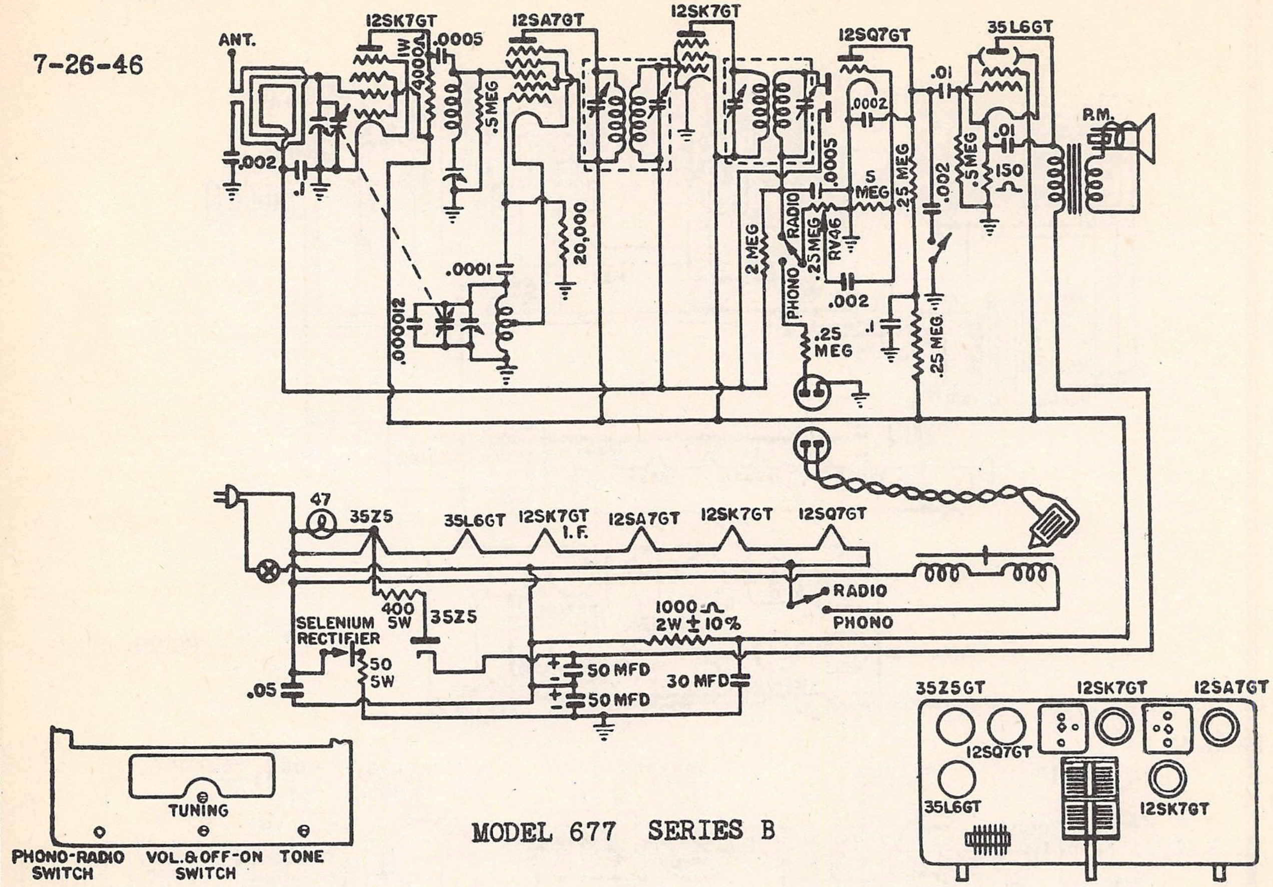
I. F. 455 K.C.
RANGE 1700-540 K.C.

MODEL F-790

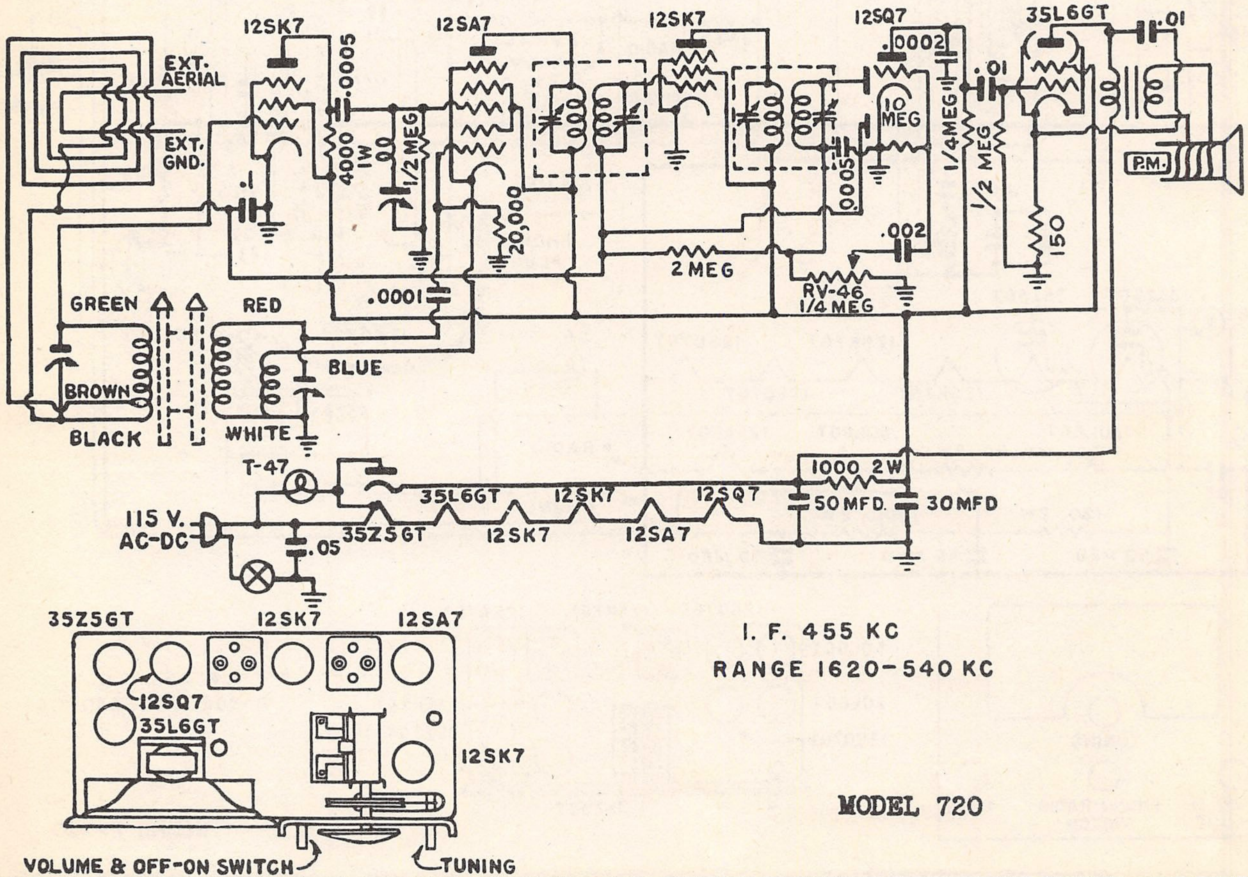
**MODEL 677, Series B**
**MODEL 720**

## AUTOMATIC RADIO MFG. CO., INC.

7-26-46


ANT.
12SK7GT
12SA7GT
12SK7GT
12SQ7GT
35L6GT
.0005
1W 4000
.5MEG
.002
.1
.00012
.0001
20,000
2 MEG
RADIO
PHONO
.25MEG
RV46
.0005
5 MEG
.0002
.25 MEG
.002
.01
.5MEG
150
.01
P.M.
.002
.1
.25 MEG
.25 MEG
47
35Z5
35L6GT
12SK7GT I.F.
12SA7GT
12SK7GT
12SQ7GT
400 5W
35Z5
SELENIUM RECTIFIER
50 5W
.05
1000 Ω 2W ± 10%
50 MFD
50 MFD
30 MFD
RADIO
PHONO
TUNING
PHONO-RADIO SWITCH
VOL.& OFF-ON SWITCH
TONE
35Z5GT
12SK7GT
12SA7GT
12SQ7GT
35L6GT
12SK7GT

MODEL 677 SERIES B


EXT. AERIAL
EXT. GND.
12SK7
.0005
4000 1W
.1
1/2 MEG
12SA7
20,000
12SK7
12SQ7
.0002
10 MEG
.005
.002
2 MEG
RV-46 1/4 MEG
35L6GT
.01
1/4 MEG
1/2 MEG
150
.01
P.M.
.0001
GREEN
RED
BLUE
BROWN
BLACK
WHITE
T-47
115 V. AC-DC
.05
35Z5GT
35L6GT
12SK7
12SK7
12SA7
12SQ7
1000 2W
50 MFD.
30 MFD
35Z5GT
12SK7
12SA7
12SQ7
35L6GT
12SK7
VOLUME & OFF-ON SWITCH
TUNING

I. F. 455 KC
RANGE 1620–540 KC

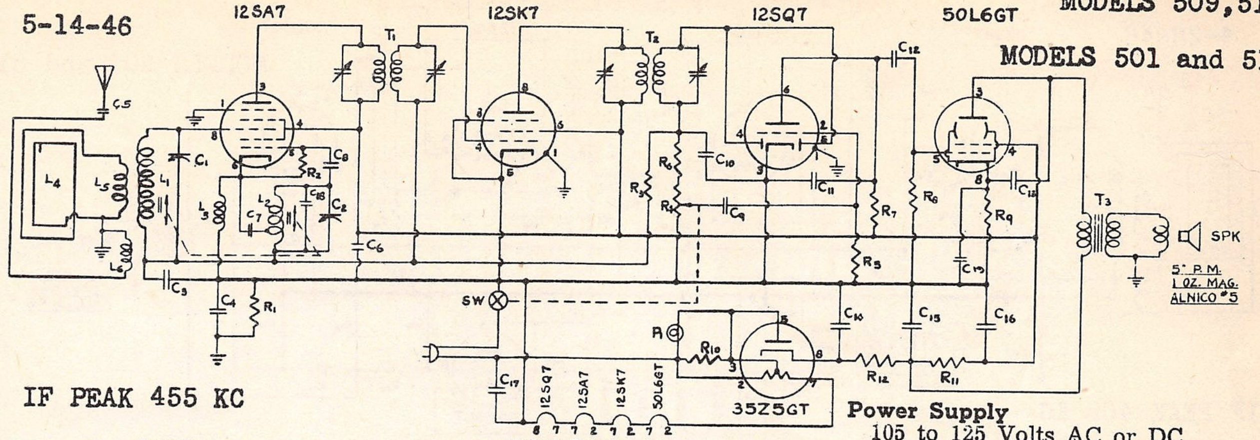
MODEL 720

# AVIOLA RADIO CORP.

**MODELS 501,512**
**MODELS 509,518**

5-14-46

## MODELS 501 and 512


12SA7
12SK7
12SQ7
50L6GT
T1
T2
C5
L4
L5
L1
C1
L6
L3
L2
C7
C18
C2
R2
C8
C6
C3
C4
R1
SW
R3
R6
R4
C10
C9
C11
R7
R5
C12
R8
R9
C13
C19
T3
SPK
5" P.M.
1 OZ. MAG.
ALNICO #5
R
R10
C14
C15
C16
R12
R11
35Z5GT
C17
12SQ7
12SA7
12SK7
50L6GT

IF PEAK 455 KC

**Power Supply**
105 to 125 Volts AC or DC

**Power Consumption**
30 Watts

**Tuning Range**
540 KC to 1625 KC

**Circuit**
5 tybe superheterodyne. Built in Antenna with provision for connecting external antenna. Do not connect ground to receiver.

### Capacitors

| | Part No. |
|---|---|
| C1 Ant. Trimmer 160 mmf | R-1072-1 |
| C2 Osc. Trimmer 160 mmf | |
| C3 .05 mf 200 V | 12000-05 |
| C4 .1 mf 200 V | 12000-1 |
| C5 100 mmf Mica | 12010-100 |
| C6 .05 mf 200 V | 12000-05 |
| C7 2000 mmf Mica | 12012-2000 |
| C8 50 mmf Mica | 12010-50 |
| C9 .01 mf 400 V | 12002-01 |
| C10 100 mmf Mica | 12010-100 |
| C11 250 mmf Mica | 12010-250 |
| C12 .01 mf 400 V | 12002-01 |
| C13 .03 mf 400 V | 12002-03 |
| C14 20 mf 150 V | 12104-20-20-20 |
| C15 20 mf 150 V | |
| C16 20 mf 150 V | |
| C17 .05 mf 400 V | 12002-05 |
| C18 250 mmf Mica | 12010-250 |
| C19 10 mf 25 V | 12105-10 |

### Resistors

| | Part No. |
|---|---|
| R1 220,000 ½W | 11005-224 |
| R2 33,000 ½W | 11005-333 |
| R3 2.2 Meg. ½W | 11005-225 |
| R4 500,000 V. C. & SW | R-1043 |
| R5 6.8 Meg ½W | 11005-685 |
| R6 47,000 ½W | 11005-473 |
| R7 470,000 ½W | 11005-474 |
| R8 470,000 ½W | 11005-474 |
| R9 150 ½W | 11005-151 |
| R10 150 ½W | 11005-151 |
| R11 1200 1W | 11008-222 |
| R12 100 ½W | 11005-101 |

### Coils & Transformers

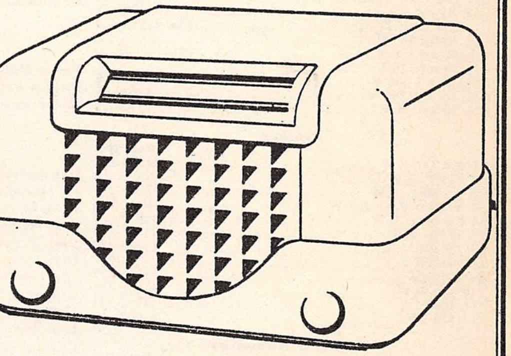
| | Part No. |
|---|---|
| L1 R. F. Coil | R-1162 |
| L2 Osc. Coil | R-1163 |
| L3 Tracking Coil | R-1165 |
| L4 Loop | R-1075 |
| L5 Primary Coil | R-1166 |
| T1 1st IF | R-1025-1 |
| T2 2nd IF | R-1025-2 |
| T3 Output Trans. | R-1040-1 |
| L6 Ant. Coil | R-1093 |

### Cabinet & Accessories

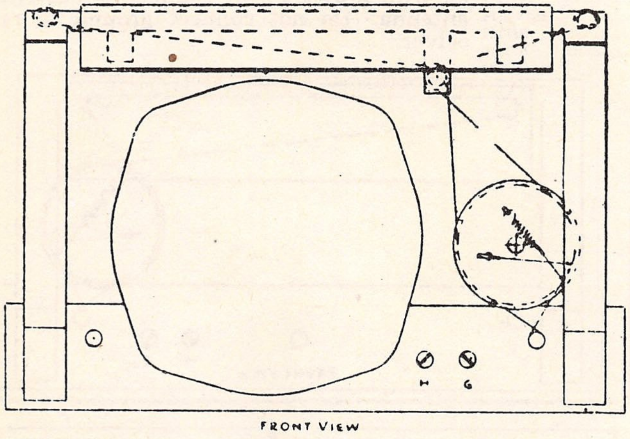
| | Part No. |
|---|---|
| Cabinet Mod. 501—Plastic | R-5000 |
| Cabinet Mod. 512—Wood | R-5004 |
| Knobs | R-1032 |

### Miscellaneous

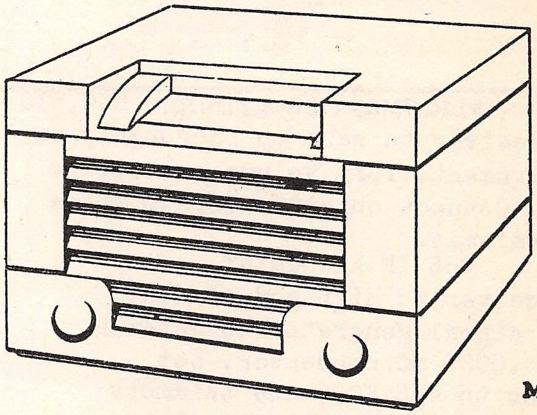
| | Part No. |
|---|---|
| Spk Speaker | R-1046 |
| P1 Mazda No. 47 | R-6005 |
| Pilot Light Socket | R-1098 |
| Dial—Glass | R-1052 |
| Dial—String | 10132 |
| Dial—Pointer | R-1255-1 |
| Dial—Spring | 10083 |
| Diffusion Screen | R-1194 |
| Pulley | R-1013 |
| Line Cord | 10111-1 |
| Tuning Shaft, Model 501 — R-1160, Model 512 — | R-1159 |
| Dial Glass Clip | R-1197 |



**Model 501**

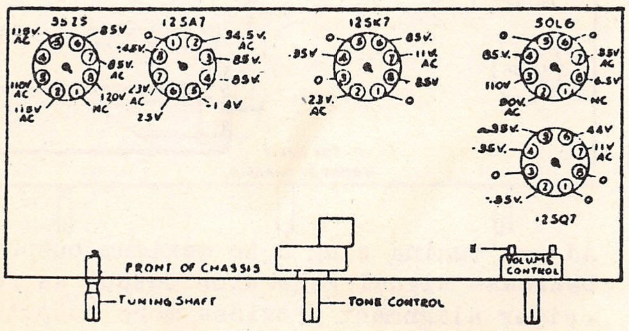


FRONT VIEW



**Model 512**

## MODELS 501,512; 509,518


35Z5
115V. AC
85V
85V. AC
110V AC
120V
115V AC
NC
12SA7
0
94.5V. AC
-4.5V.
85V.
85V.
23V. AC
-1.4V
25V
12SK7
85V.
.85V
11V. AC
0
85V
23V. AC
0
50L6
0
0
85V.
85V AC
110V
6.5V
80V. AC
NC
85V.
44V
85V.
11V AC
0
0
85V.
0
12SQ7
X
PRONT OF CHASSIS
VOLUME CONTROL
TUNING SHAFT
TONE CONTROL

VOLTAGE DIAGRAM
(BOTTOM VIEW)

### VOLTAGE DATA

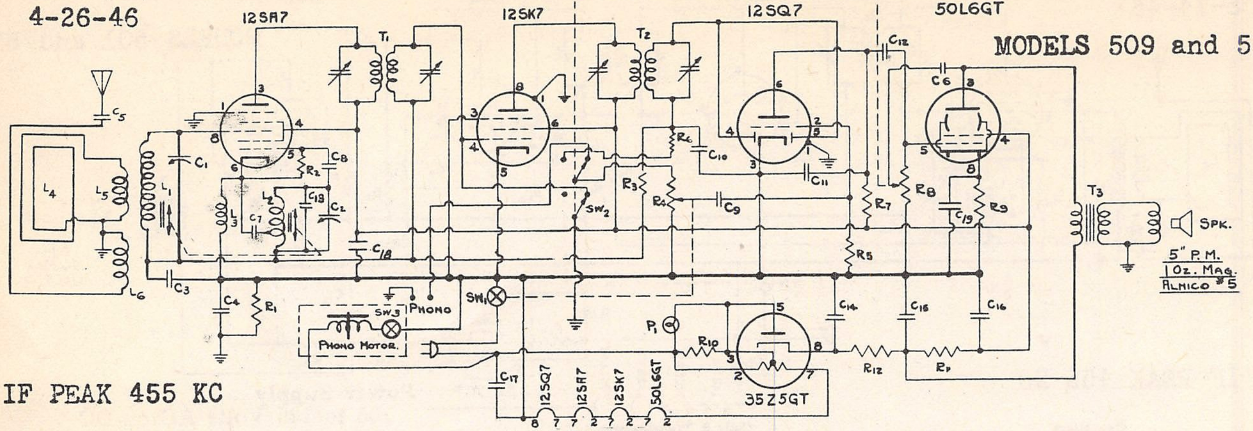
Measured in 115 Volt line.
Volume control in maximum position.
Dial tuned to low frequency end — no signal.
Readings taken between tube socket and B—bus—point x on volume control.
Voltages measured with high resistance voltmeter, 20,000 ohm per volt preferable.

MODELS 501,512 MODELS 509,518

## AVIOLA RADIO CORP.

4-26-46

MODELS 509 and 518



IF PEAK 455 KC

**Capacitors**

| | Part No. |
|---|---|
| C1 Ant. Trimmer 160 mmf | R-1027-1 |
| C2 Osc, Trimmer 160 mmf | |
| C3 .05 mf 200 V | 12000-05 |
| C4 .1 mf 200 V | 12000-1 |
| C5 100 mmf Mica | 12010-100 |
| C6 1000 mmf Mica | 12012-1000 |
| C7 2000 mmf Mica | 12012-2000 |
| C8 50 mmf Mica | 12010-50 |
| C9 .01 mf 400 V | 12002-01 |
| C10 100 mmf Mica | 12010-100 |
| C11 250 mmf Mica | 12010-250 |
| C12 .01 mf 400 V | 12002-01 |
| C13 250 mmf Mica | 12010-250 |
| C14 20 mf 150 V | 12104-20-20-20 |
| C15 20 mf 150 V | |
| C16 20 mf 150 V | |
| C17 .05 mf 400 V | 12002-05 |
| C18 .05 mf 200 V | 12000-05 |
| C19 10 mf 25 V | 12105-10 |

**Resistors**

| | Part No. |
|---|---|
| R1 220,000 ½W | 11005-224 |
| R2 33,000 ½W | 11005-333 |
| R3 2.2 Meg. ½W | 11005-225 |
| R4 500,000 V. C. & SW | R-1043-2 |
| R5 6.8 Meg. ½W | 11005-685 |
| R6 47,000 ½W | 11005-473 |
| R7 220,000 ½W | 11005-224 |
| R8 500,000 T. C. | R-1247 |
| R9 150 ½W | 11005-151 |
| R10 150 ½W | 11005-151 |
| R11 1200 1W | 11008-122 |
| R12 330 1W | 11008-331 |

**Cabinet & Accessories**

| | Part No. |
|---|---|
| Cabinet | R-5002 |
| Knobs | R-1051 |
| Lid Bracket | R-5056 |

**Coils & Transformers**

| | Part No. |
|---|---|
| L1 R. F. Coil | R11162 |
| L2 Osc. Coil | R-1163 |
| L3 Tracking Coil | R-1165 |
| L4 Loop | R-1076 |
| L5 Primary Coil | R-1166 |
| T1 1st IF | R-1025-1 |
| T2 2nd IF | R-1025-2 |
| T3 Output Trans. | R-1040-1 |
| L6 Antenna Coil | R-1093 |

**Phonograph Unit**

| | Part No. |
|---|---|
| Phono Motor & Turntable Assem. | RC-206 or RC-207 |
| Pickup Arm Assem. | RC-251 |
| Motor Switch | RC-148 |

**Miscellaneous**

| | Part No. |
|---|---|
| Spk Speaker | R-1046 |
| P1 Mazda No. 47 | R-6005 |
| Pilot Light Socket | R-1098 |
| Dial—Glass | R-1052 |
| Dial—String | 10132 |
| Dial—Pointer | R-1255-1 |
| Dial—Spring | 10083 |
| Diffusion Screen | R-1194 |
| Pulley | R-1013 |
| Line Cord | 10111-1 |
| Chassis—Mtg, screw | 10019-8-14 |
| Tuning Shaft | R-1159 |
| Dial Glass Clip | R-1019 |
| Phono-Radio Switch | R-1248 |

Specifications: These combinations are available for both 110V-60 Cycle and 50 Cycle AC.

**WARNING: DO NOT USE ON DC**
Each instrument is shipped operating on 110V-60 Cycle. Additional motor bushings will be supplied to each dealer desiring 50 Cycle operation.

**Power Supply**
105 to 125 Volts 50 or 60 Cycle AC

**Power Consumption**
50 Watts AC

**Tuning Range**
540 KC to 1625 KC

**Circuit**
5 tube superheterodyne. Built in Antenna with provision for connecting external antenna. Do not connect ground to receiver.

501,512 **ALIGNMENT PROCEDURE** 509,518

Allow receiver to warm up thoroughly before alignment. Turm volume control to maximum. Connect output meter to voice coil terminals.

455 IF ALIGNMENT

Tune receiver to high end of dial. Connect signal generator to antenna through .0005 mf condenser. Set generatot to 455 KC, tune trimmers E-F-G-D- to maximum output. Always use lowest input from signal generator that provides good output indication.

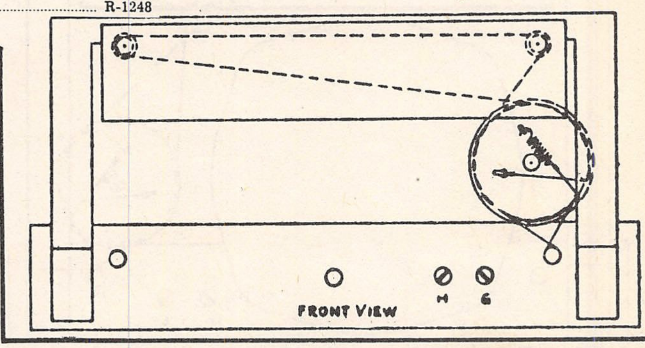
540 KC to 1640 KC ALIGNMENT

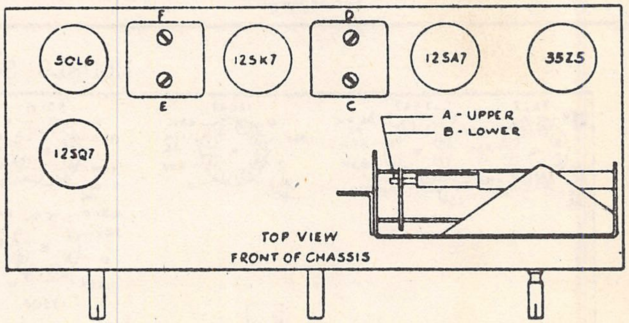
Loosely couple the signal generator to receiver by placing S.G. output lead near the pick-up antenna. (Not connected to it.) Set generator and receiver to 1400 KC.

Adjust trimmer H to signal.

Adjust trimmer G to maximum output.

Set generator to 600 KC. Tune receiver to 600 KC. Adjust tuning slug A to signal.

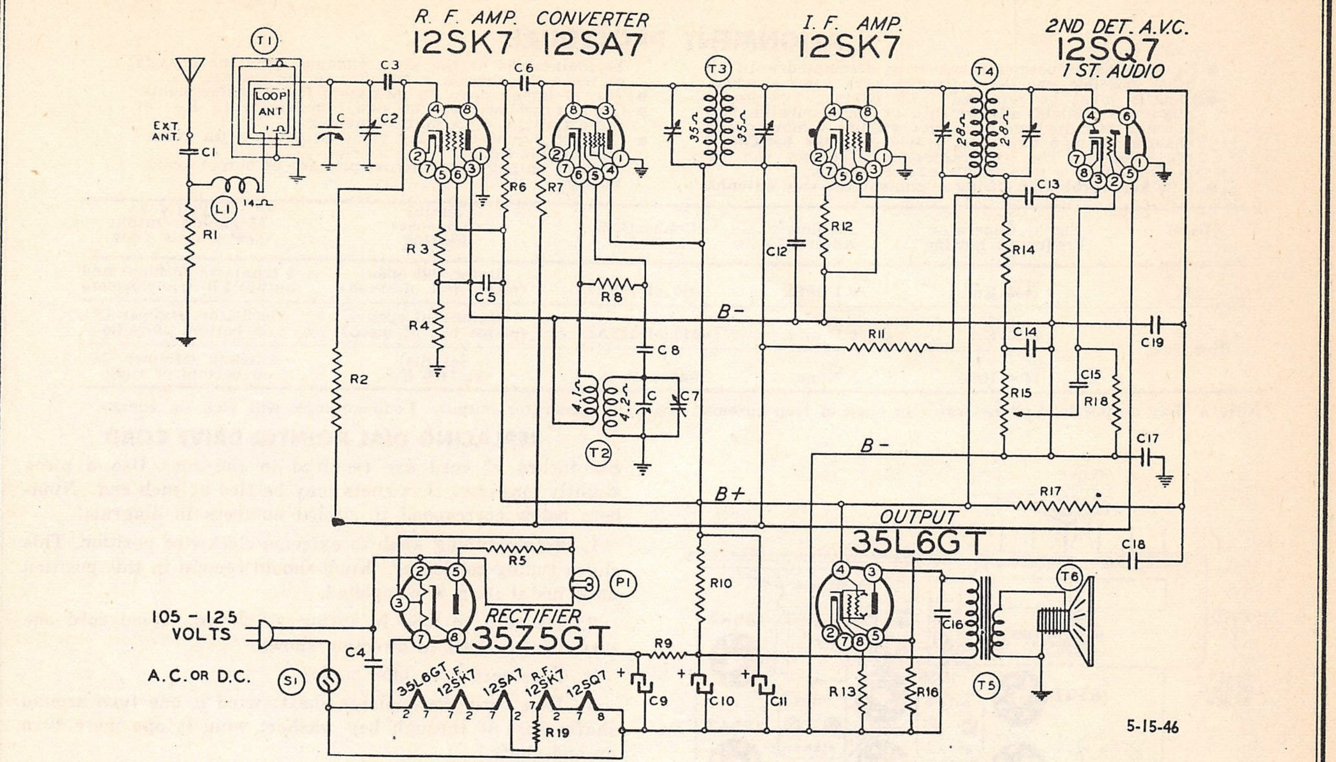




Adjust tuning slug B to maximum output. Decrease signal generator output as receiver alignment provides more output to meter.

# BELMONT RADIO CORP.

## MODEL 6D111, Series B



Tuning range ........................ 530 to 1650 Kc.
Intermediate frequency ........................ 455 Kc.
Power consumption ........................ 35 Watts
Sensitivity (for 0.05 watt output) ........................ 10 microvolts average

Selectivity ........................ 55 Kc. broad at 1000 x signal at 1000 Kc.
Power output (in voice coil)
Undistorted ........................ 0.8 watt
Maximum ........................ 1.0 watt
Voice coil impedance ........................ 3.2 ohms

### DIAL PARTS

| | |
|---|---|
| 115448 | End plate (right hand bracket) |
| 115448C | End plate (left hand bracket) |
| 115146 | Cams |
| 115143 | Key washer (13 used on cam shaft) |
| 117528 | Brass spacer (one used on cam shaft |
| 117602 | Brass spacer (four used on cam shaft |
| 131181 | Spring washers, for locking collar |
| 117604 | Locking collar |
| 117600 | Lever shaft |
| 115361 | Lever with roller |
| 120283 | Return spring for levers |
| 115449B | Dial bracket assembly |
| 112785 | Pointer |
| A-53A-10989 | Drive cord, 6 inches used |
| A-49A-11087 | Spring on tuning shaft, for cord |
| A-3N-11086 | Spacer under above spring |
| 120143 | Take-up spring for drive cord |
| B-6D-10241 | Dial scale |
| 112659 | Crystal, clear, for dial scale |
| A-2M-7758 | Cinch buttons for fastening scale to bracket |
| 117833 | Brass spacer (for spacing pointer from dial) |

### MISCELLANEOUS

| | | |
|---|---|---|
| 10798 | | Line cord and plug |
| 101218 | R15 | Volume control and switch, 1 megohm |
| B-8A-10211 | C | 2-gang variable condenser |
| 107249 | P1 | Pilot light bulb, type T-47 |
| 134123 | | Rubber bumper (bottom of cabinet) |
| 128495B | | Cardboard back |
| 131193 | | Cinch buttons, for fastening back to cabinet |
| 13141 | | Cinch buttons, to cover trimmer holes in cabinet |
| 128292B-8 | | Pushbuttons |
| 112784 | | Station call letters, set |
| 112606 | | Acetate tabs for call letters |
| 128473-9 | | Cabinet, bakelite |
| 128496-8 | | Knob, volume |
| A-5B-10994-9 | | Knob, tuning |
| A-3F-10995 | | Locking screw for tuning knob |
| 120388 | | Locking spring for tuning knob |
| A-2H-10715 | | Tube shield (for metal-base 12SA7GT) |
| A-2H-11271 | | Tube shield (for bakelite-base 12SA7GT) |

### CONDENSERS

| | | |
|---|---|---|
| C-8D-10778 | C1, C15 | .002 x 600 volts, +40%, −15% |
| 1292 | C3 | .0005, mica, ±20% |
| 1001 | C4 | .1 x 400 volts, +50%, −10% |
| 1006 | C5 | .25 x 200 volts, ±20% |
| 1295 | C6, C8, C19 | .0001, mica, ±20% |
| 11994 | C9, C10, C11 | Electrolytic (for 60-cycle sets), 40 mfd. x 150 volts, 20 mfd. x 150 volts, 20 mfd. x 150 volts. |
| A-8C-10946 | C9, C10, C11 | Electrolytic (for 25-cycle sets), 60 mfd. x 150 volts, 40 mfd. x 150 volts, 40 mfd. x 150 volts. |
| 1009 | C12 | .05 x 200 volts, ±25% |
| 129161 | C13 C14 | Dual .0001, mica, +25%, −10% |
| 10026 | C16 | .02 x 400 volts, ±25% |
| 100110 | C17 | .2 x 400 volts, +5%, —20% |
| 100106 | C18 | .004 x 600 volts, ±10% |

### RESISTORS*

| | | |
|---|---|---|
| C-9B1-70 | R1 | 4700 ohms, ½ watt, ±10% |
| C-9B1-31 | R2 | 1 megohm, ½ watt, ±20% |
| C-9B1-50 | R3 | 100 ohms, ½ watt, ±10% |
| C-9B1-26 | R4 | 150,000 ohms, ½ watt, ±20% |
| C-9B1-42 | R5 | 22 ohms, ½ watt, ±10% |
| C-9B1-17 | R6 | 4700 ohms, ½ watt, ±20% |
| C-9B1-25 | R7 | 100,000 ohms, ½ watt, ±20% |
| C-9B1-23 | R8, R14 | 47,000 ohms, ½ watt, ±20% |
| C-9B2-53 | R9 | 180 ohms, 1 watt, ±10% |
| C-9B2-63 | R10 | 1200 ohms, 1 watt, ±10% |
| C-9B1-34 | R11 | 3.3 megohms, ½ watt, ±20% |
| C-9B1-52 | R12, R13 | 150 ohms, ½ watt, ±10% |
| C-9B1-29 | R16 | 470,000 ohms, ½ watt, ±20% |
| C-9B1-27 | R17 | 220,000 ohms, ½ watt, ±20% |
| C-9B1-35 | R18 | 4.7 megohms, ½ watt, ±20% |
| C-9B2-44 | R19 | 33 ohms, 1 watt, ±10% |

### COILS

| | | |
|---|---|---|
| 12310 | L1 | Load coil |
| B-13E-10242 | T1 | Loop antenna assembly, complete on back |
| A-13D-10215 | T2 | Oscillator coil |
| 108140H | T3 | Input I.F. coil in can, 455 Kc. |
| 108145 | T4 | Output I.F. coil in can, 455 Kc. |

### SOCKETS

| | |
|---|---|
| 121210 | 8-prong octal tube sockets, molded |
| 121171 | 8-prong socket for 12SK7, laminated |
| 121216 | Socket base, bakelite |
| 107271 | Pilot light socket assembly |

### SPEAKER

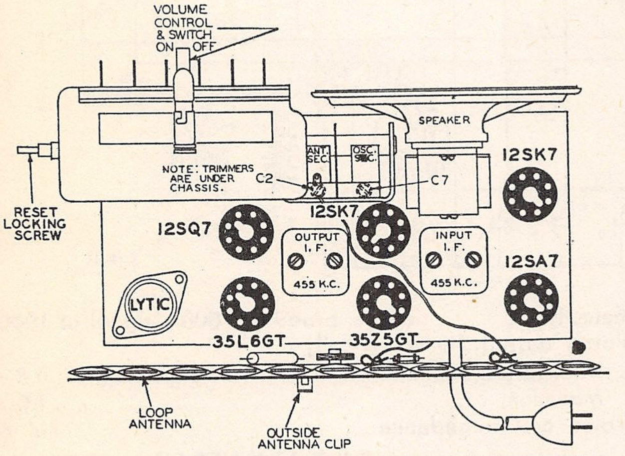
| | | |
|---|---|---|
| 114197 | T6 | 5-inch P.M. speaker |
| 105104 | T5 | Output transformer for speaker |

## ALIGNMENT PROCEDURE

- No aligning adjustments should be attempted until all other possible causes of trouble have been checked.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The two adjustment screws can be reached with a long insulated screwdriver.
- It is important that during alignment the loop antenna be maintained at the same distance from the chassis as when the chassis is installed in the cabinet.
- Turn volume control to maximum for all adjustments.
- Connect ground post of signal generator to B— of radio through a 0.1 mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.

| Band | Signal Generator Frequency Setting | Dummy Antenna | Connection to Radio | Tuning Condenser Setting | Adjust for Maximum Output (see chassis view) |
|---|---|---|---|---|---|
| I.F. | 455 Kc. | 0.1 mfd. | Grid of 12SA7 | Rotor full open (plates out of mesh) | 4 trimmers on input and output I.F. transformers |
| Broadcast | 1650 Kc. | 0.1 mfd. | Grid of 12SA7 | Rotor full open (plates out of mesh) | Oscillator trimmer C7 on bottom of radio |
| | 1400 Kc. | None | See note A | Set dial at 1400 Kc. | Antenna trimmer C2 on bottom of radio |

Note A: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop antenna will pick up energy.



CHASSIS VIEW, SHOWING TUBE LOCATIONS

### SETTING THE PUSHBUTTONS

The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations which you select. They can be set up in any order.

1. Turn on the radio. Allow it to warm up for at least one minute.

2. Push out the call letters of the six stations from the call-letter sheets supplied with this manual.

3. Insert one call-letter tab in the rectangular opening in each of the pushbuttons, in any sequence. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.

4. With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see illustration) is loose. If it is not, turn it several turns to the left (counterclockwise).

5. Press the first pushbutton down **all the way.** With one hand hold the button down **firmly** and with the other carefully tune in the desired station. Release the pushbutton.

6. Follow this procedure for each of the five other buttons, adjusting each one for a different station.

7. Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.

8. The pushbuttons are now properly set for automatic tuning. Any of the six stations may now be tuned in simply by pressing the proper button down as far as it will go. If it is desired to reset any of the buttons for a new station, loosen the locking screw in the center of the tuning knob, set the pushbutton as described above, and re-tighten the locking screw.

### REPLACING DIAL POINTER DRIVE CORD

Six inches of cord are required in the set. Use a piece slightly longer so that knots may be tied at each end. Numbers below correspond to circled numbers in diagram.

1. Rotate tuning knob to extreme clockwise position. This closes tuning condenser. Knob should remain in this position until installation is completed.

2. Tie cord to loop in spring as shown. Wind cord one turn around shaft in direction shown.

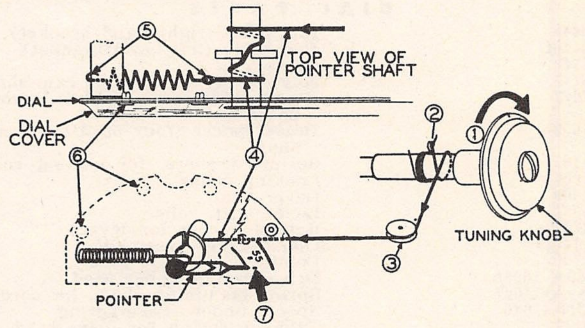
3. Pass cord over idler pulley.

4. Pass cord over pointer shaft; wind it one turn around shaft; pass it through key washer; wind it one more turn around shaft.

5. Hook spring over end of dial support. Tie cord to spring. IMPORTANT: Before tying knot stretch spring enough so that full contraction of spring will rotate pointer shaft at least one-half turn.

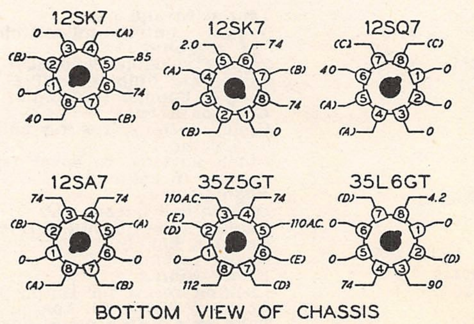
6. Remove dial crystal by removing Cinch buttons.

7. Make sure tuning knob is in extreme clockwise position. Then rotate pointer clockwise, against friction of shaft, until it is in horizontal position, as shown.



A-CANNOT BE MEASURED WITH VOLTMETER.
B-12 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
C-12 VOLTS A.C. MEASURED ACROSS PINS 7 & 8.
D-30 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
E-117 VOLTS A.C. MEASURED ACROSS PINS 2 & 6.

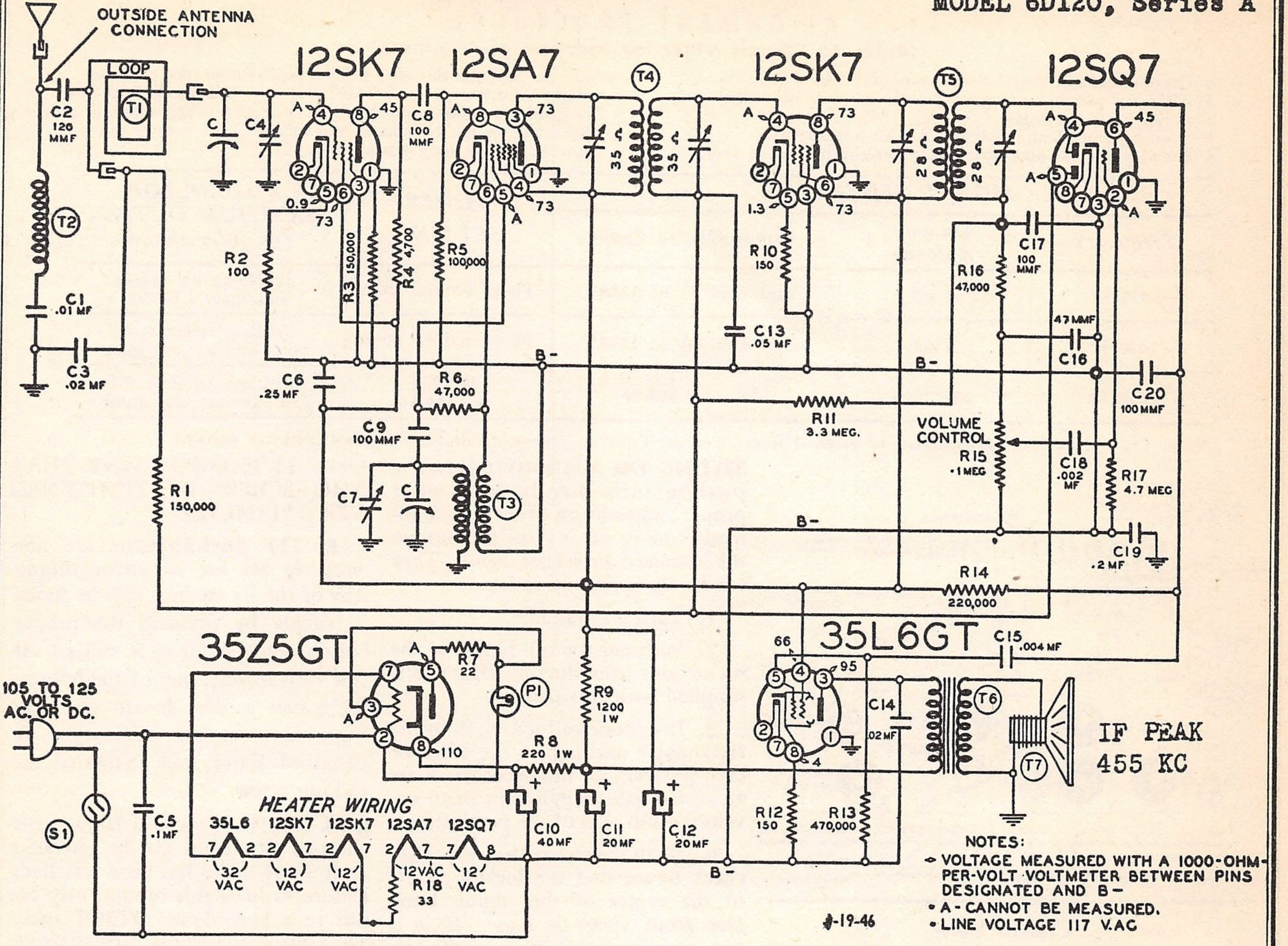
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B-. LINE VOLTAGE 117 VOLTS AC. VOLUME CONTROL AT MINIMUM.



VOLTAGES AT TUBE SOCKET TERMINALS

# BELMONT RADIO CORP.

## MODEL 6D120, Series A


OUTSIDE ANTENNA CONNECTION
LOOP
T1
T2
C2 120 MMF
C1 .01 MF
C3 .02 MF
C
C4
12SK7
12SA7
12SK7
12SQ7
C8 100 MMF
T4
T5
T3
R1 150,000
R2 100
R3 150,000
R4 4,700
R5 100,000
R6 47,000
C6 .25 MF
C9 100 MMF
C7
R10 150
C13 .05 MF
R11 3.3 MEG.
R16 47,000
C17 100 MMF
47 MMF C16
C20 100 MMF
VOLUME CONTROL R15 1 MEG
C18 .002 MF
R17 4.7 MEG
C19 .2 MF
R14 220,000
B-
35Z5GT
R7 22
P1
R9 1200 1W
R8 220 1W
35L6GT
C15 .004 MF
C14 .02 MF
T6
T7
R12 150
R13 470,000
105 TO 125 VOLTS AC. OR DC.
S1
C5 .1 MF
C10 40 MF
C11 20 MF
C12 20 MF
HEATER WIRING
35L6 32 VAC
12SK7 12 VAC
12SK7 12 VAC
12SA7 12VAC
R18 33
12SQ7 12 VAC

IF PEAK 455 KC

NOTES:
- ◇ VOLTAGE MEASURED WITH A 1000-OHM-PER-VOLT VOLTMETER BETWEEN PINS DESIGNATED AND B−
- • A - CANNOT BE MEASURED.
- • LINE VOLTAGE 117 V.AC

4-19-46

### CAPACITORS*

| | | |
|---|---|---|
| C,C4,C7 | B-8A-10211 | Two-gang, including antenna and oscillator trimmers |
| C1 | C-8D-10761 | .01 mf, 400 volts, 20% |
| C2 | C-8F3-114 | 120 mmf, 500 volts, 10%, mica |
| C3,C14 | C-8D-10774 | .02 mf, 400 volts, 20% |
| C5 | C-8D-10760 | .1 mf, 400 volts, +20%—10% |
| C6 | C-8D-10775 | .25 mf, 200 volts, +20%—10% |
| C8,C9<br>C17,C20 | C-8F3-8 | 100 mmf, 500 volts, 20%, mica |
| C10,C11,<br>C12 | 11994<br>or | Electrolytic for 60 cycles; 40 mf, 20 mf, 20 mf x 150 volts |
| | 11995 | Electrolytic for 25 cycles; 60 mf, 40 mf, 40 mf x 150 volts |
| C13 | C-8D-10770 | .05 mf, 200 volts, 20% |
| C15 | C-8D-10788 | .004 mf, 600 volts, 20% |
| C16 | C-8F3-6 | 47 mmf, 500 volts, 20%, mica |
| C18 | C-8D-10778 | .002 mf, 600 volts, +40%—15% |
| C19 | C-8D-10942 | .2 mf, 400 volts, +30%—10% |

### RESISTORS*

| | | |
|---|---|---|
| R1,R3 | C-9B1-26 | 150,000 ohms, ½ watt, 20% |
| R2 | C-9B1-50 | 100 ohms, ½ watt, 10% |
| R4 | C-9B1-70 | 4700 ohms, ½ watt, 10% |
| R5 | C-9B1-25 | 100,000 ohms, ½ watt, 20% |
| R6 | C-9B1-82 | 47,000 ohms, ½ watt, 10% |
| R7 | C-9B1-42 | 22 ohms, ½ watt, 10% |
| R8 | C-9B2-54 | 220 ohms, 1 watt, 10% |
| R9 | C-9B2-63 | 1200 ohms, 1 watt, 10% |
| R10,R12 | C-9B1-52 | 150 ohms, ½ watt, 10% |
| R11 | C-9B1-34 | 3.3 megohms, ½ watt, 20% |
| R13 | C-9B1-29 | 470,000 ohms, ½ watt, 20% |
| R14 | C-9B1-27 | 220,000 ohms, ½ watt, 20% |
| R15,S1 | 101193 | Volume control (1 megohm) and on-off switch |
| R16 | C-9B1-23 | 47,000 ohms, ½ watt, 20% |
| R17 | C-9B1-35 | 4.7 megohms, ½ watt, 20% |
| R18 | C-9B2-44 | 33 ohms, 1 watt, 10% |

### COILS AND TRANSFORMERS

| | | |
|---|---|---|
| T1,T2 | B-212-11062<br>or<br>B-212-11404 | Loop antenna assembly, including capacitors C1 and C2, coil T2, and cardboard back. |
| T3 | A-13D-10215 | Oscillator coil |
| T4 | 108140G | Input I.F. coil complete in can. Range of trimmers: 56-104 mmf |
| T5 | 108145C | Output I.F. coil complete in can. Range of trimmers: 56-104 mmf |
| T6 | 10595B | Output transformer |

### TUNER MECHANICAL PARTS

| | |
|---|---|
| 115146 | Cams (6 used on cam shaft) |
| 115143 | Key washers (12 used) |
| 117528 | Spacer (1 used on shaft) |
| 117602 | Spacer (4 used on shaft) |
| 117604 | Locking collar |
| 131181 | Spring washer for collar |
| A-3N-11086 | Spacer on shaft for drive cord |
| A-49A-11087 | Spring on shaft for drive cord |
| 115361 | Cam lever with roller |
| 120283 | Return spring for lever |
| 112785 | Pointer |
| A-53A-10989 | Drive cord (6 inches) |
| 120143 | Tension spring for drive cord |
| B-6D-10241<br>or | Dial scale |
| B-6D-10241-1 | Dial scale |
| 112659 | Crystal for dial scale |
| B-2M-10383 | Snap-in rivets (4) for crystal |

### MISCELLANEOUS

| | | |
|---|---|---|
| T7 | 114191B | Speaker, 5-inch, P.M. |
| | 121171 | Socket for tube (6 used) |
| | 10798D | Line cord and plug |
| P1 | 107249 | Dial lamp, 6-8 volts, T-47 |
| | 107271 | Socket assembly for dial lamp |
| | A-2H-11271 | Tube shield for bakelite-base 12SA7GT |
| | A-2H-10715 | Tube shield for metal-base 12SA7GT |
| | 128334B-9 | Cabinet, ivory |
| | A-5B-11249-8 | Knob, volume, ivory |
| | B-5B-10994-9 | Knob, tuning, ivory |
| | 120388 | Locking spring for tuning knob |
| | A-3F-10995 | Locking screw in tuning knob |
| | 128292B-8 | Pushbutton, ivory |
| | 134123 | Rubber bumper for bottom of cabinet |
| | 131193 | Snap-in rivets (4) for mounting back |
| | 112784 | Station call letters, 1 set |
| | 112606 | Acetate tabs for call letters |

### NOTE ON TUBE REPLACEMENT

**Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.**

---

*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control; some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences follows:

Pre-standardized value—200,000 ohms, 20%, 1/3 watt
RMA value—220,000 ohms, 20%, 1/2 watt
Pre-standardized value—50 mmf, 500 volts, 20%
RMA value—47 mmf, 500 volts, 20%

MODEL 6D120, Series A

## BELMONT RADIO CORP.

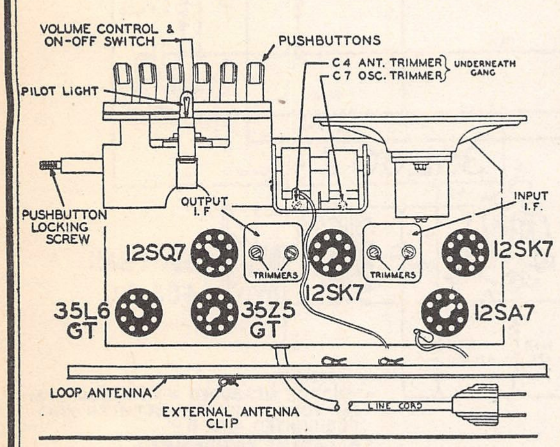
## ALIGNMENT PROCEDURE

**(Refer to Chassis View for location of trimmers)**

- Output meter across 3.2-ohm output load.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Volume control at maximum for all adjustments.
- Connect ground post of signal generator to B— of radio.
- Chassis must be removed from cabinet for proper alignment. Slight adjustments of the oscillator and antenna circuits can be made, without removing the chassis, through two holes provided on the bottom of the cabinet. The screws can be reached with a long screwdriver.

| *SIGNAL GENERATOR* | | | *TUNER SETTING* | *ADJUST FOR MAXIMUM OUTPUT (in order shown)* |
|---|---|---|---|---|
| *Frequency* | *Dummy Antenna* | *Connection to Radio* | | |
| 455 kc | .1 mf | Grid (pin 8) of 12SA7 | Plates out of mesh | Trimmers on output and input I.F. cans |
| 1650 kc | .1 mf | Grid (pin 8) of 12SA7 | Plates out of mesh | Oscillator trimmer C7 on bottom of gang |
| 1400 kc | 200 mmf | See note below | Set dial at 1400 kc | Antenna trimmer C4 on bottom of gang |

Note: Lay output lead of generator in back of loop antenna. Turn up generator output. Loop will pick up energy.



Chassis View

**SETTING THE PUSHBUTTONS**—The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations on the standard broadcast band. They can be set up in any order.

**1.** Turn on the radio.

**2.** Push out the call letters of the six stations from the call-letter sheets supplied with this manual.

**3.** Insert one call-letter tab in the rectangular opening in the front of each pushbutton, in any order. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.

**4.** With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see front view) is loose. If it is not, turn it several turns to the left (counterclockwise).

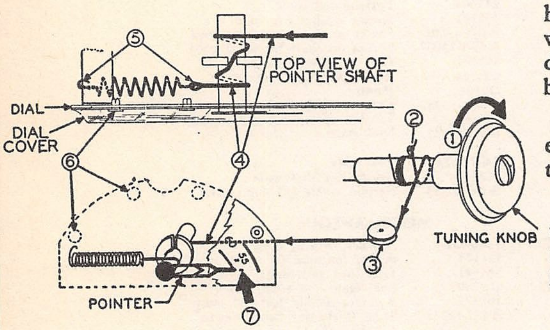
**5.** Press the first pushbutton down *all the way.* With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.

**6.** Follow this procedure for each of the five other buttons, setting each one for a different station

**7.** Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.

**8.** The pushbuttons are now properly set for automatic tuning. Any of the six stations may be tuned in simply by pressing the proper button down as far as it will go. If you wish to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.

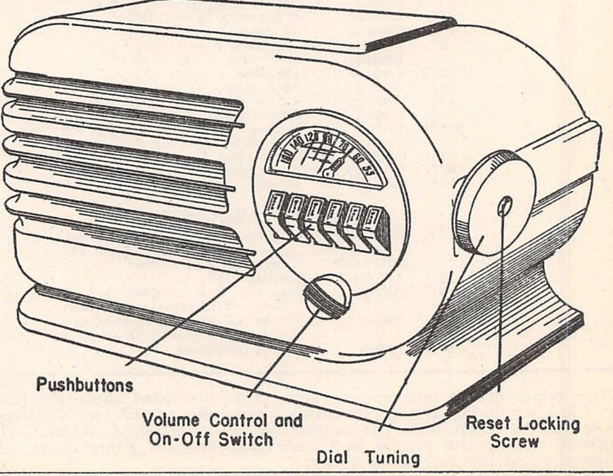
**DIAL LIGHT**—If the dial lamp burns out the set should not be operated until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube. To replace the lamp, first remove the four buttons which hold the back to the cabinet. On the inside of the back unclip the green, black, and white wires clipped to the back. The Chassis View illustration shows the location of the dial lamp. *Pull* the lamp bracket toward the rear of the radio. The lamp can now be removed and replaced. Use a 6- to 8-volt lamp, type T-47. When replacing the back on the cabinet, connect the green wire to the green-painted clip, the black wire to the black-painted clip, and the white wire to the unpainted clip.



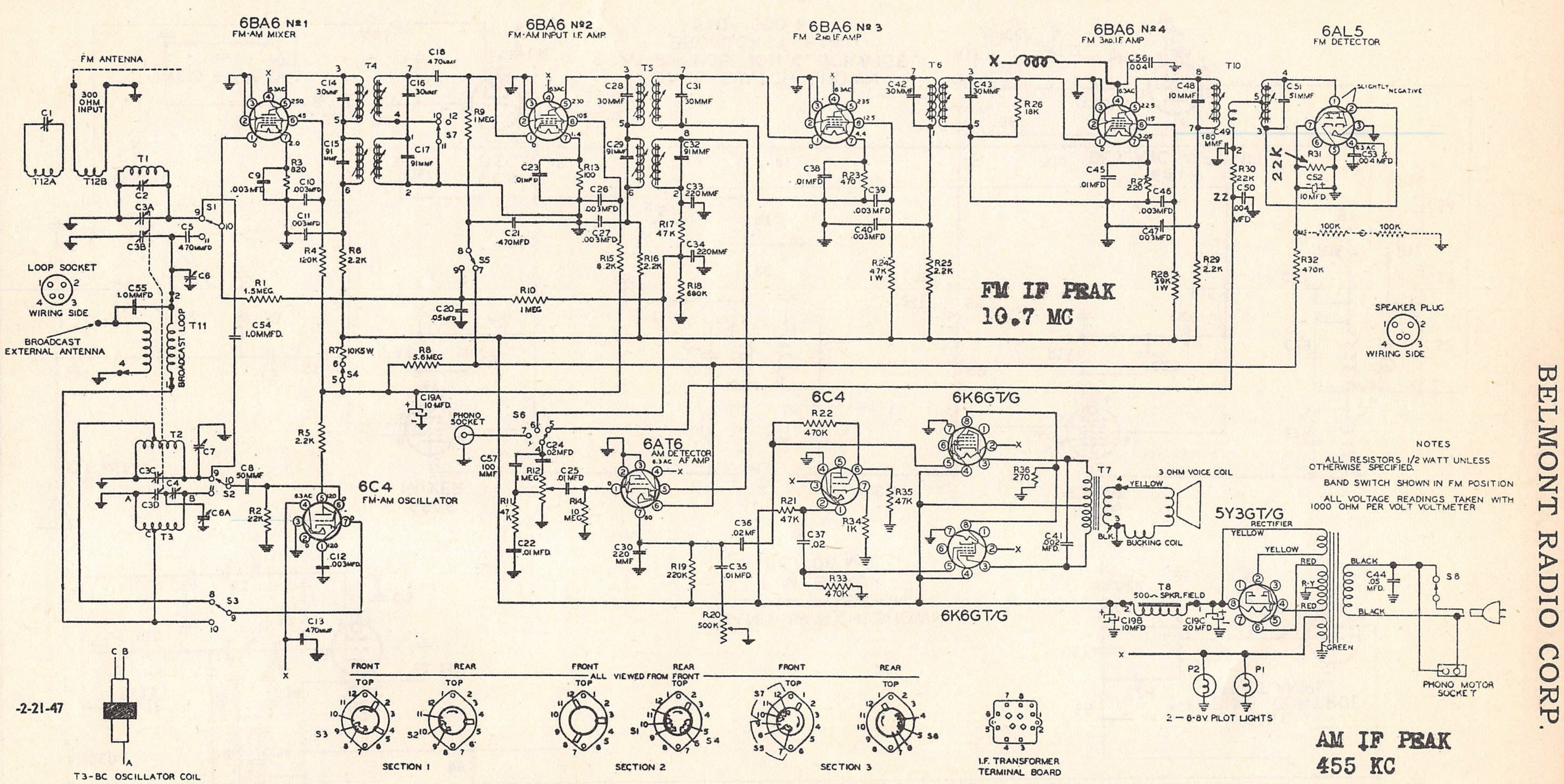
### REPLACING DIAL POINTER DRIVE CORD

Six inches of cord are required. Numbers below correspond to circled numbers in diagram.

1. Rotate tuning knob to extreme clockwise position.
2. Tie cord to loop in spring as shown.
3. Pass cord over idler pulley.
4. Pass cord OVER pointer shaft; wind it one turn around shaft; pass it through key washer, then once more around shaft.
5. Hook spring over end of dial support. Tie cord to spring. IMPORTANT: Full contraction of spring must rotate pointer shaft at least one half turn.
6. Remove dial crystal by removing snap-in rivets.
7. Make sure tuning knob is in extreme clockwise position. Then rotate pointer clockwise, against friction of shaft, until it is in a horizontal position, as shown.



## BELMONT RADIO CORP. MODEL 11AF21, Series A


6BA6 No1
FM-AM MIXER
6BA6 No2
FM-AM INPUT I.F. AMP
6BA6 No3
FM 2nd I.F. AMP
6BA6 No4
FM 3rd I.F. AMP
6AL5
FM DETECTOR
6C4
FM-AM OSCILLATOR
6AT6
AM DETECTOR AF AMP
6C4
6K6GT/G
6K6GT/G
5Y3GT/G
RECTIFIER
FM ANTENNA
300 OHM INPUT
T12A
T12B
T1
T2
T3
T4
T5
T6
T7
T8
T10
T11
LOOP SOCKET
WIRING SIDE
BROADCAST EXTERNAL ANTENNA
BROADCAST LOOP
PHONO SOCKET
SPEAKER PLUG
WIRING SIDE
3 OHM VOICE COIL
BUCKING COIL
500Ω SPKR. FIELD
YELLOW
RED
R-Y
BLACK
GREEN
BLK
PHONO MOTOR SOCKET
2 — 6-8V PILOT LIGHTS
P1
P2
S1
S2
S3
S4
S5
S6
S7
S8
SLIGHTLY NEGATIVE
22K
FRONT
REAR
TOP
ALL VIEWED FROM FRONT
SECTION 1
SECTION 2
SECTION 3
I.F. TRANSFORMER TERMINAL BOARD
T3-BC OSCILLATOR COIL
C
B
A

NOTES
ALL RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED.
BAND SWITCH SHOWN IN FM POSITION
ALL VOLTAGE READINGS TAKEN WITH 1000 OHM PER VOLT VOLTMETER

FM IF PEAK
10.7 MC

AM IF PEAK
455 KC

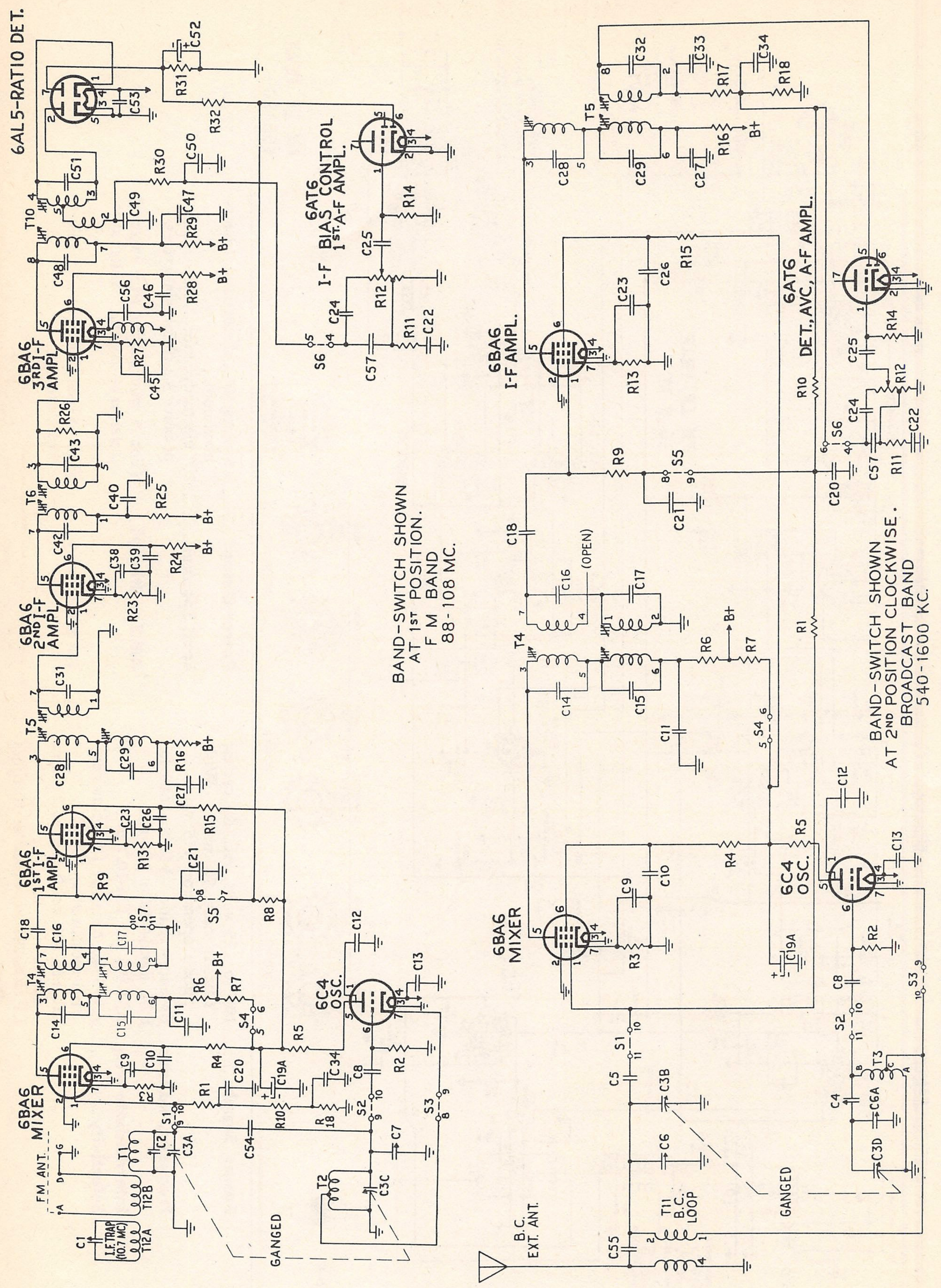
-2-21-47

| | |
|---|---|
| **Power Supply** | 105 to 125 volts, AC, 60 cycles; Chassis only 90 watts. With phono operation 115 watts. |
| **Frequency Ranges** | Broadcast Band—540 to 1600 kc.<br>F.M. Band—88 to 108 mc. |
| **Intermediate Freq.** | AM-455 kc.; FM-10.7 mc. |
| **Selectivity** | AM-50kc. broad at 1000 times signal measured at 1000 kc.<br>I.F. FM-180 kc. broad at 2 times down.<br>I.F. FM-290 kc. broad at 10 times down. |
| **Power Output** | 5.5 watts 10% distortion. 7 watts maximum. |
| **Loud Speaker** | 10″ electrodynamic. Voice coil impedance 3.2 ohms, 400 cycles. |
| **AM Sensitivity** | (For .5 watt output with external antenna)—20 microvolts average. |
| **FM Sensitivity** | (For .5 watt output)—15 microvolts average. |

"clarified schematics"

**MODEL 11AF21, Series A**

## BELMONT RADIO CORP.

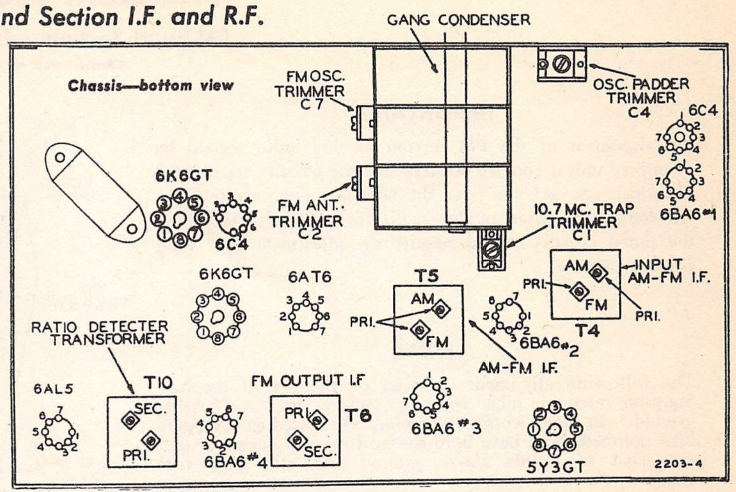

6AL5-RATIO DET.
6BA6 3RD I-F AMPL.
6BA6 2ND I-F AMPL.
6BA6 1ST I-F AMPL.
6BA6 MIXER
6C4 OSC.
6AT6 I-F BIAS CONTROL 1ST A-F AMPL.
BAND-SWITCH SHOWN AT 1ST POSITION. F M BAND 88-108 MC.
6BA6 I-F AMPL.
6AT6 DET., AVC, A-F AMPL.
6BA6 MIXER
6C4 OSC.
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST BAND 540-1600 KC.
FM ANT.
I.F. TRAP (10.7 MC) T12A
T12B
T1
T2
T3
T4
T5
T6
T10
T11 B.C. LOOP
B.C. EXT. ANT.
GANGED
GANGED
(OPEN)
B+
S1
S2
S3
S4
S5
S6
S7
C3A
C3B
C3C
C3D
C6A
C19A
C55
C57
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R23
R24
R25
R26
R27
R28
R29
R30
R31
R32

## ALIGNMENT PROCEDURE

### *Broadcast Band Section I.F. and R.F.*

The alignment procedure below includes the sensitivities at the inputs of various stages. All signal input values are based on an output of ½ watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a ½-watt output with the speaker connected. The volume control must be set at maximum. The tone control must be set for maximum treble.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycle audio signal. A 400 cycle audio signal is required for the audio measurement. Variations in sensitivities of plus or minus 25% are usually permissible.


GANG CONDENSER
Chassis—bottom view
FM OSC. TRIMMER C7
OSC. PADDER TRIMMER C4
6C4
6K6GT
6C4
FM ANT. TRIMMER C2
10.7 MC. TRAP TRIMMER C1
6BA6#1
6K6GT
6AT6
T5
AM
FM
PRI.
INPUT AM-FM I.F.
AM
FM
PRI.
PRI.
T4
6BA6#2
AM-FM I.F.
RATIO DETECTER TRANSFORMER
6AL5
T10
SEC.
PRI.
FM OUTPUT I.F
PRI.
SEC.
T6
6BA6#4
6BA6 #3
5Y3GT
2203-4

## AM - I. F. ALIGNMENT

*Band Switch in AM Position. Tune Set to 1400 Kc. Dummy Antenna .1 Mfd.*

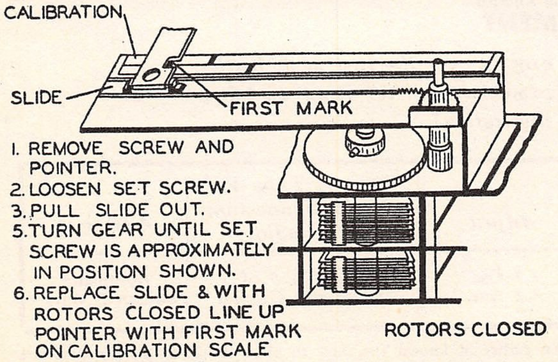
| *Signal Generator Frequency* | *Connection to Radio* | *Adjustment to Be Made* | *Adjust for* |
|---|---|---|---|
| 455 Kc. Use 2100 microvolts | Pin No. 1 of 6BA6 No. 2 and ground | Primary and Secondary of T5 AM windings. See top and bottom views | Maximum output. Should be ½ watt |
| 455 Kc. Use 64 microvolts | Pin No. 1 of 6BA6 No. 1 and ground | Primary and Secondary of T4 AM windings. See top and bottom views | Maximum output. Should be ½ watt |
| 400 cycles. Use 63 millivolts | Pin No. 1 of 6AT6 and ground | None | Maximum output. Should be ½ watt |

## BROADCAST BAND — R. F. ALIGNMENT

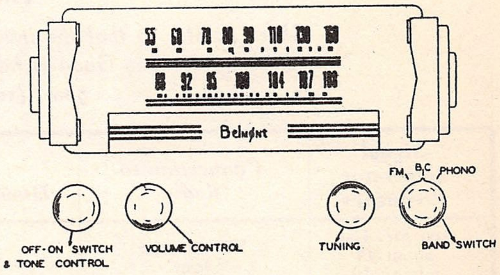
*Check Pointer so that the inside of the notch is exactly over the first mark to the extreme left when Gang is fully closed. For adjustment loosen set screw on large gear. (see dial mechanism illustration).*

| *Signal Generator Frequency* | *Connection to Radio* | *Dummy Antenna* | *Adjust* |
|---|---|---|---|
| 1400 Kc. Use 15 microvolts | Antenna and Ground | 200 mmf. | C6A for maximum. ½ watt |
| 600 Kc. Use 25 microvolts | Antenna and Ground | 200 mmf. | C4 for maximum. ½ watt |
| 1400 Kc. | Antenna and Ground | 200 mmf. | C6<br>See Note |

NOTE: Recheck first two adjustments after this adjustment because of inter-locking effects.


CALIBRATION
SLIDE
FIRST MARK
ROTORS CLOSED

1. REMOVE SCREW AND POINTER.
2. LOOSEN SET SCREW.
3. PULL SLIDE OUT.
5. TURN GEAR UNTIL SET SCREW IS APPROXIMATELY IN POSITION SHOWN.
6. REPLACE SLIDE & WITH ROTORS CLOSED LINE UP POINTER WITH FIRST MARK ON CALIBRATION SCALE
7. TIGHTEN SCREW.


55 60 70 80 90 110 130 160
88 92 96 100 104 107 108
Belmont
FM
B.C
PHONO
OFF-ON SWITCH & TONE CONTROL
VOLUME CONTROL
TUNING
BAND SWITCH

**Procedure for disassembly and assembly of dial mechanism**

## ALIGNMENT PROCEDURE

### FM Band Section. I.F. and R.F.

### IMPORTANT

No alignment of the FM section of this radio should be attempted unless you are positive that the circuits are in need of adjustment and you have the necessary equipment.

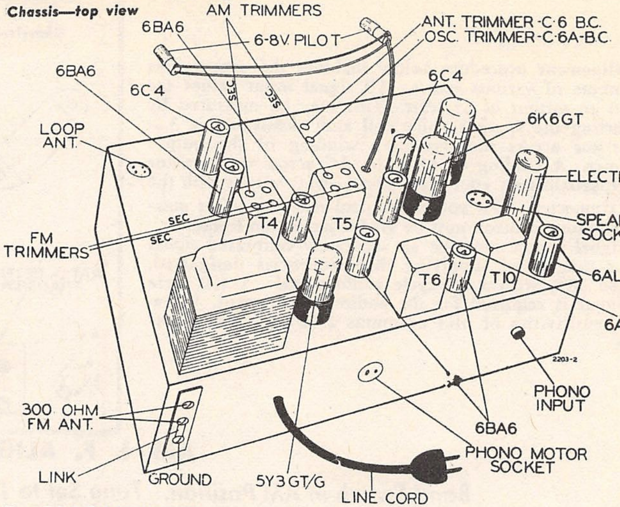
All components used in this radio are extremely stable and the tuned circuits should require no adjustment over long periods of time.

### NOTE

The following alignment is based on the use of the new Simpson vacuum tube voltmeter which has a "floating ground." In other words, the meter, when used as a vacuum tube voltmeter, can have both the positive and negative sides connected to points above ground and still give true readings.

A standard AM signal generator is required.

**Chassis—top view**



## FM - I. F. ALIGNMENT

*Band Switch in FM Position. Dummy Antenna .1 Mfd.*

| *Signal Generator Frequency* | *Connection to Radio* | *Vacuum Tube Volt Meter Connection to Radio* | *Adjustment to Be Made* | *Adjust for* |
|---|---|---|---|---|
| 10.7 Mc. Use about .1 volt | Pin No. 1 of 6BA6 No. 4 and ground | Pin No. 7 of 6AL5 and ground | Primary of T10 | Resonance should be about 3 volts |
| 10.7 Mc. Use about .1 volt | Pin No. 1 of 6BA6 No. 4 and ground | See note "A" | Secondary of T10 | Zero. Use zero center scale. See note "B" |
| 10.7 Mc. Use about 4000 microvolts | Pin No. 1 of 6BA6 No. 3 and ground | Pin No. 7 of 6AL5 and ground | Primary and Secondary of T6 | Resonance should be about 3 volts |
| 10.7 Mc. Use about 150 microvolts | Pin No. 1 of 6BA6 No. 2 and ground | Pin No. 7 of 6AL5 and ground | Primary and Secondary of 10.7 mc. windings of T5. See top and bottom views. | Resonance should be about 3 volts |
| 10.7 Mc. Use 3000 microvolts | FM Antenna input and ground | Pin No. 7 of 6AL5 and ground | Primary and Secondary of 10.7 mc. windings of T4. See top and bottom views. | Resonance should be about 3 volts See Note "C" |
| 10.7 Mc. | FM Antenna input and ground | Pin No. 7 of 6AL5 and ground | C1 | Minimum response. This is a trap circuit |

**NOTES ON FM—I.F. ALIGNMENT**

NOTE "A"—Connect two resistors, 100K OHMS each, from Pin No. 7 of 6AL5 to ground. These resistors must be matched within 5%. Connect as shown in dotted lines on schematic diagram. Connect vacuum tube voltmeter between the mid point of the resistors and point zz.

NOTE "B"—If T10 has been tampered with, it is possible that no cross-over point will be found at first. Careful adjustment of both primary and secondary is necessary.

GENERAL—Input signals should be adjusted to give approximately 3 volts. The ratio detector is operating at a reasonable level at this point and will give the truest indication of correct alignment with the procedure specified.

NOTE "C"—The input microvolts specified is based on the trap circuits being adjusted.

## FM - R. F. ALIGNMENT

*Check Pointer so that the inside of the notch is exactly over the first mark to the extreme left when Gang is fully closed. For adjustment loosen set screw on large gear. (see dial mechanism illustration).*

| *Signal Generator Frequency* | *Connection to Radio* | *Dummy Antenna* | *Adjust* | *Vacuum Tube Volt Meter Connection to Radio* | *Adjust to* |
|---|---|---|---|---|---|
| 100 Mc. Use about 15 microvolts | FM Antenna lead | 300 ohms | C7 Osc.<br>C2 Ant. | Pin No. 7 of 6AL5 and Ground | Resonance about 3 volts |

NOTE—If a signal generator with the above fundamental frequency is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is to use a local station carrier of known frequency to align the F.M. Band and to use the vacuum tube volt meter as above for resonance indication. A weak carrier, however, will not produce 3 volts.

## REPLACEMENT PARTS LIST

**When ordering specify part number, model number, and series**

### R.F. TUNER PARTS

#### CONDENSERS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| C3A-B-C-D | B-8A-11275 | Two gang split stator variable | 1 |
| C2 | A-8E-12079 | Trimmer cond. F.M. antenna | 1 |
| C1 | A-8E-11506 | Trimmer cond. I.F. trap | 1 |
| C7 | A-8E-11279 | Trimmer cond. F.M. osc. trimmer | 1 |
| C6, C6A | A-8E-12557 | Trimmer cond. B.C. antenna and oscillator | 1 |
| C4 | A-8E-12177 | Padder cond.—B.C. Band | 1 |
| C8 | C-8G-11484 | 50 mmf, ±10%, ceramic | 1 |
| C55 | C-18G-12408 | 1.0 mmf, ±.2 mmf, ceramic | 1 |
| C-9-10-11-12 | C-8G-11486 | 3000 mmf, ±20%, ceramic | 4 |
| C5-13 | C-8F3-12 | 470 mmf, 500 volts, ±20% mica | 2 |

#### RESISTORS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| R3 | C-9B1-61 | 820 ohms, ½ watt, 10% | 1 |
| R12 | A-10B-11263 | Volume control (1 megohm) | 1 |
| R20, S8 | A-11A-11262 | Tone control (500M ohms) and switch | 1 |
| R5, R6 | C-9B1-15 | 2200 ohms, ½ watt, 20% | 2 |
| R1 | C-9B1-32 | 1.5 megohm, ½ watt, 20% | 1 |
| R2 | C-9B1-78 | 22K megohms, ½ watt, 10% | 1 |

#### MISCELLANEOUS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
|  | A-15C-11491 | 7-prong miniature tube socket | 1 |
|  | A-15A-11276 | Miniature tube socket, ceramic with base | 1 |
|  | A-2H-12337 | Socket shield base | 1 |
|  | A-2H-11494 | Tube shield | 2 |
|  | 200-12862 | Spur gear assembly—consists of two gears, two springs and bushing | 1 |
|  | A-49A-11673 | Spring for above assembly | 2 |
| S1-2-3-4-5-6-7 | B-20A-11261 | Band switch and phono-radio switch | 1 |
|  | B-2C-11188-1 | Dial plate assembly with tape guide, bushing, shaft and pinion gears | 1 |
|  | A-3J-11182 | Pinion gear—inner side of plate | 1 |
|  | A-3J-11183 | Pinion gear—outer side of plate | 1 |
|  | A-3A-11181 | Shaft—for pinion gears | 1 |
|  | B-2J-11190 | Rack tape—with teeth and bracket | 1 |
|  | B-2G-10588-2 | Pointer | 1 |
|  | A-2D-11513 | Pointer bracket | 1 |
|  | A-2J-11041 | Pointer tension spring | 1 |
|  | 32F4-10830 | B.H.M.S. 4-40 x ⅛ screw, to fasten pointer and bracket to tape bracket | 1 |

#### COILS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| T2 | A-13D-11282 | 88-108 mc oscillator coil | 1 |
| T1 | A-13E-11283 | 88-108 mc antenna coil secondary | 1 |
| T12A, T12B | A-13E-11284 | 88-108 mc antenna coil primary with trap | 1 |

### MAIN CHASSIS PARTS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| C52 | A-8C-11495 | Electrolytic condenser 10 mfd x 150 volts | 1 |
| C19A, B, C | A-8C-10272 | Electrolytic condenser 10 mfd x 10 mfd x 20 mfd | 1 |
| C24, C36, C37 | C-8D-10774 | .02 mfd x 400 v., 20%, tubular | 3 |
| C20 | C-8D-10770 | .05 mfd x 200 v., 20%, tubular | 1 |
| C22 | C-8D-11738 | .01 mfd x 200 v., 20%, tubular | 1 |
| C25, 35 | C-8D-10761 | .01 mfd x 400 v., 20%, tubular | 2 |
| C50, 53, 56 | C-8D-10788 | .004 mfd x 600 v., 20%, tubular | 3 |
| C49 | C-8F3-116 | 180 mmfd x 500 v., 10%, mica | 1 |
| C23, 38, 45 | C-8F9-20 | 10K mmfd x 300 v., 20%, mica | 3 |
| C21,18 | C-8F3-12 | 470 mmfd x 500 v., 20%, mica | 2 |
| C30, 33, 34 | C-8F3-10 | 220 mmfd x 500 v., 20%, mica | 3 |
| C44 | C-8J-11388 | .05 mfd x 600 v., 20%, molded case paper | 1 |
| C26-27-39-40-46-47 | C-8G-12449 | 3000 mmfd, 20%, ceramic-insulated | 6 |
| C14, 16, 28, 31, 42, 43 | C-8G-12159 | 30 mmfd, 500 volts, 5%, ceramic | 6 |
| C48 | C-8G-11789 | 10 mmfd, 10%, ceramic | 1 |
| C51 | C-8G-11891 | 51 mmfd, 5%, ceramic | 1 |
| C15-17 | C-8G-12160 | 91 mmfd, 5%, ceramic | 2 |
| C-29-32 | C-8F5-224 | 91 mmfd, 5%, silver mica | 2 |
| C41 | C-8D-10789 | .002 mfd x 600 v., 20% | 1 |
| C57 | C-8F3-8 | 100 mmfd x 500 v., 20%, mica | 1 |

#### RESISTORS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| R4 | C-9B1-87 | 120K ohms, ½ watt, 10% | 1 |
| R15 | C-9B1-73 | 8200 ohms, ½ watt, 10% | 1 |
| R26 | C-9B1-77 | 18K ohms, ½ watt, 10% | 1 |
| R18 | C-9B1-96 | 680K ohms, ½ watt, 10% | 1 |
| R21, 35 | C-9B1-82 | 47K ohms, ½ watt, 10% | 2 |
| R28 | C-9B2-81 | 39K ohms, 1 watt, 10% | 1 |
| R7 | B-9C-11489 | 10K ohms, 5 watts, 10%, wirewound | 1 |
| R30 | C-9B1-78 | 22K ohms, ½ watt, 10% | 1 |
| R16, 25, 29 | C-9B1-15 | 2200 ohms, ½ watt, 20% | 3 |
| R8 | C-9B1-107 | 5.6 megohms, ½ watt, 10% | 1 |
| R9, 10 | C-9B1-31 | 1 megohm, ½ watt, 20% | 2 |
| R13 | C-9B1-50 | 100 ohms, ½ watt, 10% | 1 |
| R11, R17 | C-9B1-23 | 47K ohms, ½ watt, 20% | [illegible] |
| R19 | C-9B1-27 | 220K ohms, ½ watt, 20% | 1 |
| R14 | C-9B1-37 | 10 megohms, ½ watt, 20% | 1 |
| R27 | C-9B1-54 | 220 ohms, ½ watt, 10% | 1 |
| R32, 22, 33 | C-9B1-94 | 470K ohms, ½ watt, 10% | 3 |
| R31 | C-9B1-78 | 22K ohms, ½ watt, 10% | 1 |
| R23 | C-9B1-58 | 470 ohms, ½ watt, 10% | 1 |
| R34 | C-9B1-62 | 1000 ohms, ½ watt, ±10% | 1 |
| R36 | C-9B2-55 | 270 ohms, 1 watt, ±10% | 1 |

#### COILS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| T3 | A-13D-11285 | B.C. oscillator coil | 1 |
| T4 | C-203-11743 | Input I.F. coil combination assembly, 455 kc and 10.7 mc | 1 |
| T5 | C-203-11746 | 2nd I.F. coil combination assembly, 455 kc and 10.7 mc | 1 |
| T6 | C-203-11744 | 3rd I.F. coil assembly, 10.7 mc | 1 |
| T10 | C-203-11745 | Ratio detector I.F. coil assembly, 10.7 mc | 1 |
| T11, C55 | C-13E-12340 | Loop antenna assembly with 1.0 mmfd cond. C-8G-12408 | 1 |

#### TRANSFORMERS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| T7 | B-12C-10234-2 | Output transformer for speaker | 1 |
| T9 | B-12A-12254 | Power transformer—105-125 volts AC, 60 cycles primary | 1 |

#### SPEAKER

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| T8 | B-18B-10617 | Electrodynamic speaker, 10-inch, less output transformer | 1 |

#### MISCELLANEOUS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
|  | C-6D-12459 | Dial scale | 1 |
|  | B-5C-12457-14 | Escutcheon—walnut | 2 |
|  | B-5C-12457-41 | Escutcheon—mahogany | 2 |
|  | B-5B-10376-14 | Knob, "Volume"—walnut | 1 |
|  | B-5B-11672-14 | Knob, "Bandswitch"—walnut | 1 |
|  | B-5B-10377-14 | Knob, "Tuning"—walnut | 1 |
|  | B-5B-10378-14 | Knob, "Tone"—walnut | 1 |
|  | B-5B-10376-41 | Knob, "Volume"—mahogany | 1 |
|  | B-5B-11672-41 | Knob, "Bandswitch"—mahogany | 1 |
|  | B-5B-10377-41 | Knob, "Tuning"—mahogany | 1 |
|  | B-5B-10378-41 | Knob, "Tone"—mahogany | 1 |
|  | B-47A-12458 | Pilot lite assembly | 1 |
| P1, P2 | A-46A-11739 | Pilot lite bulb, 6-8 volt, T-44 | 2 |
|  | A-19B-11009 | Socket for phono motor | 1 |
|  | A-15B-11538 | Speaker socket | 1 |
|  | A-19B-12170 | Socket for tone arm lead | 1 |
|  | A-19B-11272 | Antenna socket | 1 |
|  | A-15B-10440 | 8-prong, octal, tube socket | 3 |
|  | A-15C-10717 | 7-prong, miniature tube socket | 6 |
|  | A-2H-10718 | Shield base | 6 |
|  | A-2H-10974 | Shield can | 6 |
|  | B-14M-11479 | A.C. line cord | 1 |
|  | A-23A-10344 | Line cord lock | 1 |

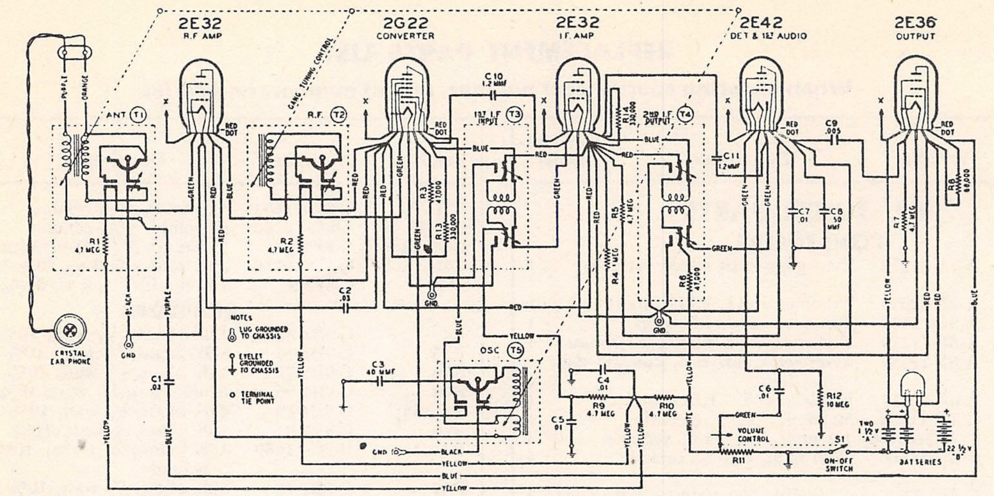
#### RECORD CHANGER

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| B-201-12262 |  | Record changer assembly, 115 volts, 60 cycles | 1 |

Note: For list of record changer parts, see Record Changer Manual.

MODELS 5P113,5P116,5P117,
Boulevard

## BELMONT RADIO CORP.


2E32
R.F. AMP
2G22
CONVERTER
2E32
I.F. AMP
2E42
DET & 1ST AUDIO
2E36
OUTPUT
GANG TUNING CONTROL
ANT (T1)
R.F. (T2)
1ST I.F. INPUT (T3)
2ND I.F. OUTPUT (T4)
OSC (T5)
C10 1.2 MMF
C11 1.2 MMF
C9 .005
C7 .01
C8 50 MMF
C2 .03
C1 .03
C3 40 MMF
C4 .01
C5 .01
C6 .01
R1 4.7 MEG
R2 4.7 MEG
R3 47,000
R13 330,000
R14 330,000
R5 4.7 MEG
R4 1 MEG
R6 47,000
R7 4.7 MEG
R8 68,000
R9 4.7 MEG
R10 4.7 MEG
R11
R12 10 MEG
VOLUME CONTROL
S1
ON-OFF SWITCH
TWO 1½V "A"
22½V "B"
BAT SERIES
CRYSTAL EAR PHONE
PURPLE
ORANGE
RED DOT
GREEN
RED
BLUE
BLACK
YELLOW
WHITE
GND
NOTES
LUG GROUNDED TO CHASSIS
EYELET GROUNDED TO CHASSIS
TERMINAL TIE POINT

### CAPACITORS

| | | |
|---|---|---|
| C1, C2 | A-8J-10295 | .03 mf, 150 volts, 20% |
| C3 | A-8G-11083 | 40 mmf, ±2.5 mmf |
| C6, C7 | A-8J-10297 | .01 mf, 150 volts, 20% |
| C8 | A-8J-10298 | 50 mmf, 150 volts, 20% |
| C9 | A-8J-10296 | .005 mf, 150 volts, 20% |
| C10, C11 | A-13G-11303 | 1.2 mmf, ±0.2 mmf (two wires) |

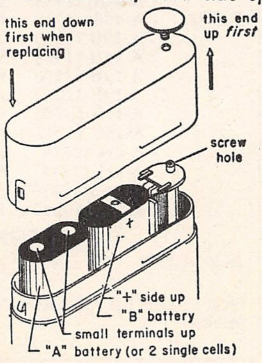
### RESISTORS

| | | |
|---|---|---|
| R3 | C-9B9-82 | 47,000 ohms, 1/5 watt, 10% |
| R4 | C-9B3-98 | 1 megohm, 1/3 watt, 10% |
| R5, R7 | C-9B3-106 | 4.7 megohms, 1/3 watt, 10% |
| R8 | C-9B9-84 | 68,000 ohms, 1/5 watt, 10% |
| R12 | C-9B3-37 | 10 megohms, 1/3 watt, 20% |
| R13, R14 | C-9B9-92 | 330,000 ohms, 1/5 watt, 10% |

### MISCELLANEOUS

| | |
|---|---|
| A-48A-10346 | Crystal phone |
| A-19B-10354 | Phone connector and cord |
| A-5M-10455 | Earpiece (medium) |
| A-5M-10455-1 | Earpiece (small) |
| A-5M-10455-2 | Earpiece (large) |
| B-2E-10308 | End bell, top (Model 5P116) |
| B-2E-10308-1 | End bell, top (Models 5P113, 5P117) |
| B-202-10419 | End bell, bottom (Model 5P116) |
| B-202-10419-1 | End bell, bottom (Models 5P113, 5P117) |
| A-5B-10466-2 | Knob, tuning (Models 5P113, 5P117) |
| A-5B-10466-51 | Knob, tuning (Model 5P116) |
| A-5B-10806-2 | Knob, volume (Models 5P113, 5P117) |
| A-5B-10806-51 | Knob, volume (Model 5P116) |

**How to Install Them** — Three "A" batteries and one "B" battery are supplied with the Boulevard. The extra "A" batteries are for replacement purposes. Remove the screw on the bottom of the radio and lift off the end bell, *screw side up first*, as shown in the illustration. (To avoid distorting the end bell, grasp it at the ends, *not on the sides*. Insert the "A" and "B" batteries in the case exactly as shown, with the "B" battery on the side with the screw hole. (If desired, the wide rubber band supplied with the set may be placed around the batteries to prevent any movement.) Then replace the end bell and the screw.


this end down first when replacing
this end up *first*
screw hole
"+" side up
"B" battery
small terminals up
"A" battery (or 2 single cells)

## ALIGNMENT PROCEDURE

Output meter must give 1.5-volt deflection without loading output tube.

Use any 1½-volt "A" battery and 22½-volt "B" battery which can be connected to set. Keep battery leads short.

Unsolder lead between .03 mf output capacitor and purple lead (see illustration). Connect one side of meter to this capacitor terminal, other side to receiver chassis. *Be sure to reconnect leads after alignment is completed.*

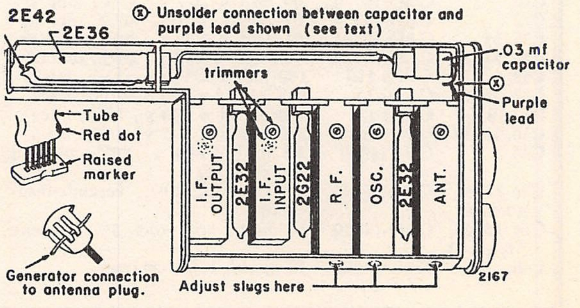
Volume control at maximum.

Connect ground lead of generator to chassis.

Align for maximum output. Reduce input as needed to keep output near 1.5 volts.

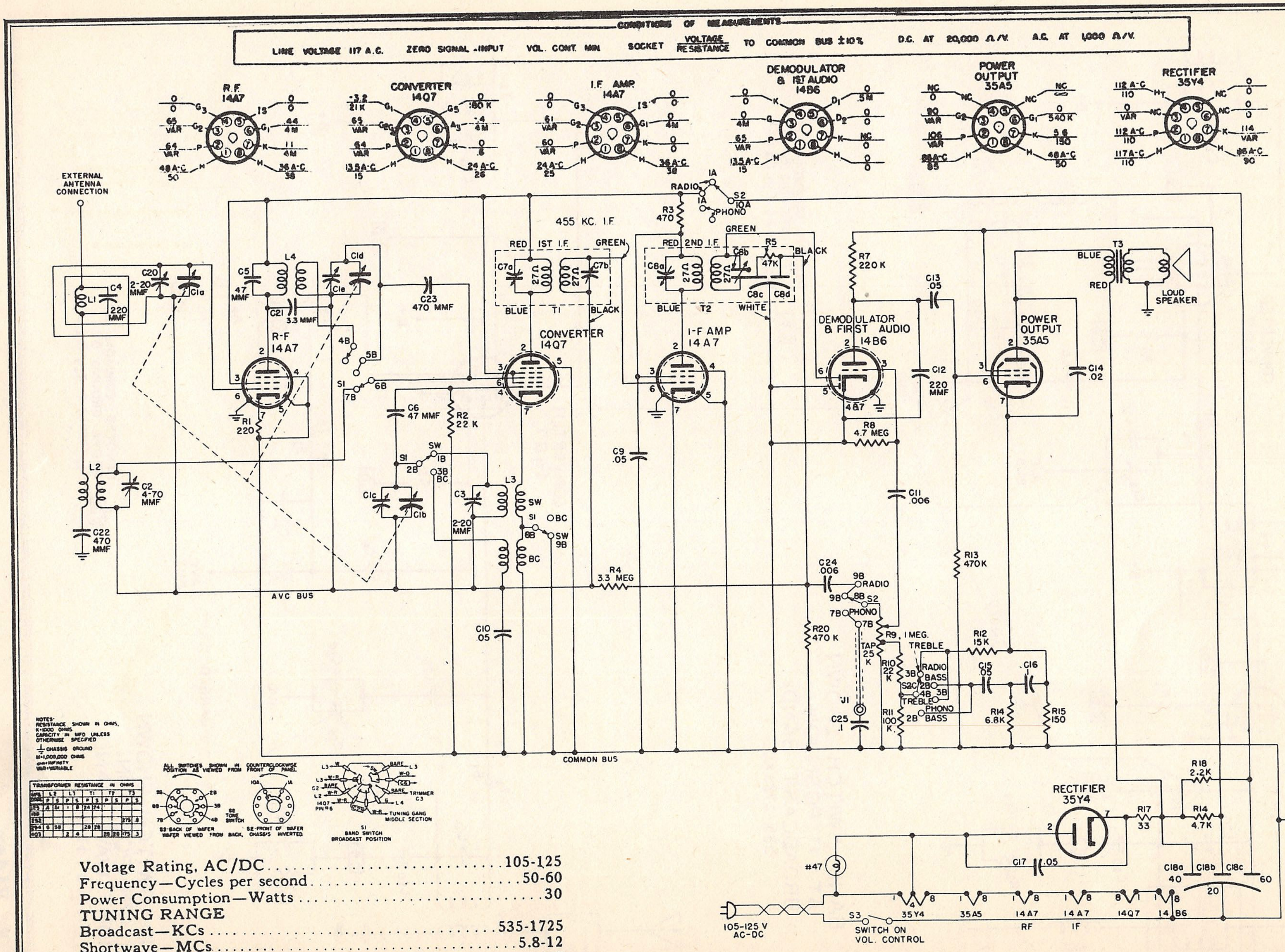
| Generator Frequency | Coupling Capacitor | Connection to Set | Adjust for Max. Output |
|---|---|---|---|
| 455 kc | .1 mf | Converter 2G22 grid | Trimmers on both I.F. transformers |
| 1625 kc | .1 mf | Converter 2G22 grid | Oscillator trimmer |
| 1400 kc | .1 mf | Converter 2G22 grid | Oscillator tuning slug* |
| 1625 kc | 10 mmf | Antenna lead (see illust.) | Osc, ant, rf trimmers |
| 1400 kc | 10 mmf | Antenna lead | Antenna, rf tuning slugs* |

Repeat this and previous step alternately for best tracking.


2E42
2E36
Ⓧ Unsolder connection between capacitor and purple lead shown (see text)
.03 mf capacitor
Ⓧ
Purple lead
trimmers
Tube
Red dot
Raised marker
I.F. OUTPUT
2E32
I.F. INPUT
2G22
R.F.
OSC.
2E32
ANT.
Generator connection to antenna plug.
Adjust slugs here
2167

# BENDIX RADIO DIV.

## MODEL 626-A

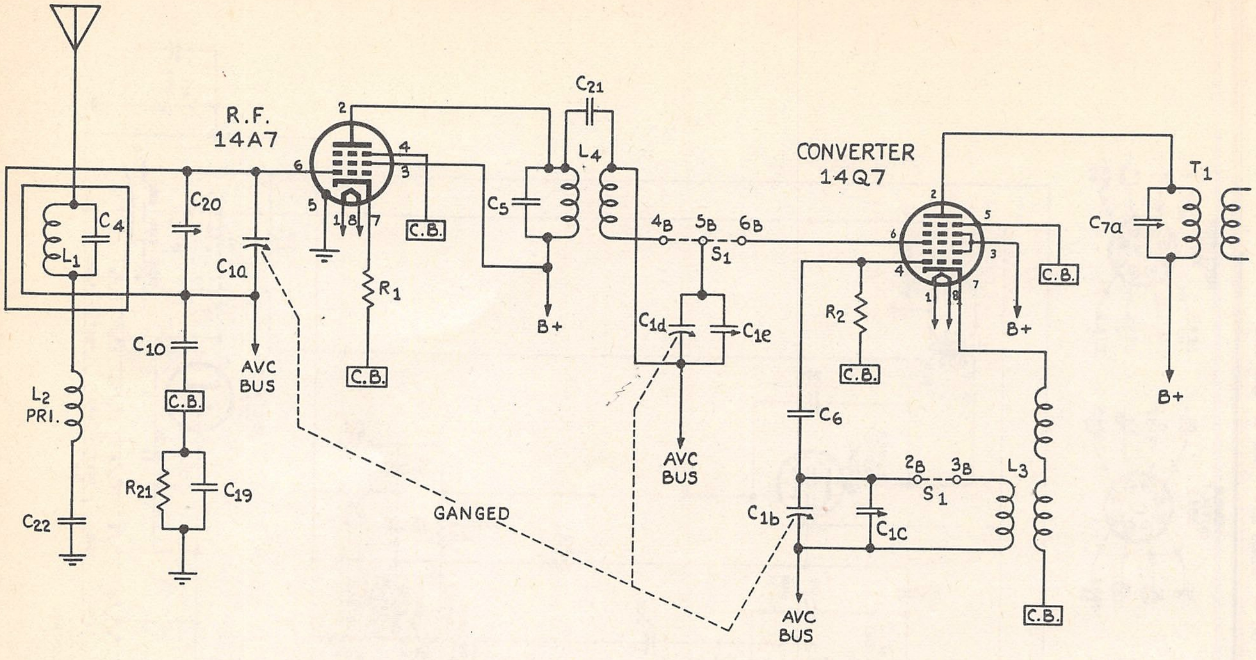

CONDITIONS OF MEASUREMENTS
LINE VOLTAGE 117 A.C.
ZERO SIGNAL INPUT
VOL. CONT. MIN.
SOCKET VOLTAGE / RESISTANCE TO COMMON BUS ±10%
D.C. AT 20,000 Ω/V.
A.C. AT 1,000 Ω/V.
R.F. 14A7
CONVERTER 14Q7
I.F. AMP. 14A7
DEMODULATOR & 1ST AUDIO 14B6
POWER OUTPUT 35A5
RECTIFIER 35Y4
EXTERNAL ANTENNA CONNECTION
455 KC. I.F.
RED
IST I.F.
GREEN
BLUE
T1
BLACK
2ND I.F.
T2
WHITE
R-F 14A7
CONVERTER 14Q7
I-F AMP 14A7
DEMODULATOR & FIRST AUDIO 14B6
POWER OUTPUT 35A5
LOUD SPEAKER
T3
RADIO
PHONO
S2
AVC BUS
COMMON BUS
TREBLE
BASS
SWITCH ON VOL. CONTROL
RECTIFIER 35Y4
105-125 V AC-DC
#47
35Y4
35A5
14A7 RF
14A7 IF
14Q7
14B6

| | |
|---|---|
| Voltage Rating, AC/DC | 105-125 |
| Frequency—Cycles per second | 50-60 |
| Power Consumption—Watts | 30 |
| TUNING RANGE | |
| Broadcast—KCs | 535-1725 |
| Shortwave—MCs | 5.8-12 |
| POWER OUTPUT—WATTS Maximum | 1.2 |
| INTERMEDIATE FREQUENCY—KCs | 455 |
| TUNING RATIO | 19:1 |
| POINTER TRAVEL—Inches | 5.25 |

# "clarified schematics"

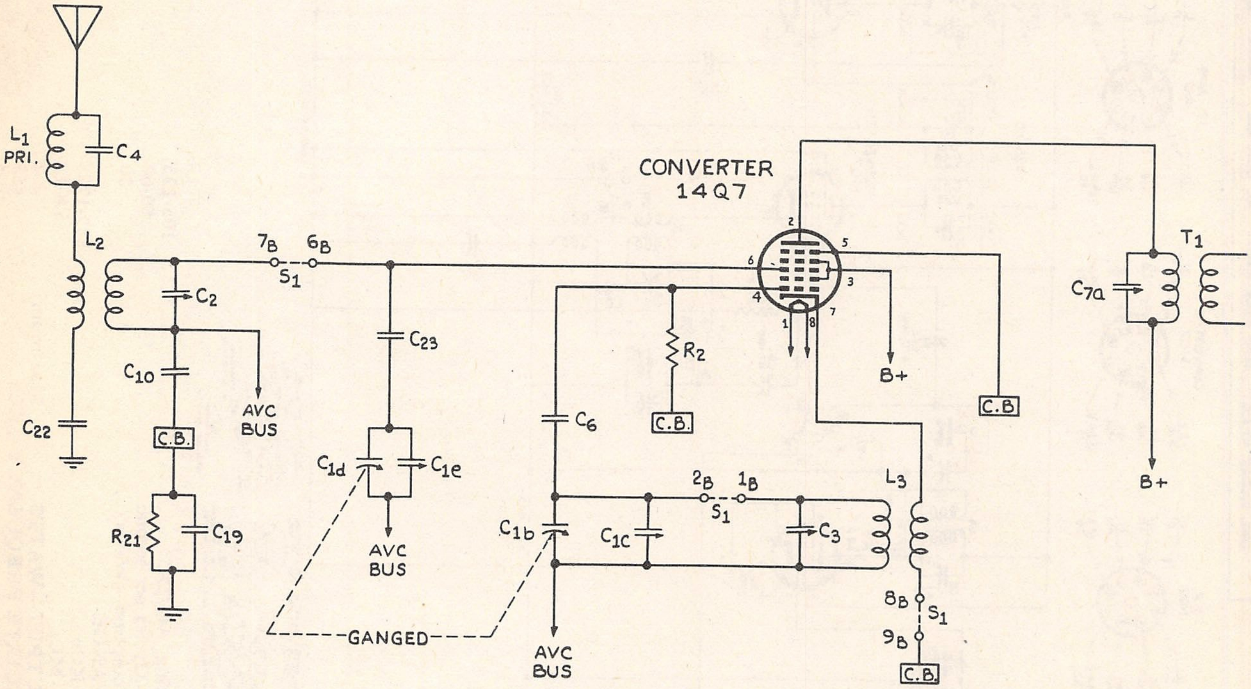
**MODEL 626-A**

## BENDIX RADIO DIV.


C21
R.F.
14A7
CONVERTER
14Q7
T1
C4
L1
C20
C1a
C5
L4
4B
5B
6B
S1
C7a
C.B.
R1
B+
C1d
C1e
R2
AVC BUS
C10
L2 PRI.
C6
2B
3B
L3
R21
C19
C22
GANGED
C1b
C1c

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
535-1725 KC.

C.B. DENOTES COMMON BUS
ABOVE GROUND BY
$R_{21}$ (220k) & $C_{19}$ (.1µf)


L1
PRI.
C4
CONVERTER
14Q7
T1
L2
7B
6B
S1
C2
C7a
C23
R2
C10
AVC BUS
B+
C22
C.B.
C1d
C1e
C6
2B
1B
L3
C1b
C1c
C3
R21
C19
8B
9B
GANGED

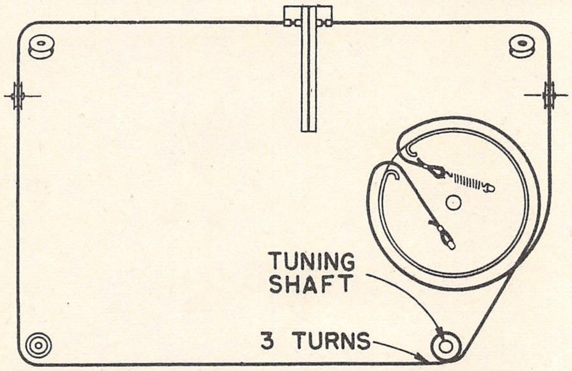
BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
5.8-12 MC.

C.B. DENOTES COMMON BUS
ABOVE GROUND BY
$R_{21}$ (220k) & $C_{19}$ (.1µf)

# BENDIX RADIO DIV.

| Stock No. | Description | List Price |
|---|---|---|
| | **ELECTRICAL COMPONENTS** | |
| AL0C01* | ANTENNA—Loop (L1) | 2.60 |
| CC9A16† | CAPACITOR—Ceramic 3.3 mmf. (C21) | .05 |
| CE3A00 | CAPACITOR—Electrolytic 40, 20, 60 | |
| CE3A00† | CAPACITOR—Electrolytic 40, 20, 60 mfd. (C18a, C18b, C18c) | 1.86 |
| CL2A01† | CORD—AC Power | .42 |
| CM5A14† | CAPACITOR—Mica 47 mmf. (C5, C6) | .18 |
| CM5A30† | CAPACITOR—Mica 220 mmf. (C4, C12) | .22 |
| CM5A38† | CAPACITOR—Mica 470 mmf. (C22) | .21 |
| CM8S50† | CAPACITOR—Mica 470 mmf. 3% (C23) | .47 |
| CP4T20 | CAPACITOR—Paper 400 V .006 mfd. (C11, C24) | .14 |
| CP4T34† | CAPACITOR—Paper 400V .02 mfd. (C14) | .14 |
| CP4T40† | CAPACITOR—Paper 400V .05 mfd. (C9, C10, C13, C15, C17) | .16 |
| CP4T51† | CAPACITOR—Paper 400V .1 mfd. (C16, C19, C25) | .18 |
| CT2A00 | CAPACITOR—Trimmer (C2 4-70 mmf., C3 2-20 mmf.) | .46 |
| CV0C00 | CAPACITOR—Variable, 3 gang (C1a, C1b, C1c, C1d, C1e) | 7.91 |
| LO6H00 | COIL—Oscillator (L3) | 1.61 |
| RC1H16† | RESISTOR—220 ohms 1/4 W Comp. (R1) | .04 |
| RC1H20† | RESISTOR—470 ohms 1/4 W Comp. (R3) | .04 |
| RC1H32† | RESISTOR—4700 ohms 1/4 W Comp. (R19) | .04 |
| RC1H34† | RESISTOR—6800 ohms 1/4 W Comp. (R14) | .04 |
| RC1H38† | RESISTOR—15000 ohms 1/4 W Comp. (R12) | .06 |
| RC1H40† | RESISTOR—22000 ohms 1/4 W Comp. (R2, R10) | .04 |
| RC1H44† | RESISTOR—47000 ohms 1/4 W Comp. (R5) | .04 |
| RC1H51† | RESISTOR—100000 ohms 1/4 W Comp. (R11) | .04 |
| RC1H54† | RESISTOR—220,000 ohms 1/4 W Comp. (R7, R21) | .04 |
| RC1H58† | RESISTOR—470,000 ohms 1/4 W Comp. (R13, R20) | .04 |
| RC1H68† | RESISTOR—3.3 meg. 1/4 W Comp. (R4) | .04 |
| RC1H70† | RESISTOR—4.7 meg. 1/4 W Comp. (R8) | .04 |
| RC4G28† | RESISTOR—2200 ohms 2W Comp. (R18) | .14 |
| RV4S00† | POTENTIOMETER—1 meg. with Switch (R9, S3) | .92 |
| RW1A06† | RESISTOR—33 ohms WW 1W (R17) | .14 |
| RW1B28† | RESISTOR—150 ohms WW 1W (R15) | .08 |
| SO0D01 | SOCKET—Dial Lamp | .23 |
| SO9S00† | SOCKET—Loctal Tube | .19 |
| SR2C01 | SWITCH—Rotary 2 Pos. 3 Pole (S1) | .70 |
| SR4C00† | SWITCH—Rotary 4 Pos. 3 Pole (S2) | .84 |
| TI0C01† | TRANSFORMER IF—1st (T1) | 3.75 |
| TI0D01† | TRANSFORMER IF—2nd (T2) | 2.65 |
| TR6D00 | TRANSFORMER RF—Shortwave (L2) | 1.26 |
| TR6L00† | TRANSFORMER BC—RF Interstage (L4) | 3.75 |
| #47† | LAMP—Pilot | .09 |
| | **ELECTRICAL COMPONENTS (continued)** | |
| JR1S00† | JACK—Receptacle, 1 Contact, Phono Jack (J1) | .06 |
| | **SPEAKER AND COMPONENTS** | |
| SP400† | SPEAKER—Oval PM (4 x 6) | 5.70 |
| CS4O00† | CONE & VOICE COIL ASS'Y.—Code 252 | |
| CS4O01† | CONE & VOICE COIL ASS'Y.—Code 328 | |
| CS4O02† | CONE & VOICE COIL ASS'Y.—Code 270 | |
| CS4006† | CONE & VOICE COIL ASS'Y.—Code 191 | |
| CS4O07† | CONE & VOICE COIL ASS'Y.—Code 371 | |
| TA0O01† | TRANSFORMER—Output (T3) | .96 |
| | **MECHANICAL COMPONENTS** | |
| AD0C00 | ASSEMBLY—Dial Back Plate | 1.04 |
| BT1S00† | BOARD—Terminal Strip 1 Lug 1 Mt | .03 |
| BT2S00 | BOARD—Terminal Strip 2 Lugs 1 Mt. | .02 |
| BT4S01† | BOARD—Terminal Strip 4 Lugs 1 Mt. | .05 |
| CD0C02 | CABLE—Dial | .17 |
| GR0S00† | GROMMET—Shockmount Rubber | .04 |
| HC0C00† | CLIP—Coil Mtg | .65/c |
| HC0C02† | CLIP—Coil Mtg. | .90/c |
| HC0C03† | CLAMP—Cable (Dial) | .43/c |
| HC0S00† | CLIP—Tuning Shaft Spring | .01 |
| HC0T00† | CLAMP—Tube Shield. | .01 |
| HN9P45† | PALNUT—3/8 x 32 | .60/c |
| HR0F00† | RIVET—Plain 13/64 x .121 | .40/c |
| HR0P01† | RIVET—Plain .088 x 1/8 | .40/c |
| HR0S01† | RIVET—Shoulder .171 x .118, .083 x .088 | .02 |
| HS0C00† | SPRING—Dial Cable | .04 |
| HS0P01† | SPACER—Antenna, Wood. | 01 |
| HS6F00† | SLEEVE & SPACER—Tuning Capacitor | .02 |
| ID0M06† | INDICATOR—Metal, Dial | .28 |
| IT0C01 | INSULATOR—Elec. Cap., Tube | .04 |
| IW0F00† | INSULATOR—Felt Washer | .20/c |
| MB0B00† | BEARING—Bushing (Tuning Shaft) | .18 |
| MP0F00† | PULLEY—Fiber (Idler) | .02 |
| MS0T02† | SHAFT—Tuning | .15 |
| PI0P01† | PLATE—Insulating, Power Cord | .01 |
| SM0T00† | SHIELD—Metal, Tube | .05 |
| | **CABINET COMPONENTS** | |
| DS0C01 | DIAL—Scale | .77 |
| GC0D02 | GASKET—Dial, Cork Strip | .09 |
| HC0D00 | CLIP—Dial (Metal) Retainer R.H. | .04 |
| HC0D01† | CLIP—Dial Retainer (Metal) L.H. | .03 |
| HC0S09 | CLIP—Spring, Knob, Band Switch | .01 |
| HK0R00† | CLIP—Spring, Knob | .01 |
| IT0F00 | INSULATOR—Flexible Tubing | .08/ft. |
| KB0B03 | KNOB—Indexed, Tan | |
| KC0B08 | KNOB—Plain, Tan | |
| KY0B00 | KNOB—Brown, Band Switch | .31 |
| ZP0I00 | CABINET—Ivory, Plastic | |

*Subject to excise tax /c—Price per hundred Prices subject to change without notice †Used on previous models PRINTED IN U.S.A.



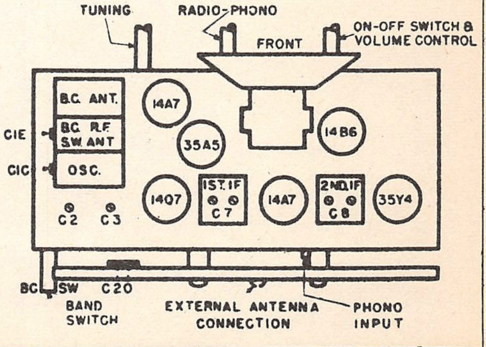
Adjust pointer 2 in. from left end with tuning gang fully meshed

**Make adjustments in table for maximum output with output meter connected across voice coil. Always keep input as low as possible for perceptible output.**

## PRECAUTIONS

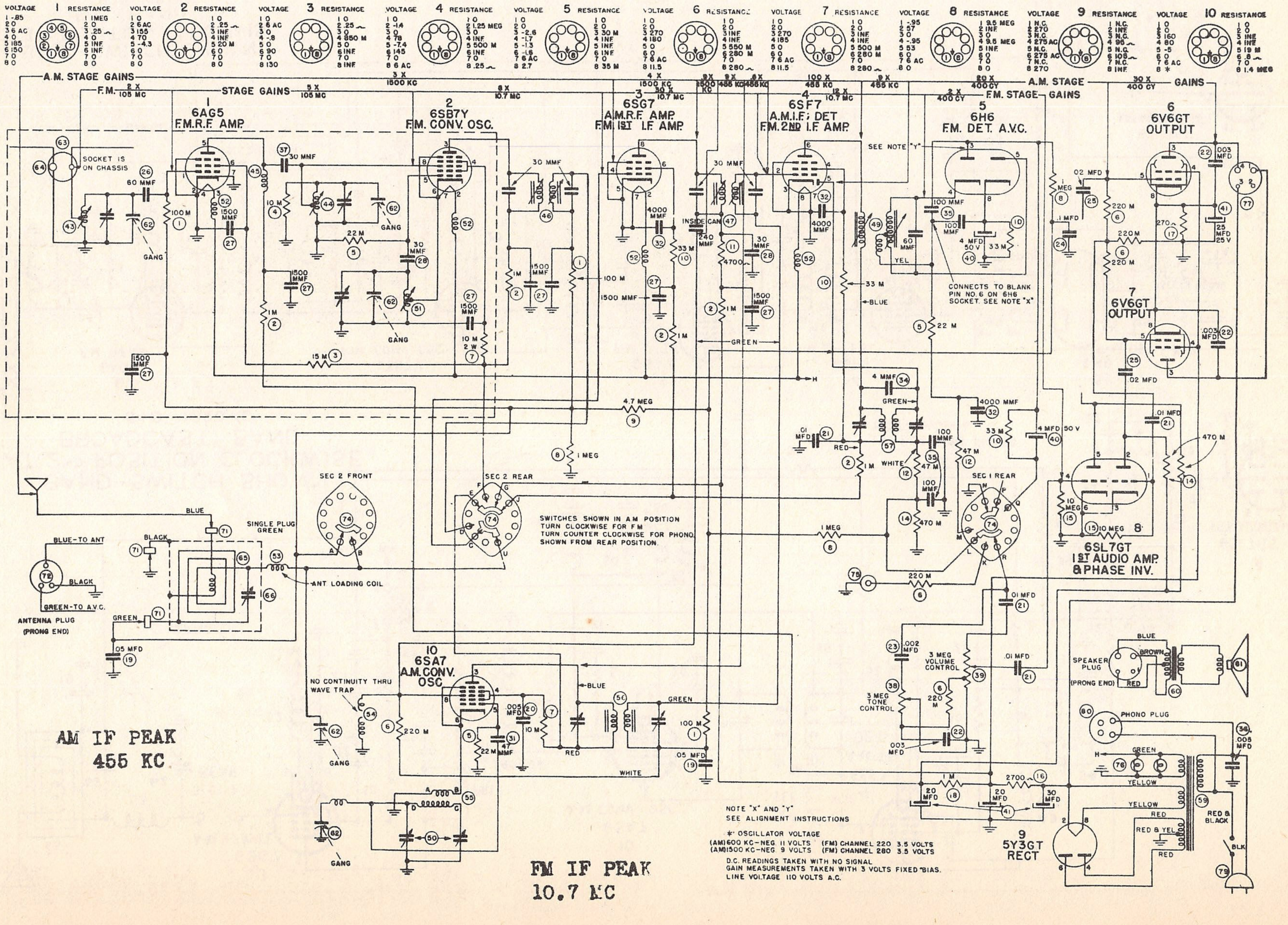
**An isolating transformer should be used between the power supply and the receiver if any of the test equipment is AC operated. The use of isolating capacitors is not recommended as AC through the capacitor may introduce hum modulation, and if the capacitors should break down the test instruments will likely be damaged.**

| CIRCUIT | CONTROL POSITIONS | APPLY | THRU | TO | ADJ |
|---|---|---|---|---|---|
| I.F. | Volume—Maximum<br>Tone—Treble<br>Band Switch—Broadcast<br>Tuning Condenser—Fully Open | 455 KC | .01mfd. | Grid 14A7 I.F. Amp.<br>Grid 14Q7 I.F. Amp. | C8b<br>C8a<br>C7b<br>C7a |
| Broadcast | Pointer 4 3/8 in. from left end. | 1475 KC | 50 mmf. | External Antenna Connection | C1c<br>C1e<br>C20 |
| Short Wave | Pointer 4 1/2 in. from left end. | 11 MC | 400 ohms in series with .01 mfd. | External Antenna Connection | C3<br>C2 |



# RADIO & TELEV. INC.

## MODELS SF-6810, T-4000, T-4000-1/2, D-6876


A.M. STAGE GAINS
F.M. STAGE GAINS
2 X 105 MC
5 X 105 MC
3 X 1500 KC
8 X 10.7 MC
4 X 1500 KC
30 X 10.7 MC
9 X 1500 KC
9 X 455 KC
8 X 455 KC
100 X 455 KC
12 X 10.7 MC
9 X 455 KC
20 X 400 CY
2 X 400 CY
30 X 400 CY
1
6AG5
F.M.R.F. AMP.
2
6SB7Y
F.M. CONV. OSC.
3
6SG7
A.M.R.F. AMP.
F.M. 1ST I.F. AMP.
4
6SF7
A.M.I.F.; DET
F.M. 2ND I.F. AMP.
5
6H6
F.M. DET. A.V.C.
6
6V6GT
OUTPUT
7
6V6GT
OUTPUT
8
6SL7GT
1ST AUDIO AMP. & PHASE INV.
9
5Y3GT
RECT
10
6SA7
A.M. CONV. OSC.
SOCKET IS ON CHASSIS
GANG
INSIDE CAN
SEE NOTE "Y"
CONNECTS TO BLANK PIN NO. 6 ON 6H6 SOCKET. SEE NOTE "X"
YEL
BLUE
GREEN
RED
WHITE
SEC 2 FRONT
SEC 2 REAR
SEC 1 REAR
SINGLE PLUG GREEN
ANT LOADING COIL
BLUE-TO ANT
BLACK
GREEN-TO A.V.C.
ANTENNA PLUG (PRONG END)
NO CONTINUITY THRU WAVE TRAP
3 MEG VOLUME CONTROL
3 MEG TONE CONTROL
SPEAKER PLUG (PRONG END)
BROWN
PHONO PLUG
YELLOW
RED & YEL
RED & BLACK
BLK
AM IF PEAK 455 KC
FM IF PEAK 10.7 KC

SWITCHES SHOWN IN A.M. POSITION
TURN CLOCKWISE FOR F.M.
TURN COUNTER CLOCKWISE FOR PHONO.
SHOWN FROM REAR POSITION.

| Pin | 1 Voltage | 1 Resistance | 2 Voltage | 2 Resistance | 3 Voltage | 3 Resistance | 4 Voltage | 4 Resistance | 5 Voltage | 5 Resistance |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | -.85 | 1 MEG | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 6 AC | .25 ~ | 6 AC | .25 ~ | -1.4 | 1.25 MEG | 0 | 0 |
| 3 | 6 AC | .25 ~ | 155 | INF. | 0 | 0 | 0 | 0 | -2.6 | 30 M |
| 4 | 0 | 0 | 70 | INF. | -.8 | 850 M | 78 | INF. | -1.7 | INF. |
| 5 | 185 | INF. | -4.3 | 20 M | 0 | 0 | -7.4 | 500 M | -1.3 | INF. |
| 6 | 150 | INF. | 0 | 0 | 90 | INF. | 145 | INF. | -1.6 | INF. |
| 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 AC | 0 |
| 8 | 0 | 0 | 0 | 0 | 130 | INF. | 6 AC | .25 ~ | 2.7 | 35 M |

| Pin | 6 Voltage | 6 Resistance | 7 Voltage | 7 Resistance | 8 Voltage | 8 Resistance | 9 Voltage | 9 Resistance | 10 Voltage | 10 Resistance |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | -.95 | 9.5 MEG | N.C. | N.C. | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 57 | INF. | 270 | INF. | 0 | 0 |
| 3 | 270 | INF. | 270 | INF. | 0 | 0 | N.C. | N.C. | 160 | INF. |
| 4 | 180 | INF. | 185 | INF. | -.95 | 9.5 MEG | 275 AC | 95 ~ | 80 | INF. |
| 5 | 0 | 550 M | 0 | 500 M | 53 | INF. | N.C. | N.C. | -5 | 19 M |
| 6 | 0 | 280 M | 0 | 280 M | 0 | 0 | 275 AC | 105 ~ | 0 | .8 ~ |
| 7 | 6 AC | 0 | 6 AC | 0 | 6 AC | 0 | N.C. | N.C. | 6 AC | 0 |
| 8 | 11.5 | 280 ~ | 11.5 | 280 ~ | 0 | 0 | 270 | INF. | * | 1.4 MEG |

NOTE "X" AND "Y"
SEE ALIGNMENT INSTRUCTIONS

*' OSCILLATOR VOLTAGE
(AM) 600 KC-NEG 11 VOLTS (FM) CHANNEL 220 3.5 VOLTS
(AM) 1500 KC-NEG 9 VOLTS (FM) CHANNEL 280 3.5 VOLTS

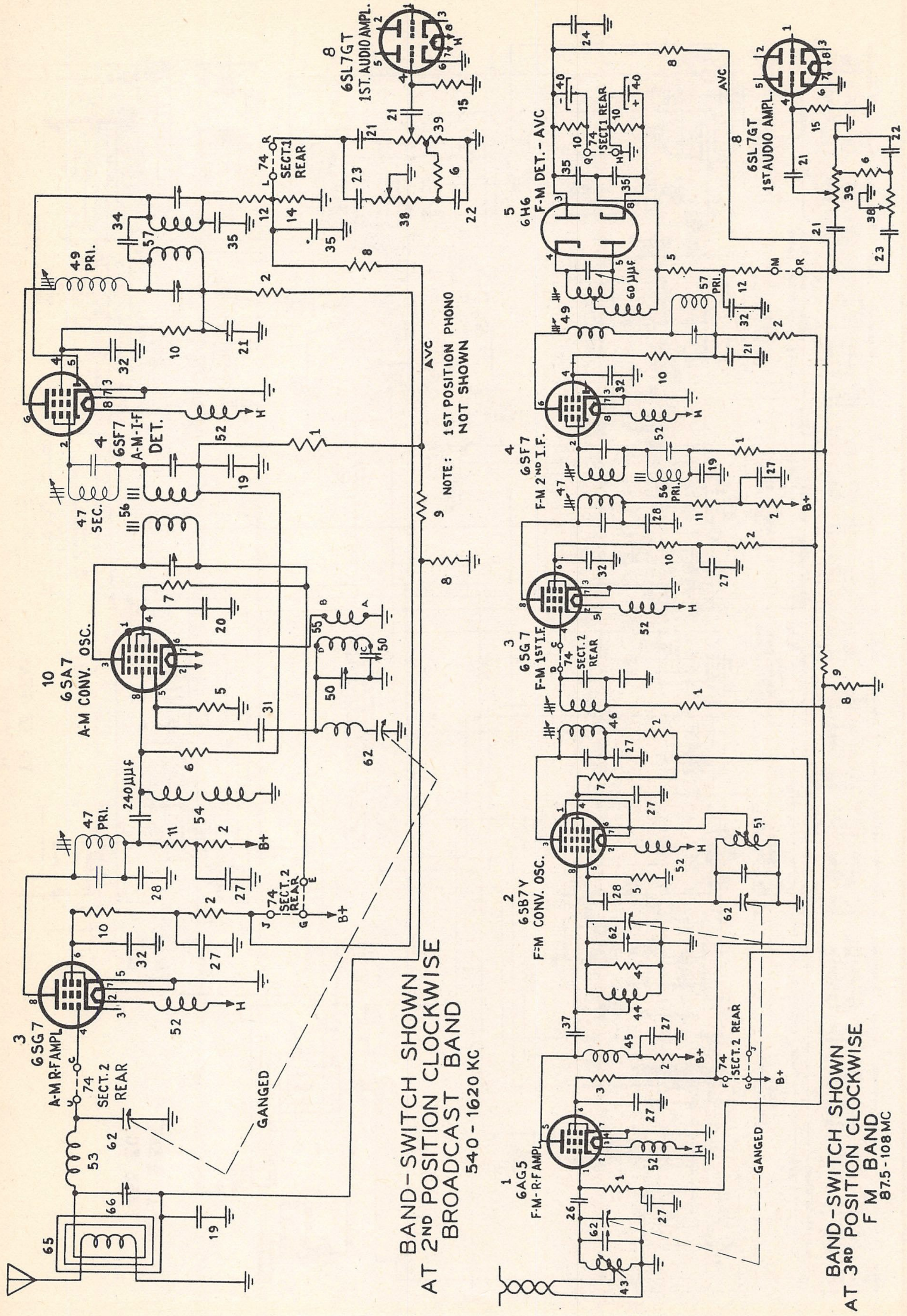
D.C. READINGS TAKEN WITH NO SIGNAL
GAIN MEASUREMENTS TAKEN WITH 3 VOLTS FIXED BIAS.
LINE VOLTAGE 110 VOLTS A.C.

RECORD CHANGER: Farnsworth P-51, RCD. CH. P.15-1

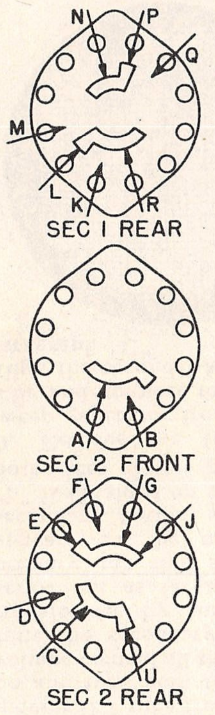
"clarified schematics"

MODELS SF-6810,T-4000,
T-4000-1/2,D-6876

RADIO & TELEV. INC.

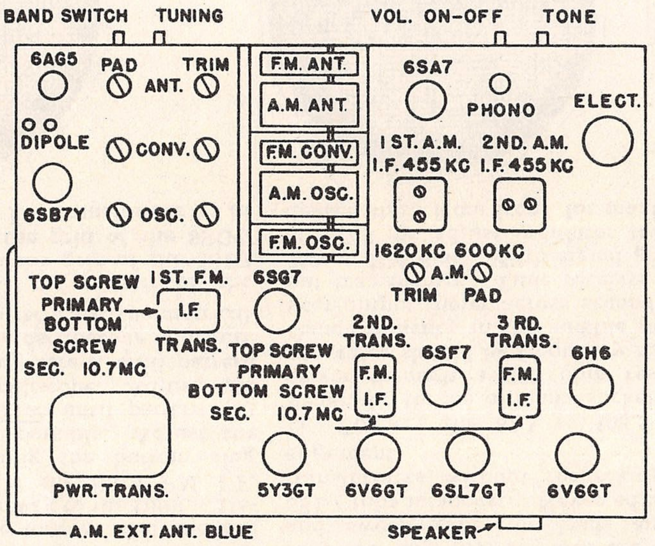

3 6SG7 A-M R-F AMPL.
10 6SA7 A-M CONV. OSC.
4 6SF7 A-M-I-F DET.
8 6SL7GT 1ST. AUDIO AMPL.
1 6AG5 F-M-R-F AMPL.
2 6SB7Y F-M CONV. OSC.
3 6SG7 F-M 1ST. I.F.
4 6SF7 F-M 2ND I.F.
5 6H6 F-M DET. - AVC
8 6SL7GT 1ST AUDIO AMPL.
74 SECT.2 REAR
74 SECT.1 REAR
240μμf
60μμf
AVC
B+
GANGED
NOTE: 1ST POSITION PHONO NOT SHOWN
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE BROADCAST BAND 540-1620 KC
BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE F M BAND 87.5-108 MC

### BAND SWITCH DECKS


N
P
Q
M
L
K
R
SEC 1 REAR
A
B
SEC 2 FRONT
F
G
E
J
D
C
U
SEC 2 REAR

Letters on terminals of switches and coils shown on this page correspond to similarly lettered terminals on the switches and coils shown in the circuit diagam.

### CHASSIS LAYOUT


BAND SWITCH
TUNING
VOL. ON-OFF
TONE
6AG5
PAD
TRIM
ANT.
DIPOLE
CONV.
6SB7Y
OSC.
F.M. ANT.
A.M. ANT.
F.M. CONV.
A.M. OSC.
F.M. OSC.
6SA7
PHONO
ELECT.
1 ST. A.M. I.F. 455 KC
2ND. A.M. I.F. 455 KC
1620 KC
600 KC
A.M.
TRIM
PAD
TOP SCREW PRIMARY
BOTTOM SCREW SEC. 10.7MC
1 ST. F.M. I.F. TRANS.
6SG7
TOP SCREW PRIMARY
BOTTOM SCREW SEC. 10.7MC
2ND. TRANS.
F.M. I.F.
6SF7
3 RD. TRANS.
F.M. I.F.
6H6
PWR. TRANS.
5Y3GT
6V6GT
6SL7GT
6V6GT
A.M. EXT. ANT. BLUE
SPEAKER

**FM ANTENNA**—The folded dipole antenna built into this instrument gives satisfactory reception under normal conditions. For best results an outdoor dipole is recommended.

**GROUND**—A ground connection is not normally required unless an outside aerial is used. The ground connection is made by attaching one end of a length of wire to a water pipe, radiator or pipe driven into the ground and connecting the other end to the black wire found at the rear of the receiver. A gas pipe or electrical conduit must not be used for a ground.

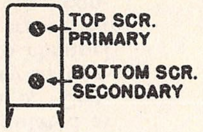
### ELECTRICAL SPECIFICATIONS:

Ten tube, 60 cycle A. C., 105-125 volt operated superheterodyne receiver with built-in loop antenna and FM folded dipole. AM Broadcast band tuning range 540 Kc. to 1620 Kc. FM band range 87.5 Mc. to 108 Mc. calibrated in channel numbers from 200 to 300.

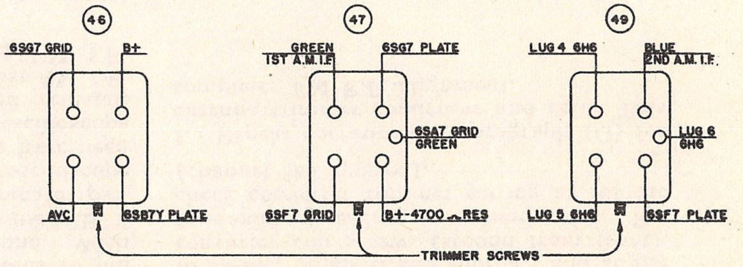
Speaker 12" PM
Voice coil impedence 3.5 ohms

Power output
Radio-7 watts
Phono-9 watts

F.M.I.F. TRANS.

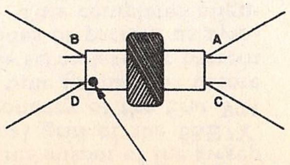

TOP SCR. PRIMARY
BOTTOM SCR. SECONDARY

### BOTTOM VIEW FM I.F. TRANS.


46
6SG7 GRID
B+
AVC
6SB7Y PLATE
47
GREEN 1ST A.M.I.F.
6SG7 PLATE
6SA7 GRID GREEN
6SF7 GRID
B+-4700 ~ RES
49
LUG 4 6H6
BLUE 2ND A.M. I.F.
LUG 6 6H6
LUG 5 6H6
6SF7 PLATE
TRIMMER SCREWS

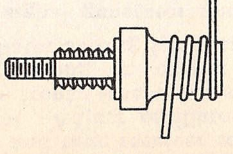
### BROADCAST AND FM COILS

B.C. OSCILLATOR COIL



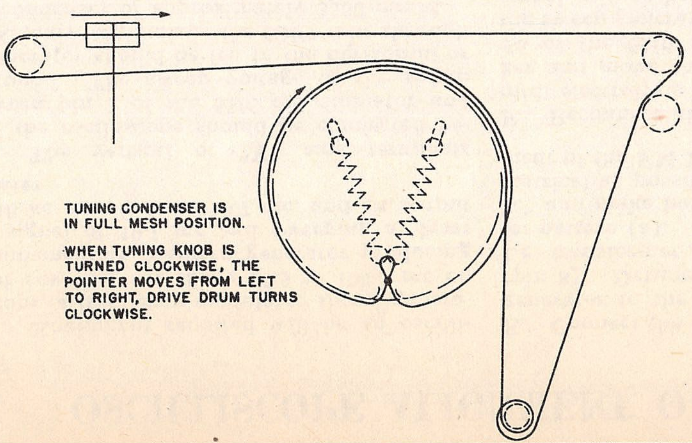
FINISH LUG INDICATED BY RED DOT.

F.M. COILS



| TOTAL | TURNS | TAP AT | |
|---|---|---|---|
| ANT. COIL | $2\frac{3}{4}$ | $1\frac{1}{2}$ TURNS | FROM GROUND END |
| CONV. COIL | $2\frac{1}{2}$ | $1\frac{1}{4}$ TURNS | |
| OSC. COIL | $3\frac{1}{4}$ | 1 TURN | |

### DIAL STRINGING



TUNING CONDENSER IS IN FULL MESH POSITION.

WHEN TUNING KNOB IS TURNED CLOCKWISE, THE POINTER MOVES FROM LEFT TO RIGHT, DRIVE DRUM TURNS CLOCKWISE.

# OSCILLISCOPE ALIGNMENT OF FM BAND

A. Equipment required will be an oscilliscope, a frequency modulated signal generator covering the range 87.5 to 108.5 mc on fundamentals, a sweep generator producing a signal of 10.7 mc and sweeping at least 150 kc each side of 10.7 mc, and an output meter.

B. The vertical or "Y" axis terminals of the oscilliscope should be connected between pin 3 of the 6H6 discriminator and ground. The sweep voltage of the sweep generator should be fed to the horizontal or "X" axis terminals of the 6SF7 tube through a condenser of approximately 3300 mmfd.

C. Remove the negative lead of the 4 mfd. electrolytic from pin #3 of 6H6 socket. Remove 6SL7 tube from socket. Turn the set on and turn both the tone control and the volume control all the way to the right. Detune the secondary of the third FM I.F. transformer by turning the bottom slug screw out as far as possible. Adjust the primary, top slug screw, until pattern (a) appears on the oscilliscope. Adjust the secondary, bottom slug screw, until pattern "b" is obtained on the oscilliscope and until both sides of this pattern are symmetrical.

D. Remove the 10.7 mc output of the sweep generator from the grid of the 6SF7 tube and connect to the grid of the 6SG7. Align the second FM I.F. transformer as in paragraph "C".

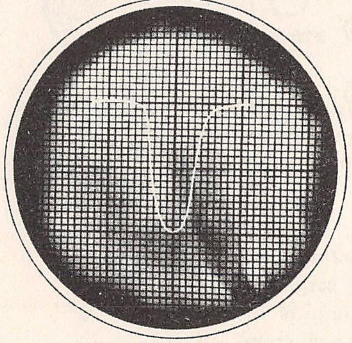
E. Connect the 10.7 ms output of the sweep generator to the signal grid of the 6SB7Y, (pin 8). Detune secondary of the first FM I.F. transformer and tune primary as before for pattern (a). Tune secondary for pattern "c" and make both sides of pattern as symmetrical as possible. This completes alignment of the FM I.F. transformers.

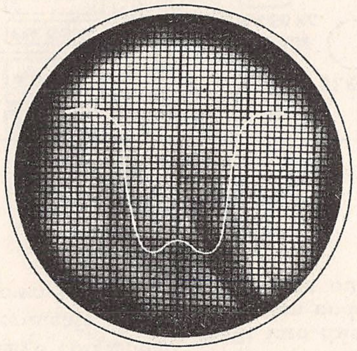
F. Reconnect the negative lead of the 4 mfd. electrolytic to pin #3 of the 6H6 socket and move the oscilliscope leads to pin #6 of the 6H6 socket and ground. With the sweep generator connected to the 6SB7Y signal grid as before, the discriminator pattern (d) should appear on the oscilliscope if the I.F. alignment instructions have been followed carefully. Remove the oscilloscope and sweep generator leads and reinstall 6SL7 tube in socket. Never adjust AM I.F. transformers without rechecking FM I.F. alignment.

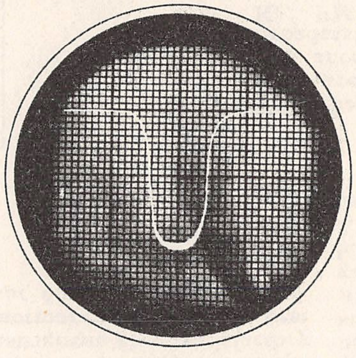
G. Connect the 87.5 to 108.5 mc signal generator to the antenna socket of the receiver through a 300 ohm resistor. The generator should be frequency modulated at some frequency in the audible range. Connect output meter across secondary of output transformer. Tune receiver to channel 300 on FM dial. With signal generator set at 107.9 mc adjust oscillator trimmer condenser, third from front, for maximum reading on output meter. Set signal generator to 87.9 mc and tune receiver to channel 200 on FM dial. Adjust oscillator coil screw, third from front, (see chassis layout) for maximum reading on output meter. Recheck oscillator setting for channel 300.

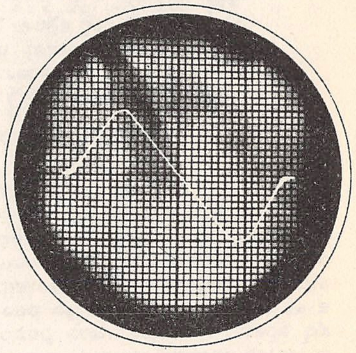
Tune signal generator and receiver to 5 mc (channel 285 approx.). Adjust converter signal grid trimmer condenser, second from front, for maximum reading on output meter. Tune signal generator and receiver to 92 mc, (channel 220 approx.) and adjust converter coil screw, (second from front), to maximum reading on output meter. Recheck converter trimmer setting at 105 mc (channel 285 approx.).

I. Repeat operations of paragraph (G) for antenna trimmer condenser and coil. This completes FM R.F. alignment.


A


B


C


D

**MODELS SF-6810,T-4000, T-4000-1/2,D-6876**

**RADIO & TELEV. INC.**

## ALIGNMENT INSTRUCTIONS AM BAND

An output meter and a signal generator calibrated at 455 Kc., 600 Kc., 1500 Kc. and 1600 Kc., are required to properly align these receivers on AM band. Keep the output of the signal generator as low as possible to prevent AVC action and false settings. Connect the high side of the generator to the blue wire found at rear of set and low side to the black wire.

| STEPS | DUMMY ANTENNA | SET GENER-ATOR AT | SET GANG AT | ADJUST | LOCATED | |
|---|---|---|---|---|---|---|
| 1 | SET VOLUME AND TONE CONTROLS AT MAXIMUM | | | | | |
| 2 | 200 MMF. | 455 Kc. | Minimum | 2nd. I.F. Trimmers * | Top of I.F. Transformers | MAXIMUM OUTPUT |
| 3 | | | | 1st. I.F. Trimmers * | | |
| 4 | | 1600 Kc. | 1600 Kc. | B. C. Osc. Trimmer | See Chassis Layout | |
| 5 | | 1500 Kc. | 1500 Kc. | B. C. R. F. Trimmer | On Loop | |
| 6 | | 600 Kc. | 600 Kc. Rock Gang | 600 Kc. Padder | See Chassis Layout | |
| 7 | | Recheck 1500 Kc. | | | | |

* Recheck after FM alignment.

## ALTERNATE FM ALIGNMENT PROCEDURE

Necessary Equipment:
Signal Generator
Voltohmyst

Connect Voltohmyst from ground to pin 6 of 6H6 (audio, marked X on Schematic). Connect generator tuned to 10.7 mc, to pin #4 on 6SG7. Turn secondary slug of 3rd FM I.F. (closest to chassis) out as far as it will go. Tune Primary of 3rd I.F. for maximum negative voltage. Next tune Secondary slug for zero voltage. (As Sec. slug is tuned voltage will go up slowly then start decreasing rapidly, tune slug till it reaches zero). Next connect voltmeter between ground and pin #3 (marked Y on Schematic) on 6H6 socket (AVC). Turn Secondary slug of 2nd FM I.F. out as far as it will turn. Tune primary for maximum negative voltage. Then tune secondary for maximum negative voltage. Move generator to pin #8 of 6SB7Y socket. Follow same procedure as on 2nd I.F. for the 1st. I.F. transformer. I.F. is now aligned.

RF ALIGNMENT:

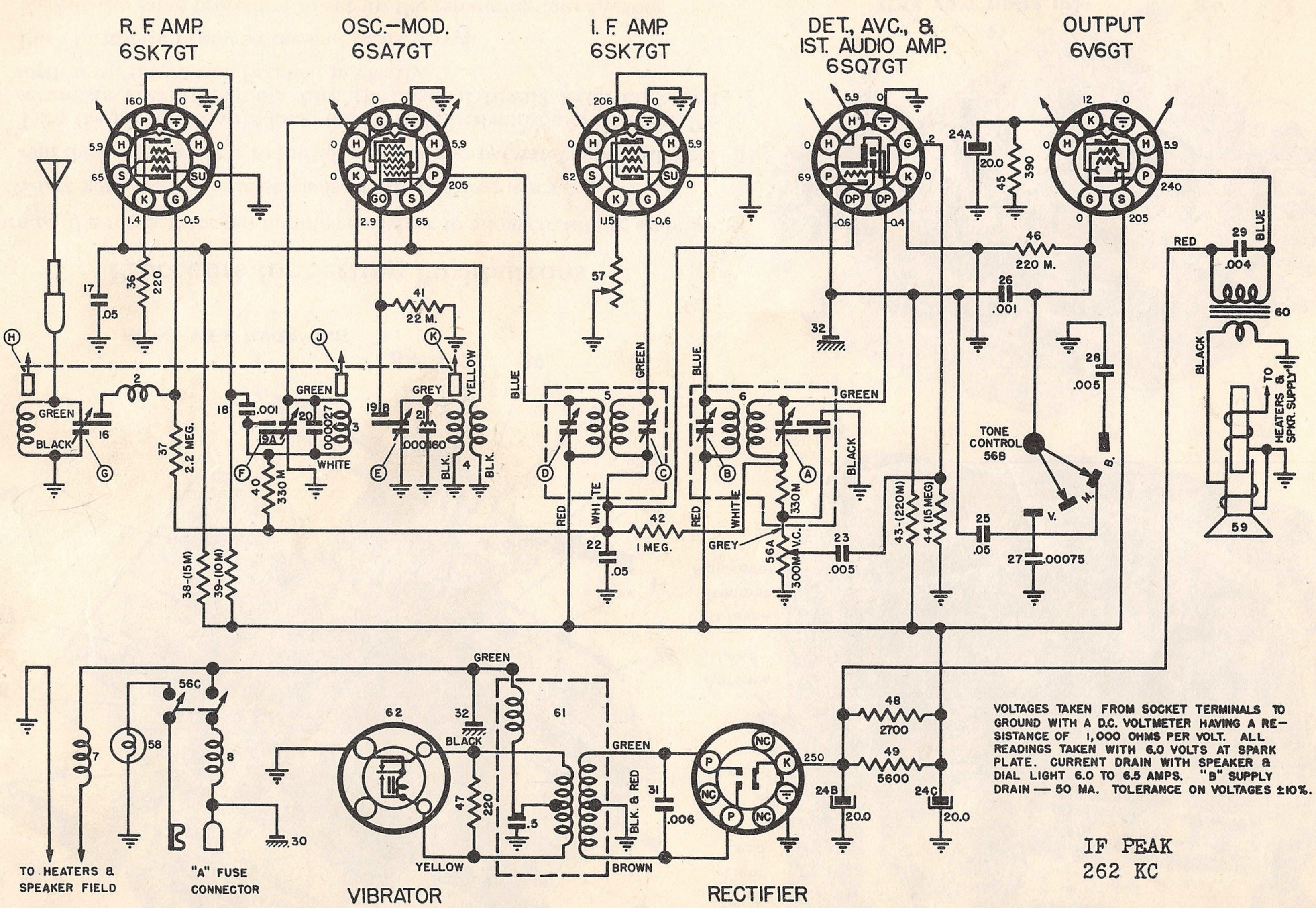
With Voltohmyst still connected between ground and pin #3 on 6H6 socket, connect generator between ground and small pin of dipole antenna socket. Use very short leads on generator and a 300 ohm resistor as a dummy antenna. Set generator at 87.5 mc and gang closed. Adjust oscillator slug for maximum voltage. Adjust generator to 108.5 mc and gang to minimum and adjust oscillator trimmer for maximum voltage. Go back and check low frequency end. Next set generator at 92 mc, tune in signal on receiver, approximately 220 on dial. Adjust converter and antenna slug for maximum voltage output. Set generator at 105 mc. Tune in signal on receiver, approximately 280 on dial. Tune converter and antenna trimmer for maximum voltage output. Check adjustment of antenna and converter slugs at 92 mc.

### MODEL SF-6810—PARTS LIST

| Ref. No. | Part No. | DESCRIPTION | List Price |
|---|---|---|---|
| 1 | 77214 | 100M Ohms | $ .15 |
| 2 | 77262 | 1000 Ohms | .15 |
| 3 | 77265 | 15 M Ohms | .15 |
| 4 | 77212 | 10 M Ohms | .15 |
| 5 | 77266 | 22 M Ohms | .15 |
| 6 | 77216 | 220 M Ohms | .15 |
| 7 | 77013 | 10 M Ohms 2 Watt | .25 |
| 8 | 77218 | 1 Megohm | .15 |
| 9 | 77272 | 4.7 Megohms | .15 |
| 10 | 77267 | 33 M Ohms | .15 |
| 11 | 77211 | 4700 Ohms | .15 |
| 12 | 77213 | 47 M Ohms | .15 |
| 14 | 77217 | 470 M Ohms | .15 |
| 15 | 77274 | 10 Megohms | .15 |
| 16 | 77243 | 2700 Ohm Molded Resistor 4.7 Watt | .50 |
| 17 | 77189 | 270 Ohms, 2 Watt | .25 |
| 18 | 77304 | 1000 Ohms, 2 Watt | .20 |
| 19 | 25196 | .05 Mfd. 600 Volt | .20 |
| 20 | 25183 | .005 Mfd. 600 Volt | .15 |
| 21 | 25194 | .01 Mfd. 600 Volt | .20 |
| 22 | 25184 | .003 Mfd. 600 Volt | .20 |
| 23 | 25185 | .002 Mfd. 600 Volt | .15 |
| 24 | 25215 | .1 Mfd. 600 Volt | .20 |
| 25 | 25031 | .005 Mfd. Buffer Capacitor, 600 Volt | .30 |
| 26 | 25333 | 60 MMF. Ceramic Capacitor | .25 |
| 27 | 25273 | 1500 MMF. Ceramic Capacitor | .30 |
| 28 | 25329 | 30 MMF. Ceramic Capacitor, N-150 | .20 |
| 31 | 25193 | 47 MMF. Mica Capacitor | .30 |
| 32 | 25271 | 4000 MMF. Ceramic Capacitor | .65 |
| 34 | 25327 | 4 MMF. Ceramic Capacitor | .60 |
| 35 | 25188 | 100 MMF. Mica Capacitor | .25 |
| 37 | 25332 | 30 MMF. Ceramic Capacitor, N-750 | .20 |
| 38 | 78072 | Tone Control, 3 Megohms | .80 |
| 39 | 78120 | Volume Control, 3 Megohms | 1.10 |
| 40 | 25316 | 4 Mfd., 50 V. Electrolytic Capacitor | .80 |
| 41 | 25214 | Electrolytic Capacitor 20 Mfd., 20 Mfd., 30 Mfd., 450 volt. 25 Mfd., 25 Volt | 3.10 |
| 43 | 38690 | FM Antenna Coil | 1.05 |
| 44 | 38691 | FM Convertor Coil | 1.05 |
| 45 | 58471 | FM RF Choke | .10 |
| 46 | 38683 | 1st. FM I.F. Transformer | 3.75 |
| 47 | 38684 | 2nd. FM I.F. Transformer | 4.05 |
| 49 | 38685 | 3rd. FM I.F. Transformer | 4.35 |
| 50 | 26240 | B. C. Osc. Trimmer Strip | .75 |
| 51 | 38692 | FM Oscillator Coil | 1.05 |
| 52 | 38661 | Heater Choke | .25 |
| 53 | 38845 | Antenna Loading Coil | .50 |
| 54 | 38484 | Wave Trap Coil | .55 |
| 55 | 38694 | BC Oscillator Coil | .65 |
| 56 | 38681 | 1st. AM I.F. Transformer | 2.40 |
| 57 | 38682 | 2nd. AM I.F. Transformer | 2.40 |
| 59 | 94204 | Power Transformer | 7.90 |
| 60 | 94195 | Output Transformer | 4.55 |
| 61 | 81126 | Speaker | 20.05 |
| 62 | 26237 | Gang Capacitor | 8.85 |
| 63 | 11325 | FM Dipole and Plug | 1.15 |
| 64 | 80361 | FM Dipole Socket | .10 |
| 65 | 38835 | Loop Antenna | 6.65 |
| 66 | 26031 | Loop Antenna Trimmer | .35 |
| 71 | 80256 | Loop Antenna Socket | .10 |
| 72 | 80252 | Antenna 3-Prong Plug | .10 |
| 74 | 90214 | Band Switch | 2.65 |
| 75 | 80030 | Phono Input Socket | .10 |
| 76 | 42185 | Dial Lamp, 250 Ma. | .15 |
| 77 | 80385 | Speaker Socket | .10 |
| 79 | 27118 | Line Cord | 1.10 |
| 80 | 11274 | Phono AC Socket | .75 |
| | 31385 | Glass Dial | 2.95 |
| | 04089 | Dial Background | 1.55 |
| | 11257 | Dial Pointer | .55 |
| | 17019 | Drive Drum | .25 |
| | 05089 | Drive Cord (42 inches) and springs | .25 |
| | 67444 | Knob | .20 |
| | 80325 | Mica Filled Octal Socket for 6SB7Y | .25 |
| | 80139 | Molded Octal Socket | .15 |
| | 80239 | Molded Octal Socket for Rectifier | .10 |
| | 80362 | 2-Prong FM Antenna Plug | .10 |
| | 80319 | Miniature Tube Socket | 1.85 |
| | 22147 | Pickup Cable | 1.20 |
| | 71223 | Phono Needle | 1.20 |

# CHEVROLET DIV.-GENERAL MOTORS

**MODEL 986067**


R. F. AMP.
6SK7GT
OSC.-MOD.
6SA7GT
I. F. AMP.
6SK7GT
DET., AVC., &
IST. AUDIO AMP.
6SQ7GT
OUTPUT
6V6GT
TONE CONTROL
56B
B.
M.
V.
59
60
TO HEATERS & SPKR. SUPPLY
RED
BLUE
BLACK
GREEN
WHITE
GREY
YELLOW
BLK.
BROWN
BLK. & RED
46
220 M.
26
.001
28
.005
25
.05
27
.00075
24A
20.0
45
390
32
43-(220M)
44 (15 MEG)
23
.005
56A
300M A.V.C.
330M
42
1 MEG.
22
.05
57
38-(15M)
39-(10M)
37
2.2 MEG.
17
.05
36
220
18
.001
19A
20
.000027
3
19B
21
.000160
4
41
22 M.
40
330 M
2
16
H
J
K
G
F
E
D
C
B
A
5
6
7
58
56C
8
30
TO HEATERS & SPEAKER FIELD
"A" FUSE CONNECTOR
VIBRATOR
62
32
47
220
61
.5
31
.006
RECTIFIER
0Z4
250
24B
20.0
24C
20.0
48
2700
49
5600

VOLTAGES TAKEN FROM SOCKET TERMINALS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1,000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS AT SPARK PLATE. CURRENT DRAIN WITH SPEAKER & DIAL LIGHT 6.0 TO 6.5 AMPS. "B" SUPPLY DRAIN — 50 MA. TOLERANCE ON VOLTAGES ±10%.

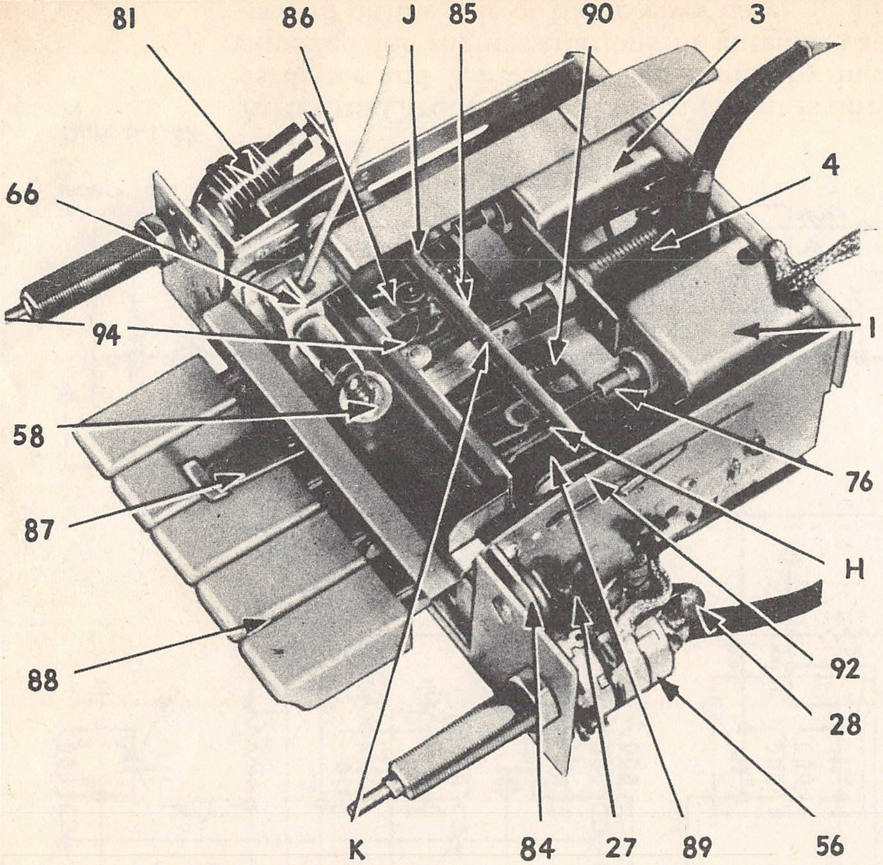
IF PEAK
262 KC

Date 6-1-47

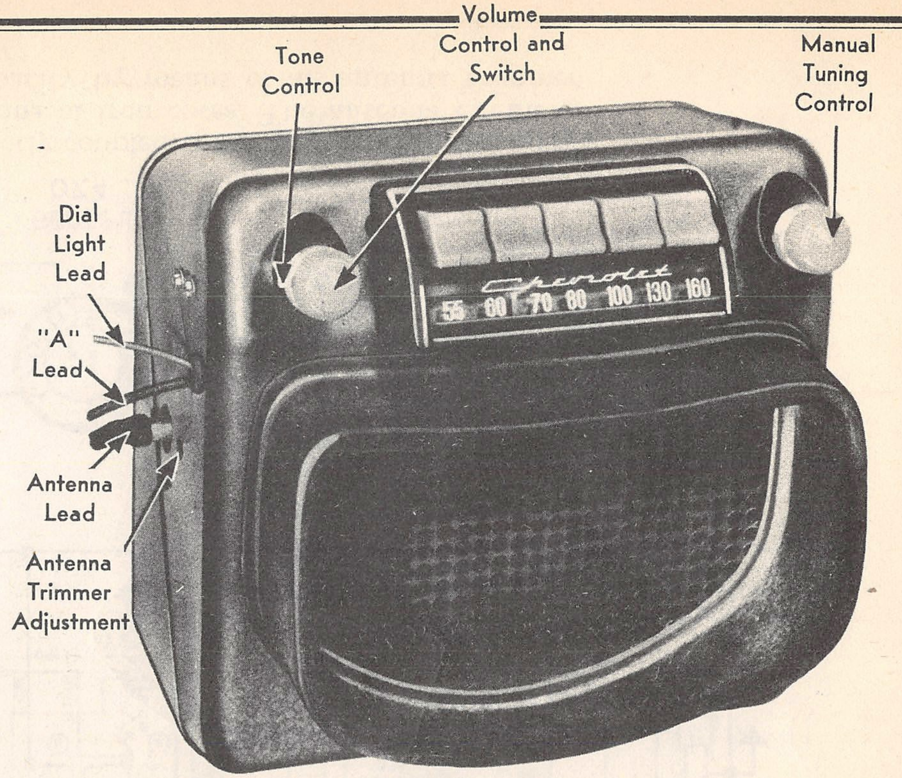
**Antenna Circuit:** The antenna circuit is directly coupled to the antenna. The antenna oscillator and R.F. circuits are tuned by means of iron cores. The antenna circuit is adjusted for slight variations in antenna capacity by means of an antenna trimmer located on the side of the receiver case.

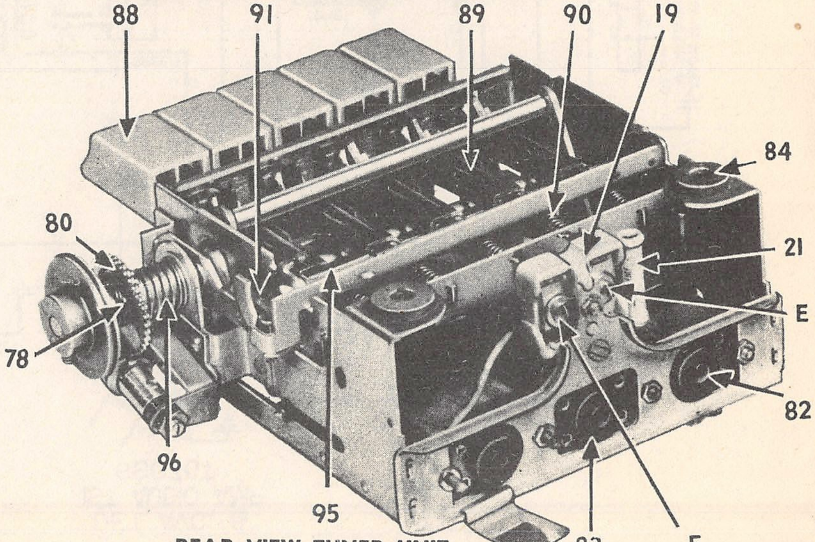
MODEL 986067

## CHEVROLET DIV.-GENERAL MOTORS


81
86
J
85
90
3
4
I
66
94
58
87
88
76
H
92
28
K
84
27
89
56

FRONT VIEW TUNER UNIT


Tone Control
Volume Control and Switch
Manual Tuning Control
Dial Light Lead
"A" Lead
Antenna Lead
Antenna Trimmer Adjustment
Chevrolet
55 60 70 80 100 130 160


88
91
89
90
19
84
80
21
E
78
82
96
95
83
F

REAR VIEW TUNER UNIT

## Procedure for Setting Pushbuttons

Turn on the receiver for ten minutes or longer to allow circuits to stabilize.

1. Select your five favorite stations in order of frequency.
2. Pull the button slightly to the left and out approximately one-half inch.
3. Turn the manual control knob until the desired station is tuned in. To secure an accurate set-up, turn the manual tuning knob back and forth until the station is tuned in clearly.
4. Push button in firmly to the end of its travel.
5. Repeat the same procedure to set up the remaining four buttons.

## Circuit Alignment

The trimmer condensers in this receiver have been carefully adjusted at the factory and should require no further adjustment (except the antenna trimmer) unless tampered with or a coil replaced. It is advisable not to attempt any adjustment unless it is definitely known that alignment is necessary. Since the iron cores of the tuning unit are sealed in place at the factory, only the trimmer adjustment as outlined under "Capacity Alignment" should be made, unless the coils or cores of the iron core tuning unit are changed. A signal generator and an output meter must be used to align the receiver circuits correctly. To make all alignment adjustments the back cover must be removed.

## Capacity Alignment

### 1. I.F. Alignment at 262 Kilocycles

(a) Connect a 0.1 mfd. condenser between the plate prong of the 6V6GT output tube and one terminal of the output meter, to protect the meter from DC voltages. Connect the other terminal of the output meter to ground.

(b) Connect the ground lead of the signal generator to the chassis frame.

(c) Connect the signal lead of the signal generator to the grid (G) prong of the 6SA7 tube socket through a 0.1 mfd. condenser.

(d) Turn the set volume control on full and rotate the tone control knob to the center of its range. Adjust the signal generator to 262 kilocycles, and tune the receiver to a frequency where no squeals or beat notes may be heard and so that when the tuning control is moved through narrow limits no appreciable change in output is noticeable.

(e) Adjust the I.F. trimmers A, B, C, and D for maximum output.

### 2. Aligning at 1615 Kilocycles

(a) Connect the signal lead of the signal generator to the receiver antenna connection through a .000070 mfd. condenser.

(b) Turn the manual control of the receiver to the stop at the high frequency end of the dial.

(c) Set the signal generator to 1615 kilocycles.

(d) Adjust the oscillator trimmer "E" for maximum output.

(e) Adjust the R.F. trimmer "F" for maximum output.

(f) Adjust the antenna trimmer "G" for maximum output.

### 3. Aligning at 1400 Kilocycles

(a) Set the signal generator frequency to 1400 kilocycles or the nearest frequency at which there is no interference from radio stations.

(b) Tune the receiver to this signal and readjust the R.F. trimmer "F" and antenna trimmer "G" for maximum output. The signal generator output should be as low as possible and still give a satisfactory output meter reading.

**NOTE:** This type tuning circuit does not require alignment at 600 kilocycles.

### 4. Alignment with Car Antenna

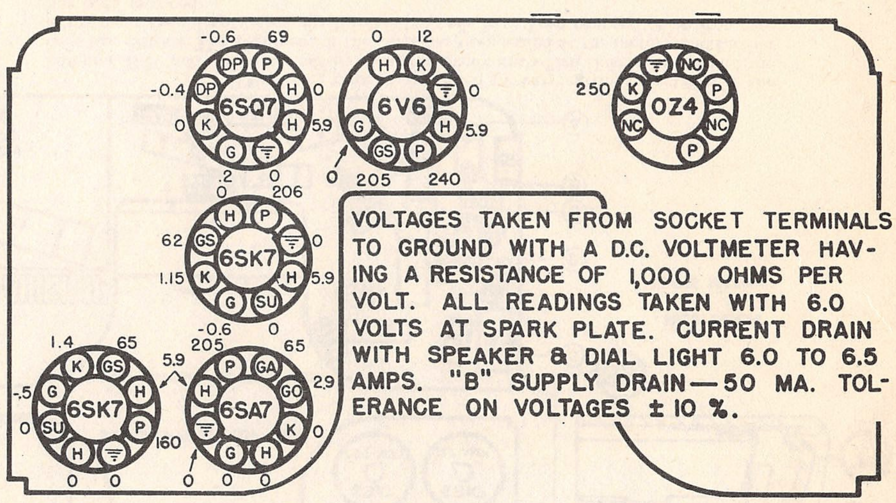
Antenna trimmer "G" must be adjusted to match the car antenna when receiver is installed. With the antenna fully extended, tune in a weak station, adjust trimmer for maximum volume.

## Capacity and Inductance Alignment

This alignment should be used only when there is definite evidence that the iron cores are out of adjustment.

### 1. I.F. Alignment at 262 Kilocycles

The same procedure as previously outlined should be followed.



VOLTAGES TAKEN FROM SOCKET TERMINALS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1,000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS AT SPARK PLATE. CURRENT DRAIN WITH SPEAKER & DIAL LIGHT 6.0 TO 6.5 AMPS. "B" SUPPLY DRAIN—50 MA. TOLERANCE ON VOLTAGES ± 10 %.

### 2. Aligning at 1615 Kilocycles

(a) Connect the signal lead of the signal generator to the set through a .000070 mfd. condenser.

(b) Set the signal generator to 1615 kilocycles.

(c) Rotate the manual tuning knob until the pointer is against the high frequency stop. Mechanically align the iron cores H, J, and K by setting the oscillator core "K" so that its rear edge is 1¾" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) The antenna core "H" and the R.F. core "J" are aligned in the same way as the oscillator core "H".

(d) Adjust the oscillator trimmer "E," the R.F. trimmer "F," and the antenna trimmer "G" for maximum output.

### 3. Aligning at 1400 Kilocycles

(a) Adjust the signal generator to 1400 kilocycles or the nearest frequency at which there is no radio station interference.

(b) Adjust the R.F. core "J" for maximum output.

(c) Adjust the antenna core "H" for maximum output.

**NOTE:** The rear end of iron cores are slotted so the maximum output adjustment can be made with a non-metallic screw driver that fits loosely in the coil form. (No inward force should be used.)

### 4. Realignment at 1615 and 1400 Kilocycles

(a) Repeat alignment of trimmers "F" and "G" at 1615 kilocycles.

(b) Repeat alignment of cores "H" and "J" at 1400 kilocycles. Do not change adjustment of oscillator core "K."

(c) Reseal core studs in guide bar with gyptal or household cement.

### 5. Alignment with Car Antenna

The same procedure as outlined previously should be followed.

MODEL 986067

# CHEVROLET DIV.-GENERAL MOTORS

| Production Part No. | Service Part No. | Part Name | Description—Function | Illus. No. |
|---|---|---|---|---|
| 7256233 | ....... | Coil | Antenna—Coil | 1 |
| 7240251 | ....... | Choke | Antenna—Choke | 2 |
| 7256233 | ....... | Coil | R.F. Coil | 3 |
| 7256235 | ....... | Coil | Oscillator—Coil | 4 |
| 7256011 | ....... | Coil | 1st I.F. Transformer Assembly | 5 |
| 7256012 | ....... | Coil | 2nd I.F. Transformer Assembly | 6 |
| 7255912 | 7241708 | Choke | Hash Choke | 7 |
| 7256004 | 1217846 | Choke | "A" Choke (inside front cover) | 8 |
| 7255907 | ....... | Trimmer | Antenna Trimmer | 16 |
| 7236842 | 7230592 | Condenser | Tubular—.05 Mfd. 600 Volt, Screen By Pass | 17 |
| 7242942 | 1217790 | Condenser | Tubular—.001 Mfd. 600 Volt, R.F. Coupling | 18 |
| 7242454 | ....... | Trimmer | Dual Trimmer—R.F. and Oscillator Sections | 19 |
| 7256348 | 7256259 | Condenser | Molded .000027 Mfd. | 20 |
| 7256276 | ....... | Condenser | Temperature Compensating .000160 Mfd. | 21 |
| 7236841 | 7230592 | Condenser | Tubular .05 Mfd. 600 Volt, AVC By Pass | 22 |
| 7230767 | ....... | Condenser | Tubular .005 Mfd. 600 Volt, Audio Coupling | 23 |
| 7240724 | ....... | Condenser | 3 Section Electrolytic | 24 |
| | | | Section A 20 Mfd. 25 Volt, Output By Pass | 24A |
| | | | Section B 520 Mfd. 400 Volt, "B" Input Filter | 24B |
| | | | Section C 20 Mfd. 400 Volt, "B" Output Filter | 24C |
| 7230892 | 7230592 | Condenser | Tubular .05 Mfd. 600 Volt, Tone Control (Voice) | 25 |
| 7239188 | 1217790 | Condenser | Tubular .001 Mfd. 600 Volt, Audio Coupling | 26 |
| 7240738 | ....... | Condenser | Tubular .00075 Mfd. 400 Volt, Tone Control (Music) | 27 |
| 7232956 | ....... | Condenser | Tubular .005 Mfd. 600 Volt, Tone Control (Bass) | 28 |
| 7233243 | 7230767 | Condenser | Tubular .004 Mfd. 800 Volt, 6V6 Output | 29 |
| 7241259 | ....... | Spark Plate | Spark Plate (inside front cover) | 30 |
| 7240906 | ....... | Condenser | Tubular .006 Mfd. 1600 Volt, Buffer | 31 |
| 1217848 | ....... | Condenser | Chassis Condenser | 32 |
| 7237825 | ....... | Resistor | Insulated, 220 ohms ½ watt, R.F. Amp. Bias | 36 |
| 1211147 | 1214563 | Resistor | Insulated, 2.2 Megohm ½ watt, AVC Isolating | 37 |
| 7233653 | ....... | Resistor | Insulated, 15,000 ohm 2 watt, Screen Dropping | 38 |
| 1211085 | ....... | Resistor | Insulated, 10,000 ohm 1 watt, Plate Dropping | 39 |
| 7240732 | 1214557 | Resistor | Insulated, 330,000 ohm ½ watt, AVC Isolating | 40 |
| 1214550 | ....... | Resistor | Insulated, 22,000 ohm ½ watt, Oscillator Grid | 41 |
| 7238873 | 1213282 | Resistor | Insulated, 1 Megohm ½ watt, AVC Isolating | 42 |
| 1213479 | 1214555 | Resistor | Insulated, 220,000 ½ watt, Plate Dropping | 43 |
| 7235837 | 1213289 | Resistor | Insulated, 15 Megohm ½ watt, 6SQ7 Grid | 44 |
| 7240977 | 1216149 | Resistor | Insulated, 390 ohm 1 watt, Output Tube Bias | 45 |
| 1213479 | 1214555 | Resistor | Insulated, 220,000 ohm ½ watt, 6V6 Grid | 46 |
| 7237994 | ....... | Resistor | Insulated, 220 ohm 1 watt, Power Transformer, Primary Load | 47 |
| 7240917 | 7242844 | Resistor | Insulated, 2700 ohm 2 watt, "B" Filter | 48 |
| 7240918 | ....... | Resistor | Insulated, 5,600 ohm 1 watt "B" Filter | 49 |
| 7256188 | ....... | Control | Volume, Tone and Switch | 56 |
| | | | Volume Control, 300,000 ohm | 56A |
| | | | Tone Control | 56B |
| | | | Switch | 56C |
| 7242204 | ....... | Control | Sensitivity Control | 57 |
| 125588 | ....... | Bulb | Dial Lamp | 58 |
| 7255903 | ....... | Speaker | Electro Dynamic 6⅜" x 9¼" Elliptical, Less Cable | 59 |
| 7256009 | ....... | Transformer | Output Transformer | 60 |
| 7255881 | ....... | Transformer | Power Transformer | 61 |
| 7239142 | ....... | Vibrator | Non-Synchronous 4 Prong | 62 |
| 7255920 | ....... | Cable | Speaker Cable and Plug | |
| 7239475 | ....... | Socket | Antenna Socket | |
| 1217838 | ....... | Socket | Dial Light Assembly (Less Lamp) | 66 |
| 7236279 | ....... | Socket | Tube—Octal | |
| 1216962 | ....... | Socket | Speaker Socket | 67 |
| 7239125 | ....... | Socket | Vibrator Socket | |

## Tuner Unit Part

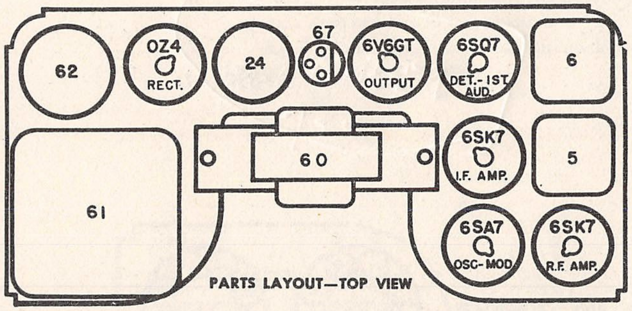
| | | | | |
|---|---|---|---|---|
| 7256112 | ....... | Core | Iron Tuning Core | 76 |
| 7255998 | ....... | Dial | Dial (Included in Escutcheon Assembly) | 77 |
| 7256105 | ....... | Disc | Clutch Driver Disc | 78 |
| 7256177 | ....... | Escutcheon | Escutcheon Assembly | 79 |
| 7256102 | ....... | Gear | Gear and Bushing (Tuning) | 80 |
| 7256100 | ....... | Gear | Gear and Bracket Worm (Tuning) | 81 |
| 7244021 | ....... | Grommet | Antenna & R.F. Coil Grommet | 82 |
| 7244020 | ....... | Grommet | Oscillator Coil Grommet | 83 |
| 7237172 | ....... | Grommet | Mounting Bracket Grommet | 84 |
| 7256179 | ....... | Guide | Guide Bar—Parallel | 85 |
| 7256271 | ....... | Link | Pointer Assembly Connecting Link | 86 |
| 7256125 | ....... | Pointer | Pointer Assembly | 87 |
| 7255985 | ....... | Button | Push Button (Included in Slide and Push Button Package) | 88 |
| 1217837 | ....... | Button Pkg. | Slide and Push Button Package | 89 |
| 7255984 | ....... | Spring | Slide Return Spring | 90 |
| 7255980 | ....... | Spring | Cam Return Spring | 91 |
| 7255990 | ....... | Spring | Treadle Bar Connecting Link Spring | 92 |
| 7256269 | ....... | Spring | (Included in Pointer Assembly Connecting Link) | |
| 7255992 | ....... | Spring | Pointer Connecting Link Spring | 94 |
| 7255987 | ....... | Spring | Declutch Lever Spring | 95 |
| 7255991 | ....... | Spring | Clutch Spring | 96 |

## Tube Complement

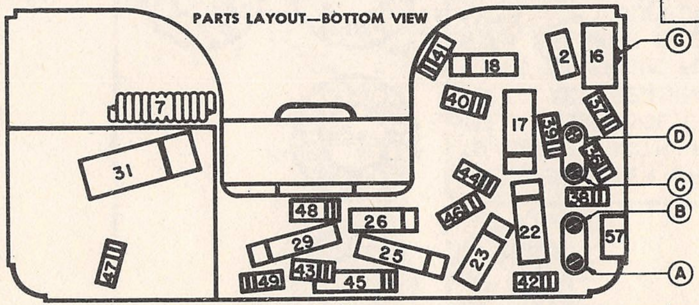
| | | | |
|---|---|---|---|
| 1211924 | ....... | Tube | 0Z4 Rectifier (1 required) |
| 1213637 | ....... | Tube | 6V6GT Output (1 required) |
| 7237886 | ....... | Tube | 6SA7GT Oscillator Modulator (1 required) |
| 7237887 | ....... | Tube | 6SK7GT R.F. and I.F. Amplifier (2 required) |
| 7237888 | ....... | Tube | 6SQ7GT Detector AVC and 1st Audio (1 required) |

## Installation Parts

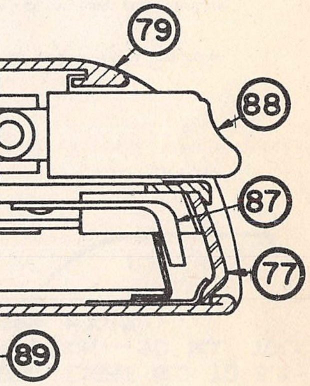
| | | | |
|---|---|---|---|
| 494786 | ....... | Collector | Static Collector (Front Wheel) |
| 1849161 | ....... | Condenser | Ammeter Condenser |
| 1908848 | ....... | Condenser | Generator Condenser |
| 1910147 | ....... | Condenser | Ignition Coil Condenser |
| 147685 | ....... | Fuse | Fuse—Radio, 14 Amp. |
| 7256297 | ....... | Holder | Fuse Holder |
| 7255936 | ....... | Knob | Wing Knob Tone Control |
| 7255935 | ....... | Knob | Dummy Knob |
| 7256148 | ....... | Knob | Control Knob |
| 1217909 | ....... | Lead | "A" Lead (Includes Fuse Holder) |
| 1888204 | ....... | Nipple | Rubber Nipple (Distributor Suppressor) |
| 986121 | ....... | Powder | Static Powder (Tire) |
| 1887829 | ....... | Suppressor | Distributor Suppressor |



PARTS LAYOUT—TOP VIEW



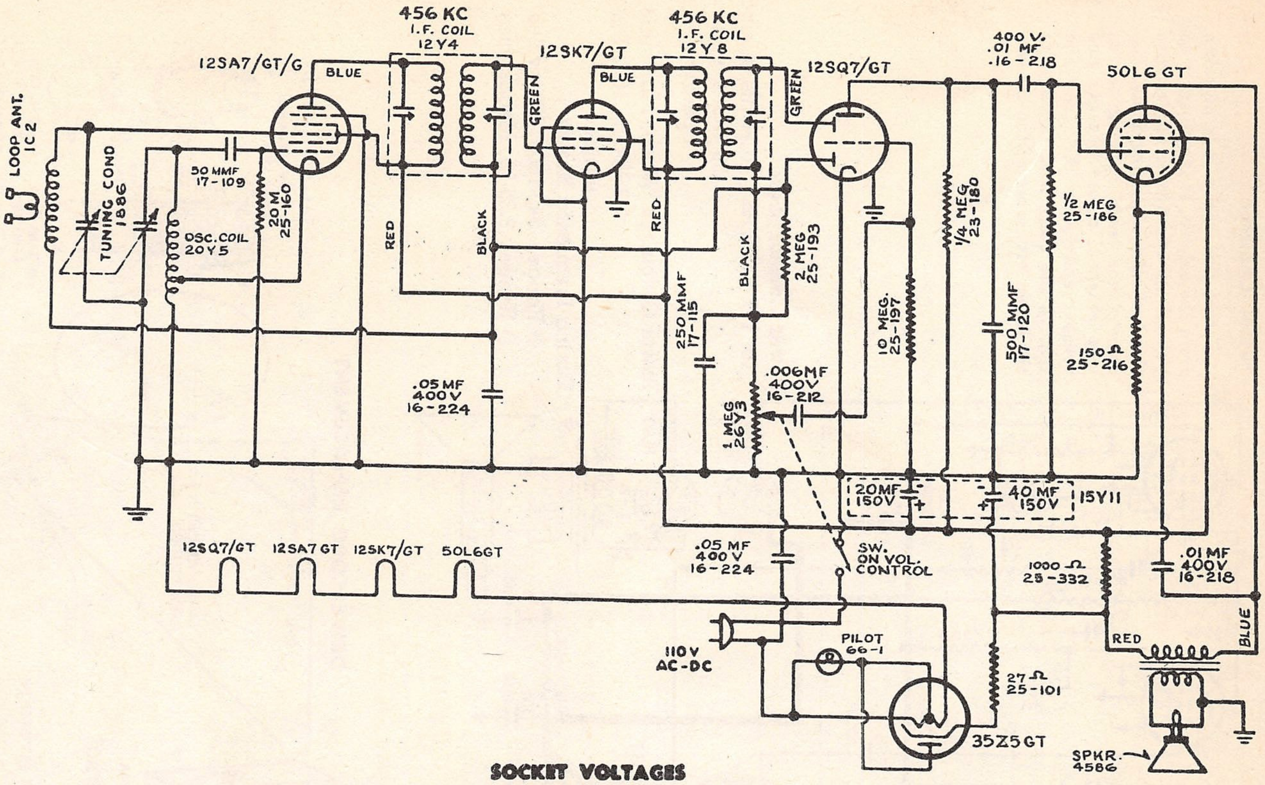
PARTS LAYOUT—BOTTOM VIEW



ESCUTCHEON CROSS SECTION

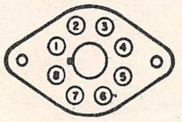
The tuning circuits are tuned by varying the inductance of the antenna, R.F. and oscillator coils by means of iron cores which slide in and out of the coils like pistons. The alignment of the cores has been sealed at the factory and further adjustment should not be required unless the coils have been changed or an iron core has been replaced.

# CONCORD RADIO CORP.


456 KC
I.F. COIL
12Y4
456 KC
I.F. COIL
12Y8
12SA7/GT/G
12SK7/GT
12SQ7/GT
50L6 GT
BLUE
GREEN
BLUE
GREEN
400 V.
.01 MF
.16 - 218
LOOP ANT.
1C2
TUNING COND
1886
50 MMF
17-109
20 M
25-160
OSC. COIL
20Y5
RED
BLACK
RED
BLACK
2 MEG
25-193
1/4 MEG
23-180
1/2 MEG
25-186
250 MMF
17-115
10 MEG.
25-197
500 MMF
17-120
150 Ω
25-216
.05 MF
400 V
16-224
.006 MF
400 V
16-212
1 MEG
26Y3
20 MF
150 V
40 MF
150 V
15Y11
12SQ7/GT
12SA7 GT
12SK7/GT
50L6GT
.05 MF
400 V
16-224
SW.
ON VOL.
CONTROL
1000 Ω
25-332
.01 MF
400 V
16-218
BLUE
RED
110 V
AC-DC
PILOT
66-1
27 Ω
25-101
35Z5 GT
SPKR.
4586

## SOCKET VOLTAGES

| TUBE | POSITION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 12SA7GT | Osc. and Mixer | 0 | 37.5 AC | 99 | 99 | –4.2 | 0 | 24.5 AC | 0 |
| 12SK7GT | IF Amplifier | 0 | 24.5 AC | 0 | 0 | 0 | 99 | 12.5 AC | 99 |
| 12SQ7GT | 2nd Det.—1st Audio | 0 | 0 | 0 | 0 | 0 | 16 | 12.5 AC | 0 |
| 50L6GT | Power Output | 0 | 85 AC | 91.5 | 99 | 0 | 0 | 37.5 AC | 5.9 |
| 35Z5GT | Rectifier | 0 | 117 AC | 112 AC | 0 | 112 AC | 0 | 85 AC | 112 |



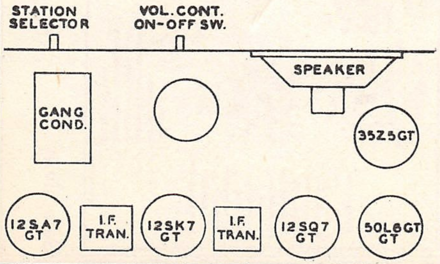
**NOTE:** All DC voltages measured with a 1000 ohm per volt meter from ON-OFF switch (—B) to socket contact indicated. All AC voltages are measured from ON-OFF switch (—B) to socket contact indicated.
All voltages are positive DC unless otherwise marked.
Volume control full on.
Line voltage 117 volts AC.

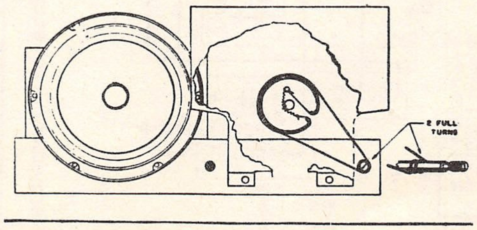
The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screwdriver.
4. Dummy antenna: — .1 mfd., — 10 mmf.

| GENERATOR | CONNECTION AT RADIO | DUMMY ANTENNA | DIAL | TO TUNE TRIMMERS | REMARKS |
|---|---|---|---|---|---|
| IF 455 kc. | 12SA7GT grid | .1 mfd. | HF end | IF trimmers C D E F | Tune to max. |
| 535 kc. | 12SA7GT Grid | 10 mmf. | LF end | Osc. trimmer B | Set limit of band |
| 1400 kc. | 12SA7GT Grid | 10 mmf. | 1400 kc. | Ant. trimmer A | Tune to max. |

Frequency Range....540-1700 kc.
Intermediate Frequency.....455 kc.
Power Supply 105-125 volts AC-DC
Loudspeaker ...5-inch Dynamic
V.C. Impedance..3.5 ohms at 400 cycles
Power Output (Undistorted .75 watts
Power Output (Maximum) 1.5 watts
Tuning Drive Ratio..........3 to 1
Rated Power Input ......32 watts


STATION SELECTOR
VOL. CONT. ON-OFF SW.
SPEAKER
GANG COND.
35Z5GT
12SA7 GT
I.F. TRAN.
12SK7 GT
I.F. TRAN.
12SQ7 GT
50L6GT GT


2 FULL TURNS

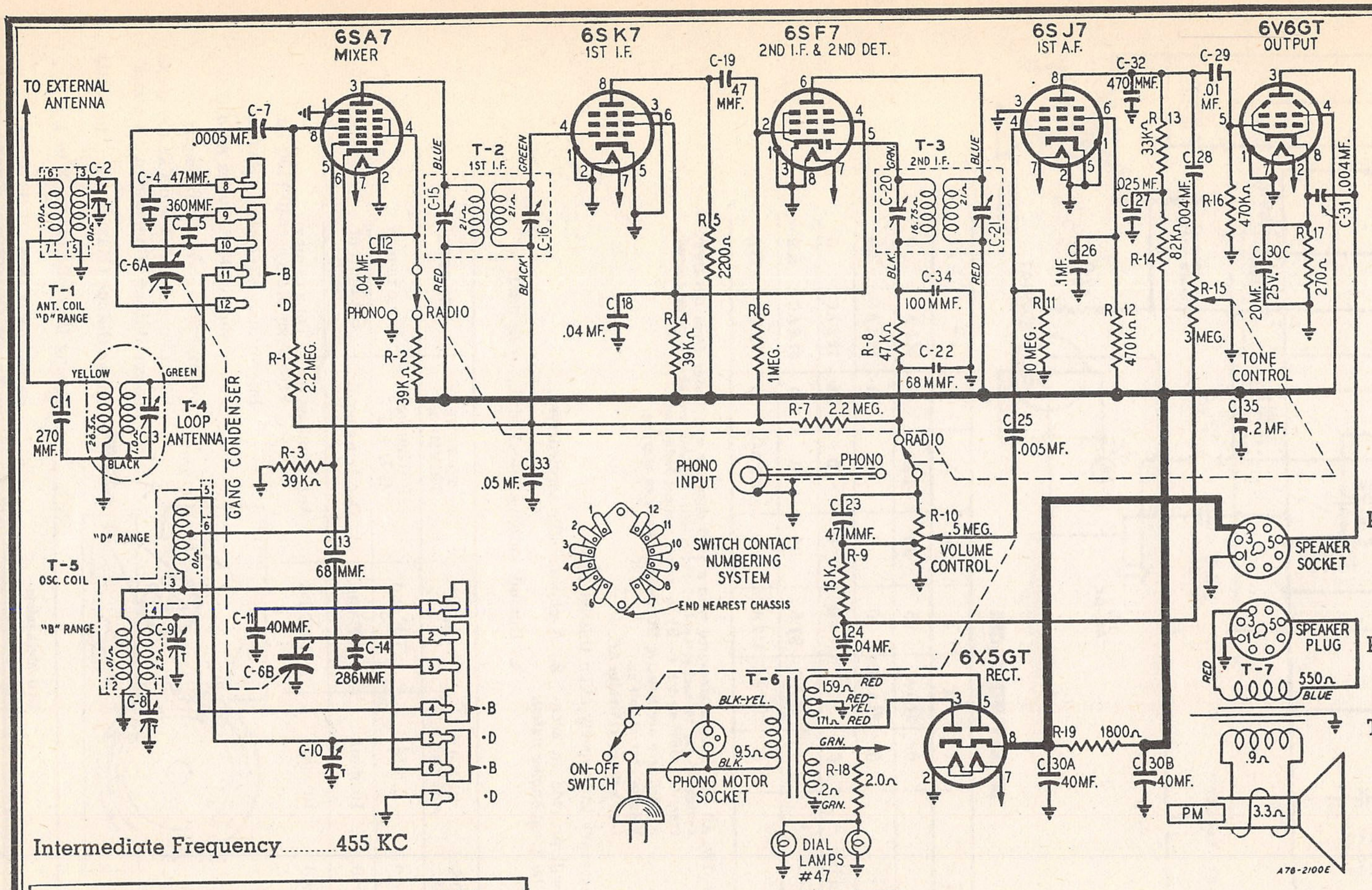
Dial Mechanism

MODEL 7G26C

# CONCORD RADIO CORP.

## REMOVAL OF CHASSIS FROM CABINET

Before the chassis may be taken from the cabinet, it is necessary to pull off the 4 control knobs, remove the 4 chassis mounting bolts, disconnect the leads running to the loop antenna, record changer and speaker and loosen the screw and remove the black lead fastened to the lower left corner of the chassis.

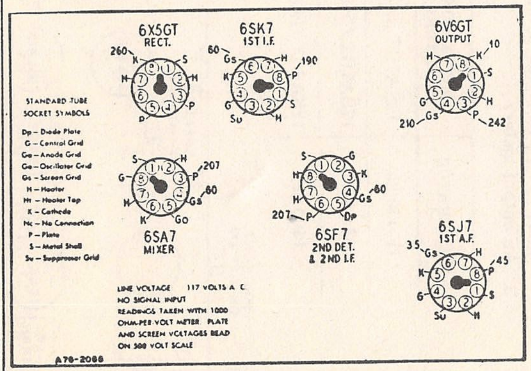

6SA7
MIXER
6SK7
1ST I.F.
6SF7
2ND I.F. & 2ND DET.
6SJ7
1ST A.F.
6V6GT
OUTPUT
6X5GT
RECT.
TO EXTERNAL ANTENNA
T-1
ANT. COIL "D" RANGE
T-2
1ST I.F.
T-3
2ND I.F.
T-4
LOOP ANTENNA
T-5
OSC. COIL
"D" RANGE
"B" RANGE
T-6
T-7
GANG CONDENSER
C-7 .0005 MF.
C-4 47MMF.
360MMF.
C-5
C-6A
C-6B
C-2
C-1 270 MMF.
C-3
C-8
C-9
C-10
C-11 40MMF.
C-12 .04 MF.
C-13 68 MMF.
C-14 286MMF.
C-15
C-16
C-18 .04 MF.
C-19 47 MMF.
C-20
C-21
C-22 68 MMF.
C-23 47MMF.
C-24 .04MF.
C-25 .005MF.
C-26 .1MF.
C-27 .025 MF.
C-28 .004MF.
C-29 .01 MF.
C-30A 40MF.
C-30B 40MF.
C-30C 20MF. 25V.
C-31 .004MF.
C-32 470MMF.
C-33 .05 MF.
C-34 100 MMF.
C-35 .2 MF.
R-1 2.2 MEG.
R-2 39Kꭥ
R-3 39Kꭥ
R-4 39Kꭥ
R-5 2200ꭥ
R-6 1MEG.
R-7 2.2 MEG.
R-8 47Kꭥ
R-9 15Kꭥ
R-10 .5 MEG. VOLUME CONTROL
R-11 10 MEG.
R-12 470Kꭥ
R-13 33Kꭥ
R-14 82Kꭥ
R-15 3 MEG. TONE CONTROL
R-16 470Kꭥ
R-17 270ꭥ
R-18 2.0ꭥ
R-19 1800ꭥ
PHONO
RADIO
PHONO INPUT
SWITCH CONTACT NUMBERING SYSTEM
END NEAREST CHASSIS
SPEAKER SOCKET
SPEAKER PLUG
550ꭥ
.9ꭥ
3.3ꭥ
PM
159ꭥ
17ꭥ
.2ꭥ
9.5ꭥ
ON-OFF SWITCH
PHONO MOTOR SOCKET
DIAL LAMPS #47
BLUE
RED
GREEN
BLACK
YELLOW
GRN.
BLK.
BLK-YEL.
RED-YEL.
A78-2100E

Power Consumption (at 117 Volts AC) 40 Watts (normal)
58 Watts (phono operating)

Power Output....4 Watts, Maximum
2.3 Watts, 10% Distortion

Tuning Frequency Range
B Range....540-1600 Kilocycles
D Range....9.25-15 Megacycles

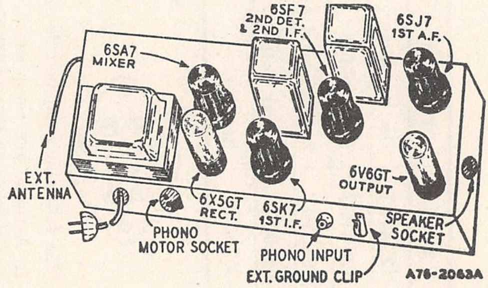
Intermediate Frequency.........455 KC


6X5GT
RECT.
6SK7
1ST I.F.
6V6GT
OUTPUT
6SA7
MIXER
6SF7
2ND DET. & 2ND I.F.
6SJ7
1ST A.F.
260
60
190
10
210
242
207
60
207
60
35
45
A78-2088

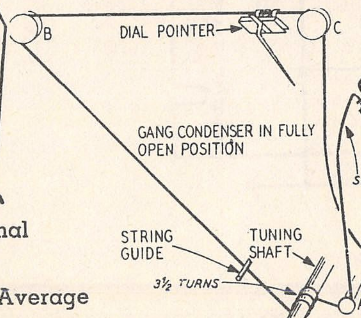
STANDARD TUBE SOCKET SYMBOLS

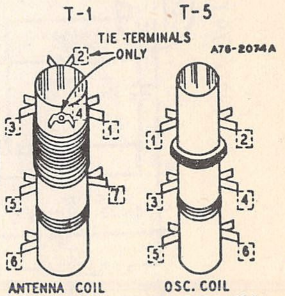
Dp – Diode Plate
G – Control Grid
Ga – Anode Grid
Go – Oscillator Grid
Gs – Screen Grid
H – Heater
Ht – Heater Tap
K – Cathode
Nc – No Connection
P – Plate
S – Metal Shell
Su – Suppressor Grid

LINE VOLTAGE 117 VOLTS A C
NO SIGNAL INPUT
READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE AND SCREEN VOLTAGES READ ON 500 VOLT SCALE


6SA7
MIXER
6SF7
2ND DET. & 2ND I.F.
6SJ7
1ST A.F.
EXT. ANTENNA
6X5GT
RECT.
6SK7
1ST I.F.
6V6GT
OUTPUT
SPEAKER SOCKET
PHONO MOTOR SOCKET
PHONO INPUT
EXT. GROUND CLIP
A78-2063A

## DRIVE CORD REPLACEMENT


B
C
A
DIAL POINTER
GANG CONDENSER IN FULLY OPEN POSITION
START
STRING GUIDE
TUNING SHAFT
3½ TURNS


T-1
T-5
TIE TERMINALS
2
ONLY
A78-2074A
1
2
3
4
5
6
7
ANTENNA COIL RANGE "D"
OSC. COIL RANGE "B" & "D"

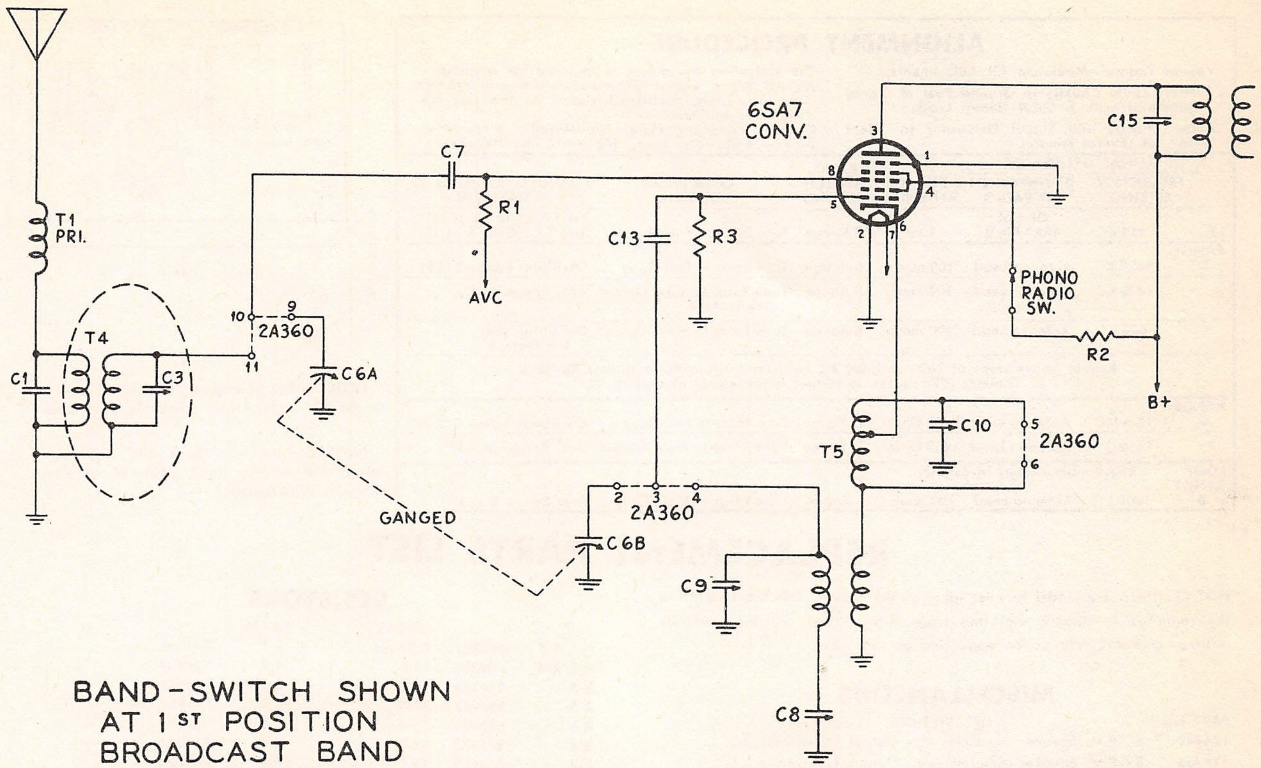
COIL TERMINALS

Sensitivity (For 0.5 Watt Output, with External Antenna)
B Range.......................... 9 Microvolts Average
D Range.......................... 20 Microvolts Average

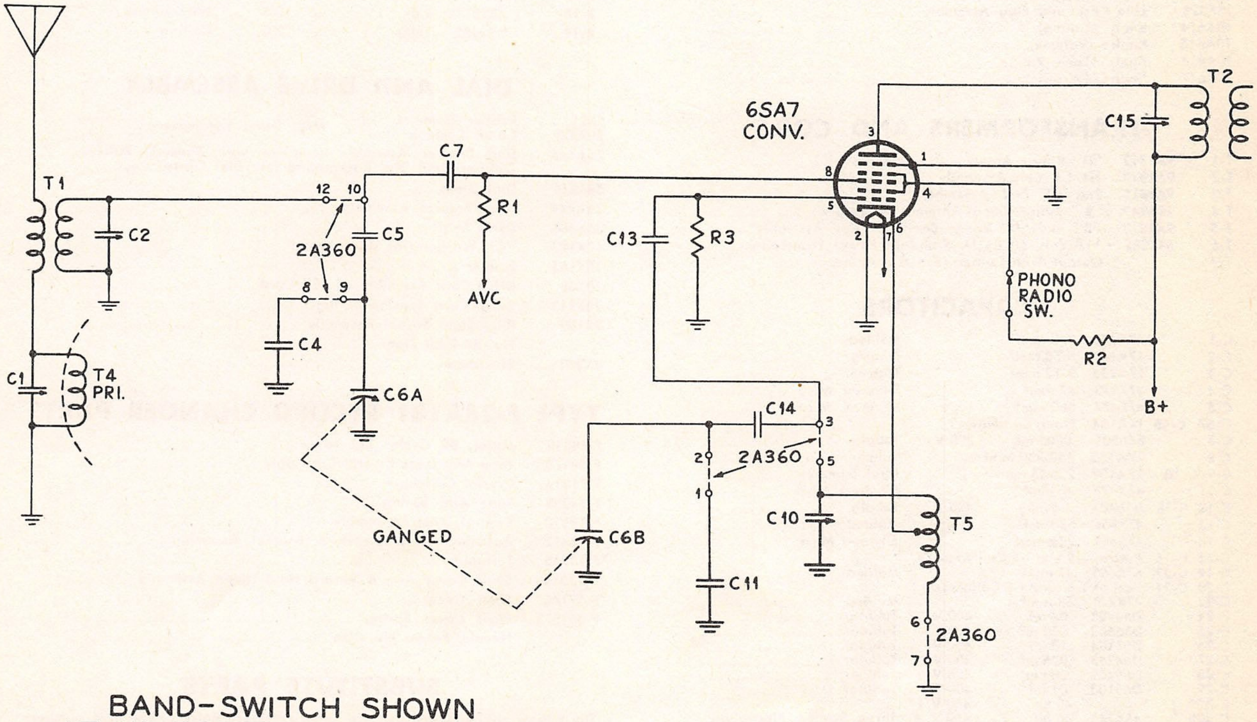
Selectivity............................40 KC Broad at 1000 Times Signal

## CONCORD RADIO CORP.

**MODEL 7G26C**


6SA7
CONV.
C7
R1
AVC
C13
R3
C15
PHONO
RADIO
SW.
R2
B+
T1
PRI.
T4
C1
C3
10
9
11
2A360
C6A
GANGED
C6B
C10
5
6
T5
2
3
4
C9
C8
1
7
8

BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND
540-1600 KC.


6SA7
CONV.
T2
C15
C7
R1
AVC
T1
C2
12
10
2A360
C5
8
9
C4
C1
T4
PRI.
C6A
C13
R3
PHONO
RADIO
SW.
R2
B+
C14
3
2
5
1
C10
T5
GANGED
C6B
C11
6
7
4

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
9.25-15 MC.

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

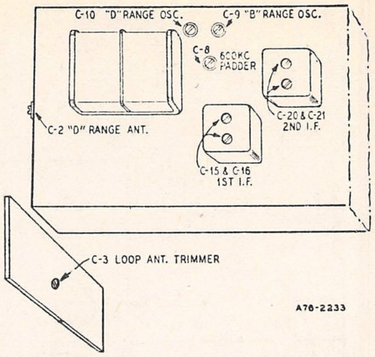
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning: An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver. Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

| | SIGNAL GENERATOR | | | | | |
|---|---|---|---|---|---|---|
| | FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM |
| I.F. | 455 KC | Grid of 6SA7 Pin 8 | .1 mf. | B Range | Turn Rotor to Full Open | 1st I.F. (C15) & (C16)<br>2nd I.F. (C20) & (C21) |
| RANGE B | 1620 KC | Antenna Lead | 100 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C9) |
| | 1400 KC | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output See Note A | Ant. Range B (C3) |
| | 600 KC | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output | Oscillator (C8) See Note B |
| Repeat above steps at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output. | | | | | | |
| RANGE D | 15.6 MC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C10) |
| | 14 MC | Antenna Lead | 400 Ohm | D Range | Tune Rotor to Max. Output | Ant. Range D (C2) |
| LOOP RANGE B | Reassemble chassis in cabinet. | | | | | |
| | 1400 KC | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output | Ant. Range B (C3) |



NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn rotor back and forth and adjust the trimmer until peak of greatest intensity is obtained.

## REPLACEMENT PARTS LIST

NOTICE: There is a Model Number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

### MISCELLANEOUS

| PART NO. | DESCRIPTION |
|---|---|
| 12A442 | 6" P.M. Speaker complete with Output Transformer |
| 12A436 | 8" P.M. Speaker complete with Output Transformer |
| | Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker) |
| | Output Transformer (Specify part number and letters stamped on speaker) |
| 3A303 | Tube Socket—Octal (8 prong) Molded |
| 3A304 | Phono Motor Socket |
| 3A305 | Phono Socket—Single Pin Tip |
| 2A360 | Band Change Switch |
| 13X328 | Line Cord and Plug Assembly |
| 10A614 | Knob (Tuning) |
| 10A615 | Knob (Volume) |
| 10A616 | Knob (Tone—R.P.) |
| 10A617 | Knob (SW-BC) |

### TRANSFORMERS AND COILS

| | | |
|---|---|---|
| T-1 | 9A1812 | "D" Range Antenna Coil Assembly |
| T-2 | 9A1814 | 1st I-F Coil Assembly |
| T-3 | 9A1815 | 2nd I-F Coil Assembly |
| T-4 | 26A449 | "B" Range Loop Antenna Assembly |
| T-5 | 9A1813 | "B" and "D" Range Oscillator Coil Assembly |
| T-6 | 53X282 | 117 Volt, 60 Cycle, Standard Power Transformer |
| T-7 | | Output Transformer (See Miscellaneous) |

### CAPACITORS

| | | | | |
|---|---|---|---|---|
| C-1 | 47X445 | 270 mmf | | Molded |
| C-2 | 17A164 | 5-50 mmf | | Trimmer |
| C-3 | 17A235 | 2-12 mmf | | Trimmer |
| C-4 | 47X473 | 47 mmf | | Silvered Mica |
| C-5 | 47X474 | 360 mmf | | Silvered Mica |
| C-6A, C-6B | 14A184 | Gang Condenser | | |
| C-7 | B66501 | .0005 mf | 200 V | Tubular |
| C-8 | 17A155 | 350-430 mmf | | Trimmer |
| C-9, C-10 | 17A109 | 2.5-35 mmf | | Dual Trimmer |
| C-11 | 47X472 | 40 mmf | | Silvered Mica |
| C-12, C-18 | D66403 | .04 mf | 400 V | Tubular |
| C-13 | 47X466 | 68 mmf | | Molded |
| C-14 | 47X481 | 286 mmf | | Silvered Mica |
| C-15, C-16 | Part of T-2 (1st I-F Coil Assem.) | | | |
| C-19, C-23 | 47X463 | 47 mmf | | Molded |
| C-20, C-21 | Part of T-3 (2nd I-F Coil Assem.) | | | |
| C-22 | 47X471 | 68 mmf | | Molded |
| C-24 | D64403 | .04 mf | 400 V | Tubular |
| C-25 | D66502 | .005 mf | 400 V | Tubular |
| C-26 | D67104 | .10 mf | 400 V | Tubular |
| C-27 | D64253 | .025 mf | 400 V | Tubular |
| C-28 | D66402 | .004 mf | 400 V | Tubular |
| C-29 | D66103 | .01 mf | 400 V | Tubular |
| C-30A | 45X346 | 40 mf | 450 V | Three Section Electrolytic |
| C-30B | | 40 mf | 450 V | |
| C-30C | | 20 mf | 25 V | |
| C-31 | F66402 | .004 mf | 600 V | Tubular |
| C-32 | 47X505 | 470 mmf | | Molded |
| C-33 | B66503 | .05 mf | 200 V | Tubular |
| C-34 | 47X476 | 100 mmf | | Molded |
| C-35 | D67204 | .2 mf | 400 V | Tubular |

### RESISTORS

| | | OHMS | WATTS | |
|---|---|---|---|---|
| R-1, R-7 | B85225 | 2.2 meg. | 0.5 | Carbon |
| R-2, R-4 | C84393 | 39 K | 1.0 | Carbon |
| R-3 | B84393 | 39 K | 0.5 | Carbon |
| R-5 | B84222 | 2200 | 0.5 | Carbon |
| R-6 | B85105 | 1 meg. | 0.5 | Carbon |
| R-8 | B85473 | 47 K | 0.5 | Carbon |
| R-9 | B84153 | 15 K | 0.5 | Carbon |
| R-10 | 36X357 | .5 meg. | | Volume Control & Switch |
| R-11 | B85106 | 10 meg. | 0.5 | Carbon |
| R-12, R-16 | B85474 | 470 K | 0.5 | Carbon |
| R-13 | B84333 | 33 K | 0.5 | Carbon |
| R-14 | B84823 | 82 K | 0.5 | Carbon |
| *R-15 | 40X277 | 3 meg. | | Tone Control & Radio Phono Switch |
| R-17 | C84271 | 270 | 1.0 | Carbon |
| R-18 | 43X213 | 2.0 | 0.5 | Wire-wound |
| R-19 | D84182 | 1800 | 2.0 | Carbon |

### DIAL AND DRIVE ASSEMBLY

| | | |
|---|---|---|
| 6X21 | Rubber Grommet | Mtg. Gang Condenser |
| 20X329 | Cond. Cushion Stud | |
| 26A443 | Dial Bracket Assembly complete with Spacers, Pulleys, Diffusers and Dial Background less Dial Glass | |
| 58X676 | Dial Glass | |
| 26A444 | Idler Bracket Assembly | |
| 26X486 | Drive Shaft | |
| 19X192 | "C" Washer (for drive shaft) | |
| 15X163 | Pointer | |
| 10X38 | Drive Cord Assembly or 50" Cord | |
| 28X113 | Drive Cord Tension Spring | |
| 7X199 | Pilot Light Socket Assembly | |
| | No. 47 Pilot Light | |
| 4X353 | Escutcheon | |

### TYPE F-28A131 RECORD CHANGER PARTS

| | |
|---|---|
| F-44038 | Motor, 60 Cycle, 115 volts |
| F-59175 | Tone Arm (Less Crystal Cartridge) |
| F-71214 | Crystal Cartridge |
| F-64343 | Tone Arm Spring |
| F-13510 | Control Knob Assembly |
| F-13412 | Automatic Stop Switch & Bracket Assembly |
| F-13435 | Turntable |
| F-13544 | Shelf Cover Arm & Record Hold Down Assembly |
| F-59176 | Shelf Cover |
| F-561333 | Shelf Cover Spring |
| | Needle, Permo No. 100 |

### SUBSTITUTE PARTS

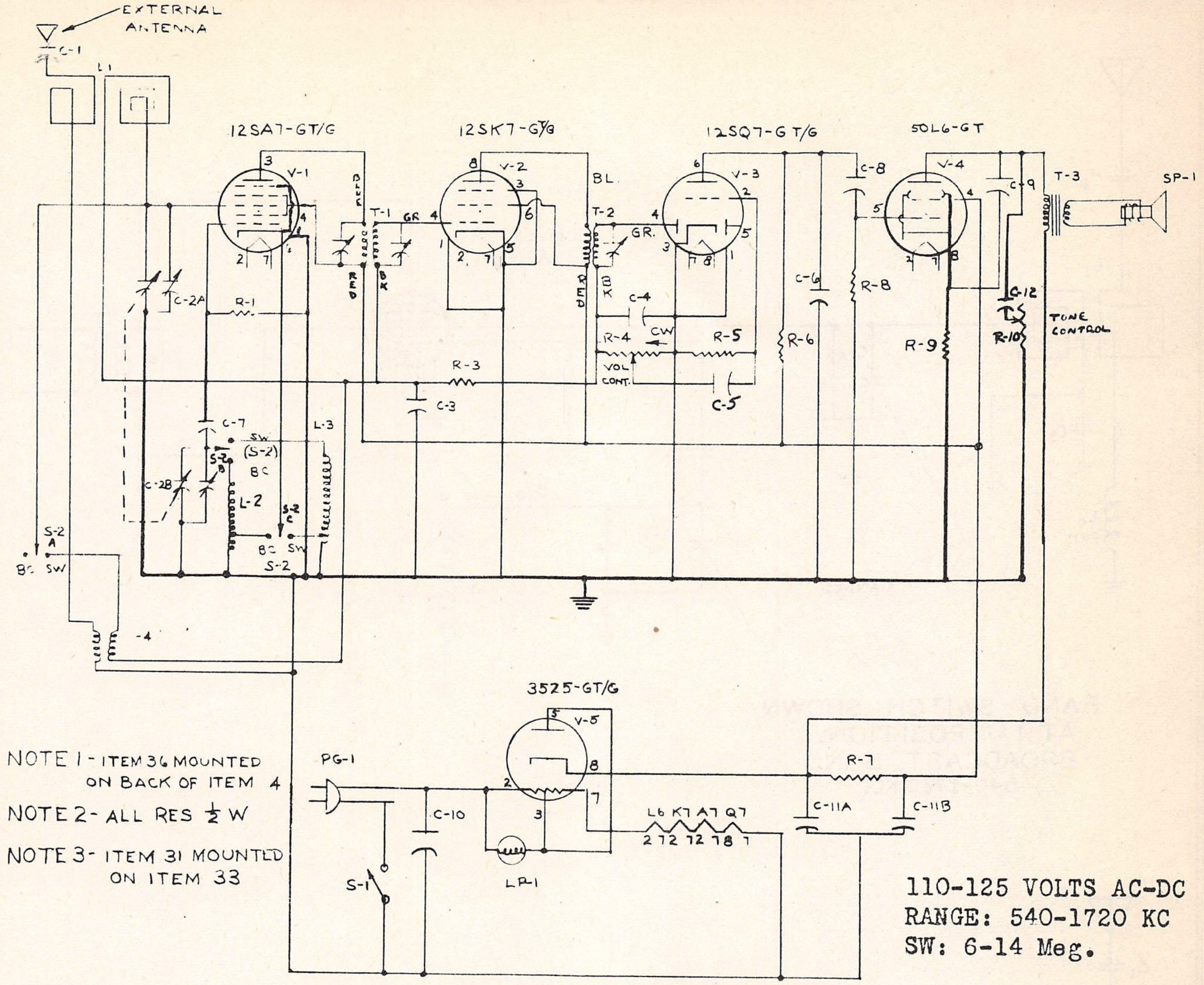
The following parts are used in some receivers only. Check part numbers on old part before ordering and order part originally used in receiver.

| | |
|---|---|
| *40X282 | Tone Control (Substitute for 40X277) |
| *25X1539 | Radio Phono Switch Lever (Use with 40X282) |
| *2A161 | D.P.D.T. Switch (Use with 40X282) |

***Use only GENUINE factory tested parts to insure service jobs you can depend on and to obtain original set performance.***

# CORONET RADIO & TELEV. CO.

**MODEL 1583**

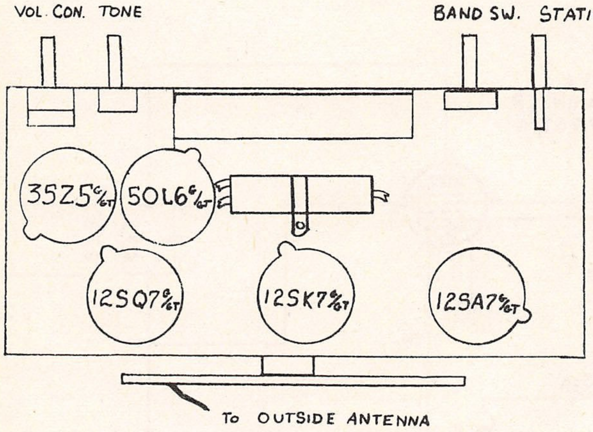

EXTERNAL ANTENNA
C-1
L-1
12SA7-GT/G
V-1
12SK7-GT/G
V-2
12SQ7-GT/G
V-3
50L6-GT
V-4
T-1
GR
BL
T-2
GR.
T-3
SP-1
C-8
C-9
C-12
TONE CONTROL
R-10
C-2A
R-1
C-4
CW
R-4
R-5
VOL CONT.
R-3
C-3
C-5
C-6
R-8
R-6
R-9
C-7
SW
(S-2)
BC
L-3
C-2B
S-2 B
L-2
S-2 C
BC SW
S-2
S-2 A
BC SW
-4
35Z5-GT/G
V-5
PG-1
C-10
S-1
LP-1
R-7
C-11A
C-11B
L6 K7 A7 Q7
2 72 72 78 7

NOTE 1 - ITEM 36 MOUNTED ON BACK OF ITEM 4

NOTE 2 - ALL RES ½ W

NOTE 3 - ITEM 31 MOUNTED ON ITEM 33

110-125 VOLTS AC-DC
RANGE: 540-1720 KC
SW: 6-14 Meg.

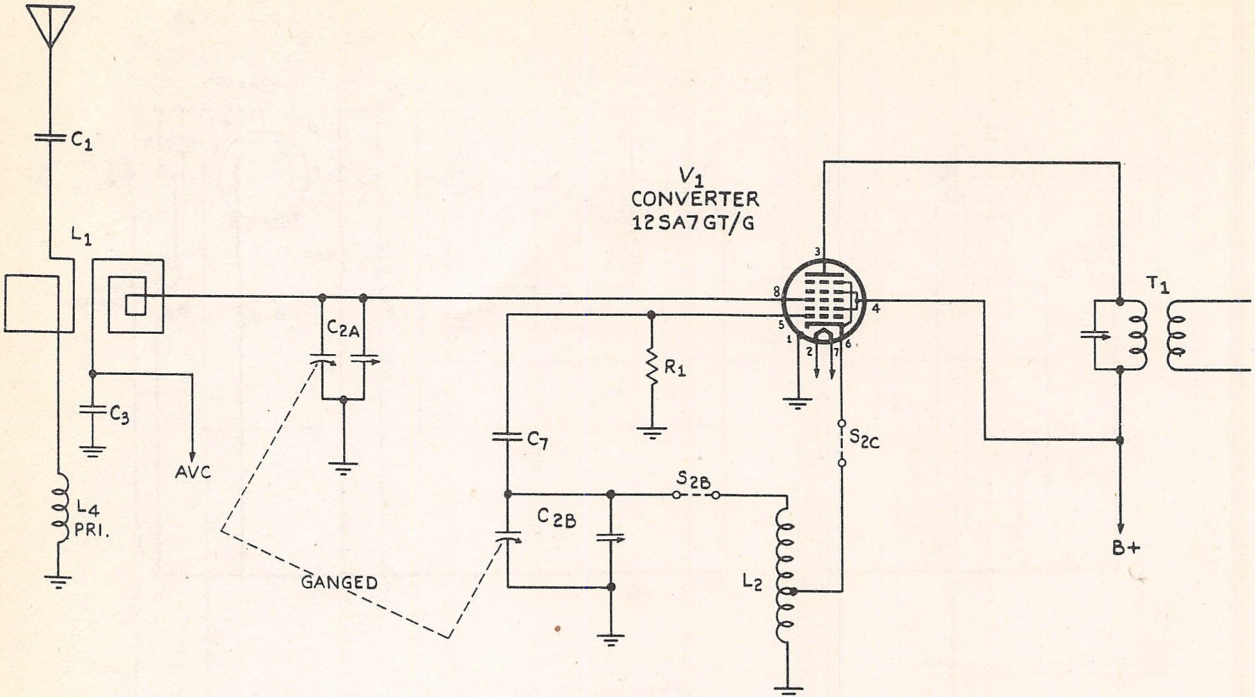

VOL. CON.
TONE
BAND SW.
STATIONS
35Z5G/GT
50L6G/GT
12SQ7G/GT
12SK7G/GT
12SA7G/GT
To OUTSIDE ANTENNA

| CODE | PART | DESCRIPTION | ITEM |
|---|---|---|---|
| R-1 | A-95 | Resistor, 22,000 ohms | 1 |
| | | | 2 |
| R-3 | A-17 | " 2.2 meg | 3 |
| R-4 | A-96 | Potentiom'r, 0.5 meg. | 4 |
| R-5 | A-18 | Resistor, 10 meg | 5 |
| R-6 | A-14 | " 0.25 meg | 6 |
| R-7 | A-98 | " 1200 ohm | 7 |
| R-8 | A-15 | " 0.5 meg | 8 |
| R-9 | A-16 | " 140 ohm | 9 |
| R-10 | A-18 | Potentiom'r .1 meg | 10 |
| | | | 11 |
| C-1 | A-5 | Condens'r; 02 mdg 200v | 12 |
| C-2 | A-19 | " Tuning | 13 |
| C-3 | A-7 | " .05 mf 200v | 14 |
| C-4 | A-9 | " 250 mmf " | 15 |
| C-5 | A-6 | " .002 mf " | 16 |
| C-6 | A-9 | " 250 mmf " | 17 |
| C-7 | A-8 | " 100 mmf " | 18 |
| C-8 | A-5 | " .02 mf " | 19 |
| C-9 | A-5 | " .02 " 400v | 20 |
| C-10 | A-4 | " 0.1 " 200v | 21 |
| C-11 | A-3 | " 50-20mf 150v | 22 |
| S-2 | A-97 | 4 pole 2 pos'ion | 23 |
| C-12 | A-99 | Cond. .05 mf 200v | 24 |
| L-1 | A-1 | Internal loop ant. | 25 |
| L-2 | A-28 | B.C. osc. coil | 26 |
| L-3 | A-98 | SW osc. coil | 27 |
| L-4 | A-98 | SW ant. coil | 28 |
| T-1 | A-10 | 456 kc. IF xformer | 29 |
| T-2 | A-11 | " " " | 30 |
| T-3 | A-2 | Output " | 31 |
| LP-1 | A-30 | Lamp, 6v, 0.15A. | 32 |
| SP-1 | A-2 | P.M. speaker | 33 |
| PG-1 | A-55 | Power plug | 34 |
| | | | 35 |
| S-1 | A-96 | Power switch | 36 |
| V-1 | A-22 | Vac. tube, 12SA7-6T/G | 37 |
| V-2 | A-23 | " " 12SK7- " | 38 |
| V-3 | A-24 | " " 12SQ7 " | 39 |
| V-4 | A-25 | " " 50LG-GT | 40 |
| V-5 | A-26 | " " 35Z5-6T/G | 41 |

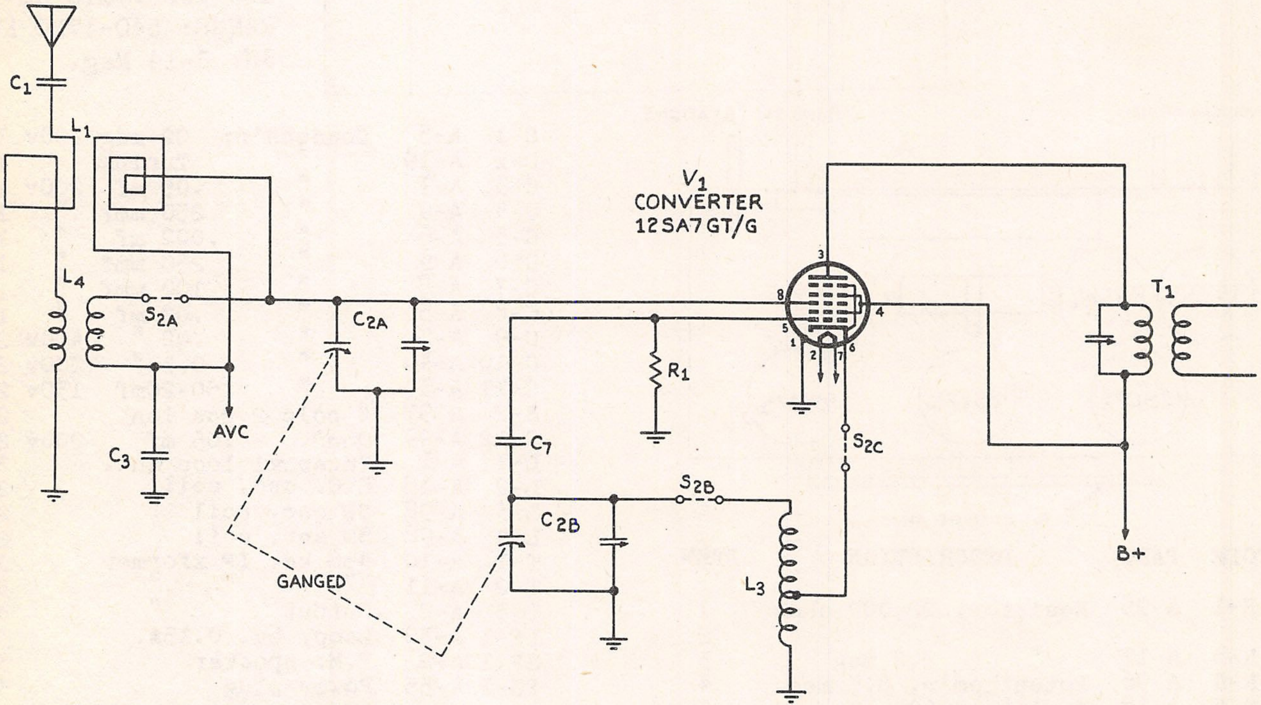
*"clarified schematics"*

**MODEL 1583**

# CORONET RADIO & TELEV. CO.


C1
L1
C3
AVC
L4
PRI.
C2A
GANGED
C7
R1
C2B
S2B
L2
V1
CONVERTER
12SA7GT/G
3
8
5
1
2
7
6
4
S2C
T1
B+

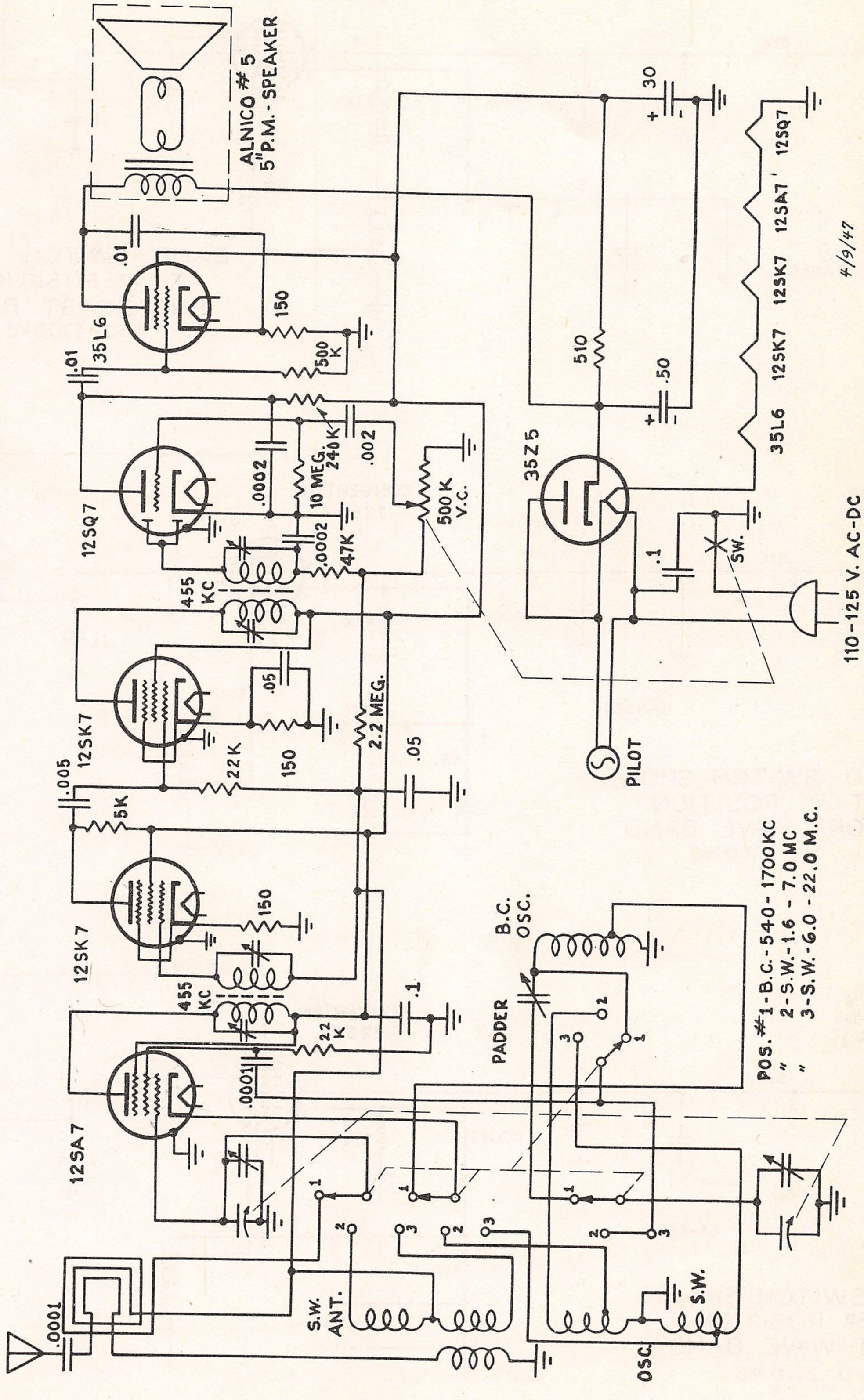
BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1720 KC.


C1
L1
L4
S2A
C3
AVC
C2A
GANGED
C7
R1
C2B
S2B
L3
V1
CONVERTER
12SA7GT/G
3
8
5
1
2
7
6
4
S2C
T1
B+

BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
6 - 14 MC.

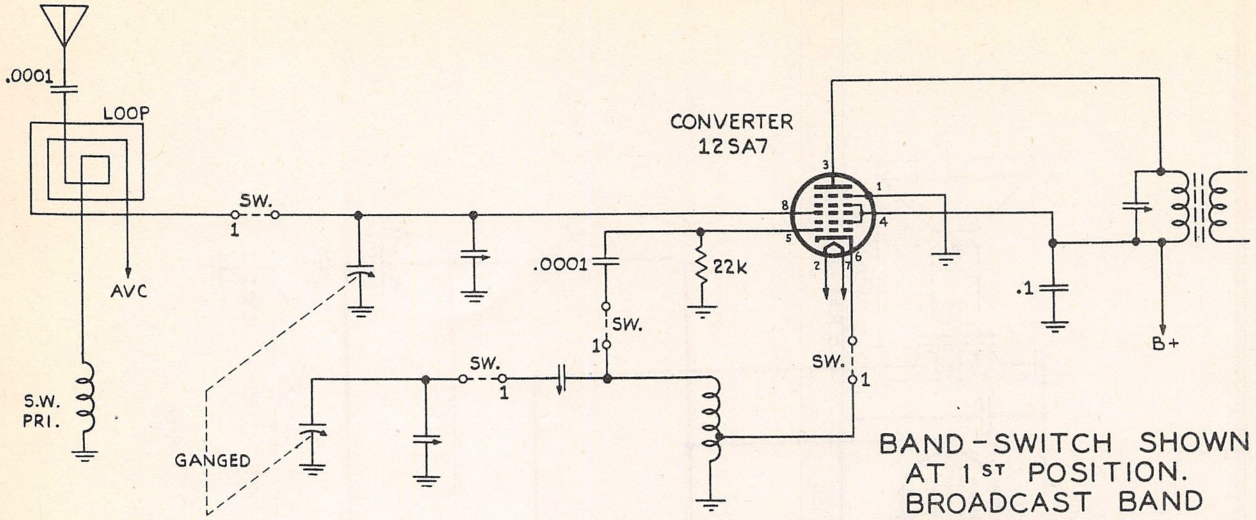
## CORONET RADIO & TELEV CO.

**MODEL 1701**

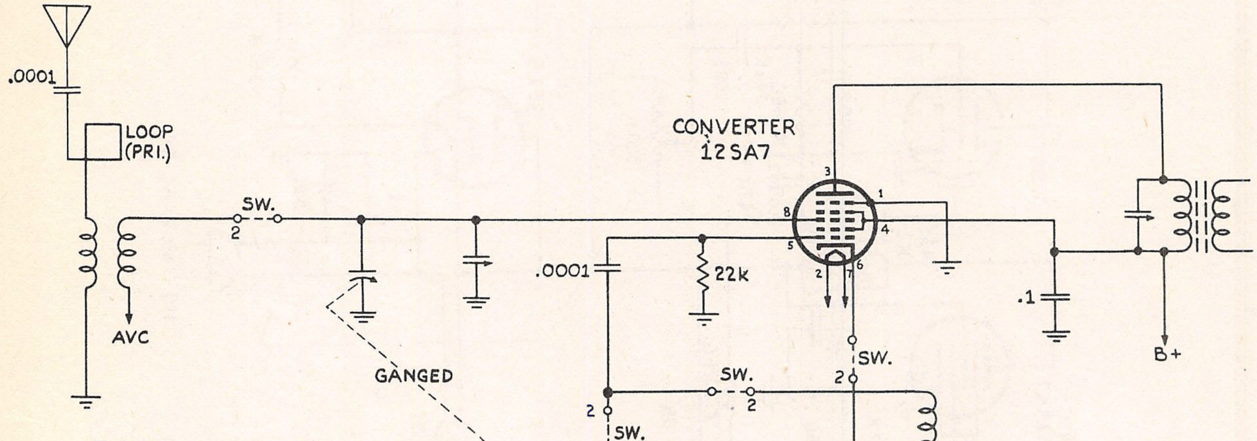

ALNICO #5
5" P.M. - SPEAKER
.01
35L6
150
500 K
.01
240K
.002
10 MEG.
.0002
.0002
47K
500 K V.C.
12SQ7
455 KC
.05
12SK7
150
22K
2.2 MEG.
.05
.005
5K
12SK7
150
455 KC
22 K
.1
.0001
12SA7
.0001
S.W. ANT.
OSC.
S.W.
PADDER
B.C. OSC.
POS. #1-B.C.-540-1700KC
" 2-S.W.-1.6 - 7.0 MC
" 3-S.W.-6.0 - 22.0 M.C.
1
2
3
30
+
-
510
.50
35Z5
35L6
12SK7
12SK7
12SA7
12SQ7
.1
SW.
110-125 V. AC-DC
PILOT
4/9/47

MODEL 1701

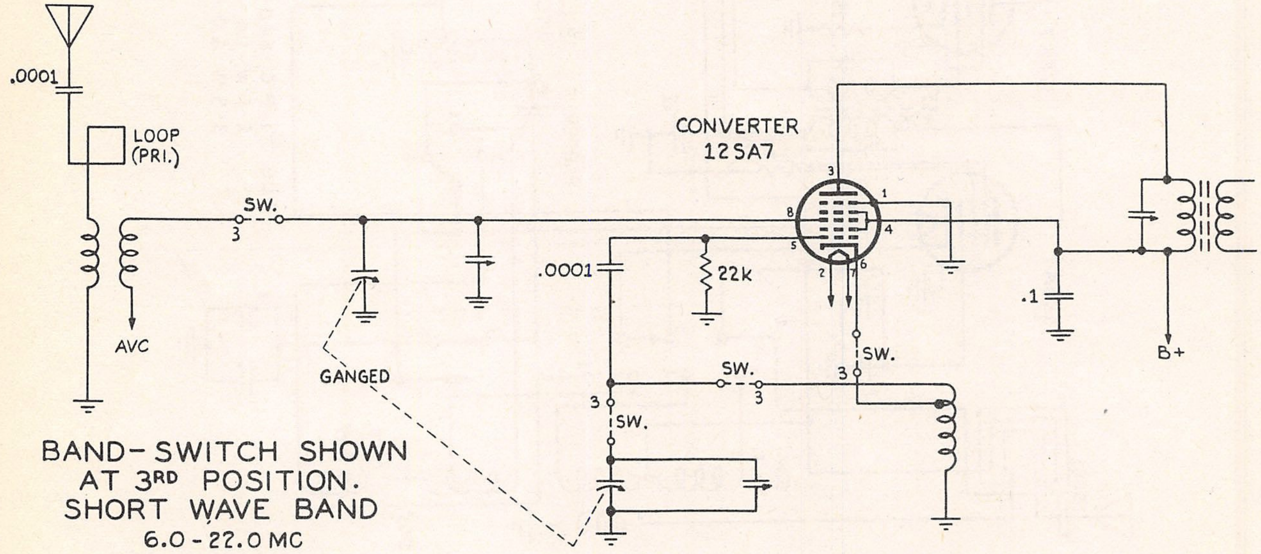
## CORONET RADIO & TELEV. CO.


.0001
LOOP
SW.
1
AVC
S.W. PRI.
GANGED
.0001
22k
SW.
1
SW.
1
CONVERTER
12SA7
3
1
8
4
5
2
7
6
SW.
1
.1
B+

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1700 KC

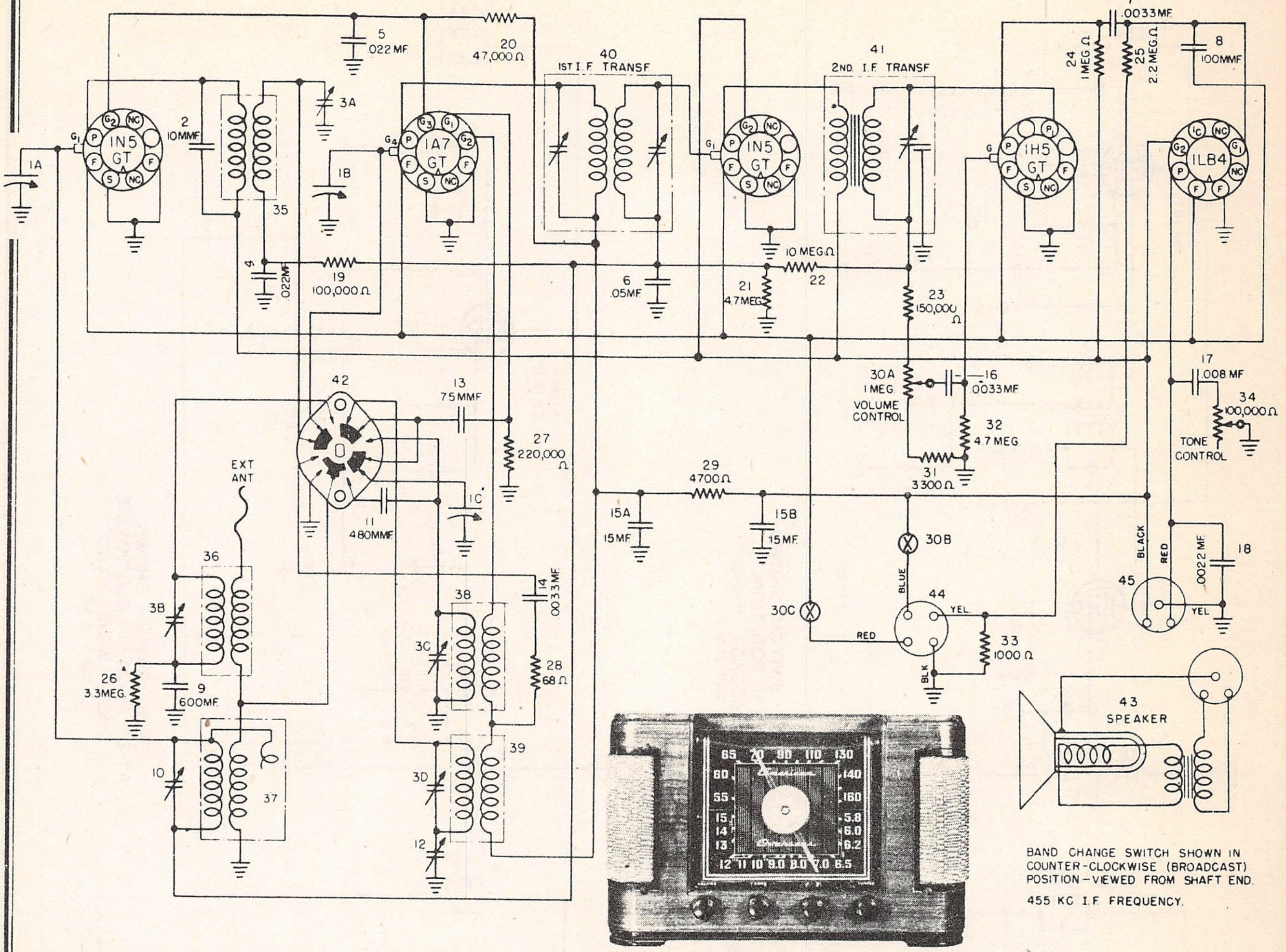

.0001
LOOP (PRI.)
SW.
2
AVC
GANGED
CONVERTER
12SA7
3
1
8
4
5
2
7
6
.0001
22k
SW.
2
SW.
2
2
SW.
.1
B+

BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
1.6 - 7.0 MC


.0001
LOOP (PRI.)
SW.
3
AVC
GANGED
CONVERTER
12SA7
3
1
8
4
5
2
7
6
.0001
22k
SW.
3
SW.
3
3
SW.
.1
B+

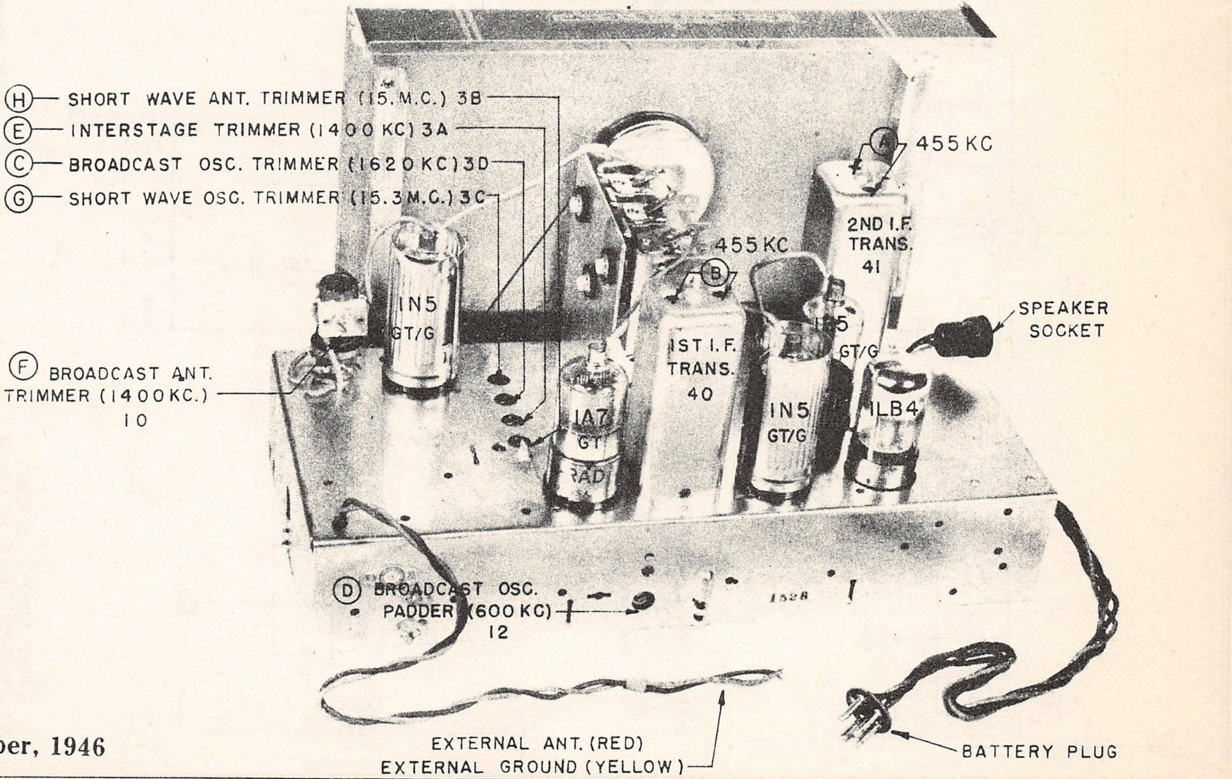
BAND-SWITCH SHOWN
AT 3RD POSITION.
SHORT WAVE BAND
6.0 - 22.0 MC

# CROSLEY DIV.
# AVCO MFG. CORP.


1A
1N5 GT
2 10MMF
35
3A
1B
1A7 GT
5 .022MF
20 47,000Ω
40 1ST I.F. TRANSF
41 2ND I.F. TRANSF
1N5 GT
1H5 GT
1LB4
7 .0033MF
24 1MEGΩ
25 2.2MEGΩ
8 100MMF
4 .022MF
19 100,000Ω
6 .05MF
21 4.7MEG
10 MEGΩ 22
23 150,000Ω
30A 1MEG. VOLUME CONTROL
16 .0033MF
17 .008MF
34 100,000Ω TONE CONTROL
32 4.7MEG.
31 3300Ω
42
13 75MMF
27 220,000Ω
11 480MMF
1C
EXT ANT
29 4700Ω
15A 15MF
15B 15MF
30B
30C
44
RED
BLUE
YEL.
BLK
33 1000Ω
45
BLACK
RED
YEL
.0022MF 18
36
3B
26 3.3MEG.
9 600MF
10
37
38
3C
14 .0033MF
28 68Ω
39
3D
12
43 SPEAKER

BAND CHANGE SWITCH SHOWN IN COUNTER-CLOCKWISE (BROADCAST) POSITION—VIEWED FROM SHAFT END.

455 KC I.F. FREQUENCY.

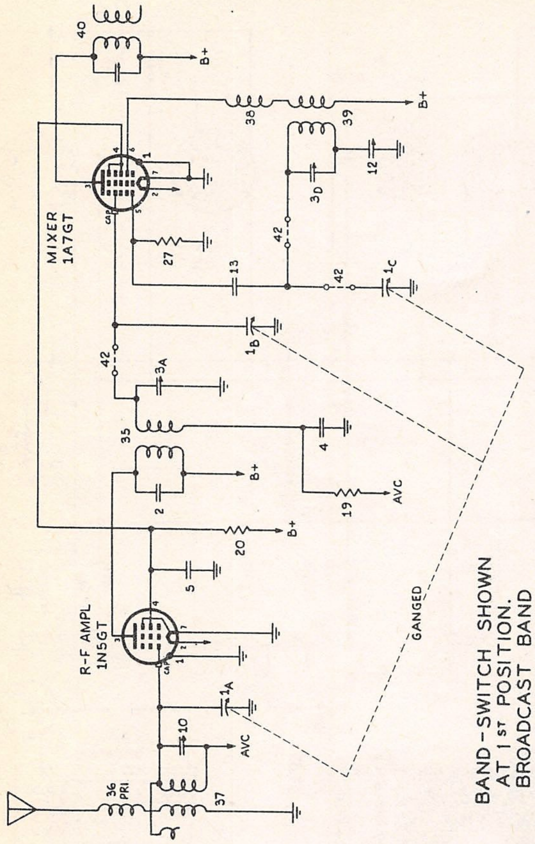

Ⓗ SHORT WAVE ANT. TRIMMER (15.M.C.) 3B
Ⓔ INTERSTAGE TRIMMER (1400 KC) 3A
Ⓒ BROADCAST OSC. TRIMMER (1620 KC) 3D
Ⓖ SHORT WAVE OSC. TRIMMER (15.3 M.C.) 3C
Ⓐ 455 KC
Ⓑ 455 KC
2ND I.F. TRANS. 41
1ST I.F. TRANS. 40
1N5 GT/G
1A7 GT
1N5 GT/G
1H5 GT/G
1LB4
SPEAKER SOCKET
Ⓕ BROADCAST ANT. TRIMMER (1400KC.) 10
Ⓓ BROADCAST OSC. PADDER (600 KC) 12
EXTERNAL ANT. (RED)
EXTERNAL GROUND (YELLOW)
BATTERY PLUG

October, 1946

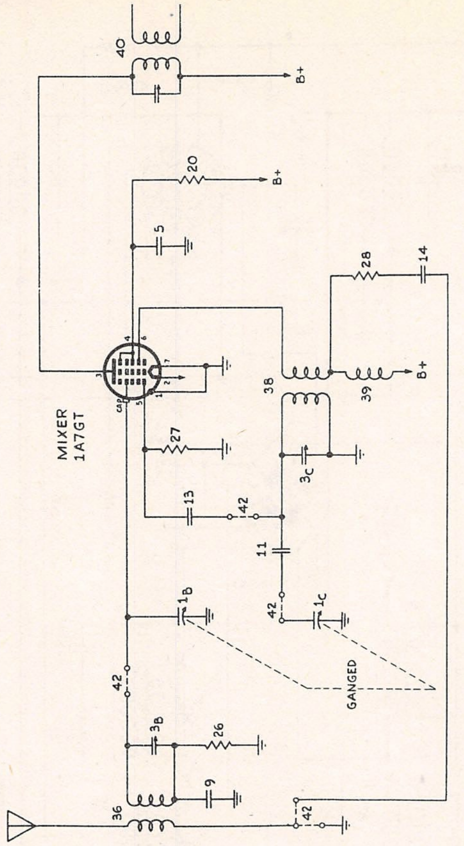
"clarified schematics"

**MODEL 56FC**
**MODEL 56TX-L**

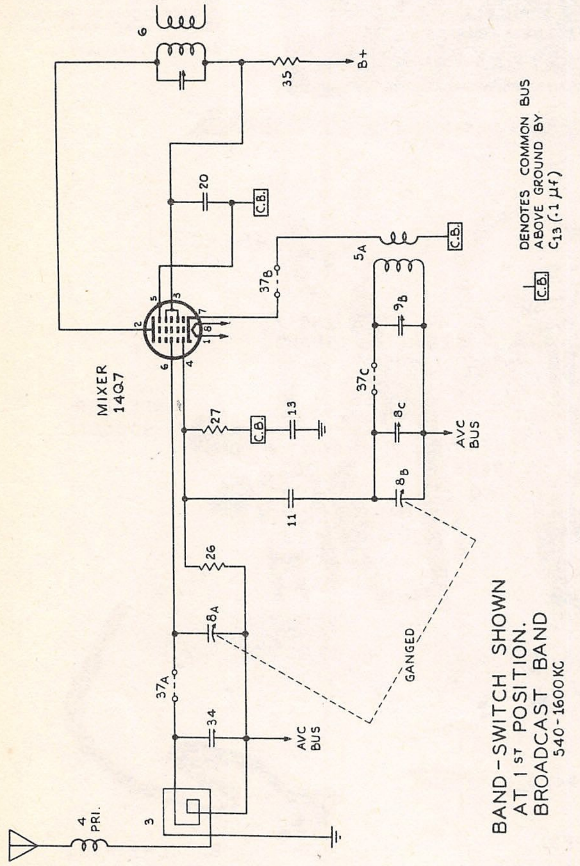
# CROSLEY DIV.
# AVCO MFG. CORP.


MIXER
1A7GT
R-F AMPL
1N5GT
B+
AVC
GANGED
40
38
39
12
3D
42
27
13
1C
1B
3A
35
4
19
2
20
5
1A
10
36
PRI
37

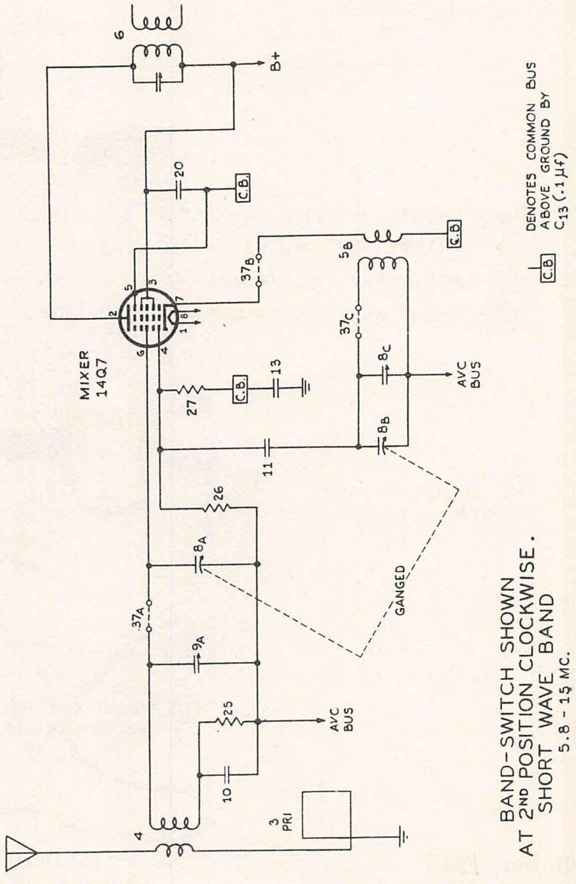
BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600KC


MIXER
1A7GT
B+
GANGED
40
20
5
28
14
38
39
27
3C
13
42
11
1B
1C
3B
26
9
36

BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 5.8 - 15 MC.


MIXER
14Q7
B+
C.B.
AVC BUS
GANGED
6
35
20
37B
5A
9B
37C
8C
27
13
11
8B
26
8A
37A
34
4
PRI
3
DENOTES COMMON BUS ABOVE GROUND BY C13 (.1 μf)

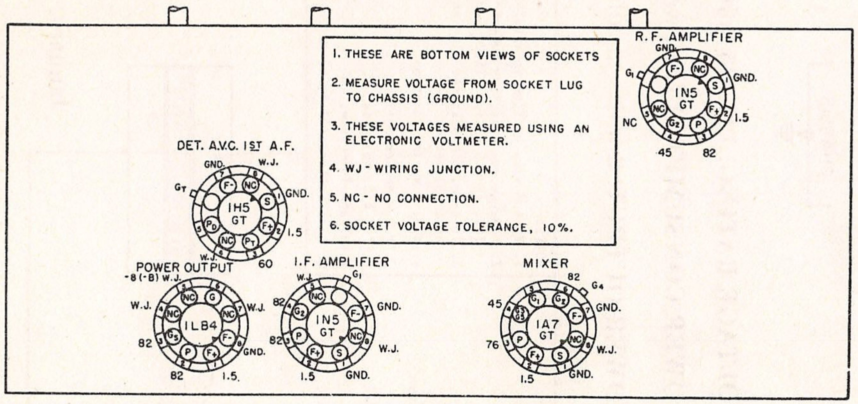
BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600KC


MIXER
14Q7
B+
C.B.
AVC BUS
GANGED
6
20
37B
5B
37C
8C
27
13
11
8B
26
8A
37A
9A
25
10
4
3
PRI
DENOTES COMMON BUS ABOVE GROUND BY C13 (.1 μf)

BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 5.8 - 15 MC.

# CROSLEY DIV.
# AV COMFG. CORP.

## SOCKET VOLTAGE CHART



1. THESE ARE BOTTOM VIEWS OF SOCKETS
2. MEASURE VOLTAGE FROM SOCKET LUG TO CHASSIS (GROUND).
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. SOCKET VOLTAGE TOLERANCE, 10%.

## PARTS LIST—MODEL 56FC

| Item No. | Part No. | Description | |
|---|---|---|---|
| 1A | AC-134898 | Condenser (Variable) | Three |
| 1B | | Condenser (Variable) | Section |
| 1C | | Condenser (Variable) | Assembly |
| 2 | 39004-1 | Condenser, 10 mmf., 500v., Mica | |
| 3A | B-132386-12 | Condenser, Trimmer | Four |
| 3B | | Condenser, Trimmer | Section |
| 3C | | Condenser, Trimmer | Assembly |
| 3D | | Condenser, Trimmer | |
| 4 | 39001-80 | Condenser, .02 mfd., 600v., Paper | |
| 5 | 39001-80 | Condenser, .02 mfd., 600v., Paper | |
| 6 | 39001-17 | Condenser, .05 mfd., 600v., Paper | |
| 7 | 39001-76 | Condenser, .003 mfd., 600v., Paper | |
| 8 | 39001-1 | Condenser, 100 mmf., 600v., Paper | |
| 9 | GC-210685-99 | Condenser, 600 mmf., 300v., Mica | |
| 10 | W-49652-15 | Condenser, Trimmer | |
| 11 | GC-210685-138 | Condenser, 480 mmf., 500v., Mica | |
| 12 | W-135130 | Condenser, Padder | |
| 13 | B-226638-54 | Condenser, 75 mmf., 500v., Mica | |
| 14 | 39001-76 | Condenser, .003 mfd., 600v., Paper | |
| 15A | W-49664 | Condenser, 15 mfd., 140 w.v. | Two Section |
| 15B | | Condenser, 15 mfd., 140 w.v. | Elect. Filter |
| 16 | 39001-76 | Condenser, .003 mfd., 600v., Paper | |
| 17 | 39001-78 | Condenser, .006 mfd., 600v., Paper | |
| 18 | 39001-74 | Condenser, .002 mfd., 600v., Paper | |
| 19 | 39294-25 | Resistor, 100,000 ohm, ½ w. | |
| 20 | 39294-23 | Resistor, 47,000 ohm, ½ w. | |
| 21 | 39294-35 | Resistor, 4.7 megohm, ½ w. | |
| 22 | 39294-37 | Resistor, 10 megohm, ½ w. | |
| 23 | 39294-26 | Resistor, 150,000 ohm, ½ w. | |
| 24 | 39294-31 | Resistor, 1 megohm, ½ w. | |
| 25 | 39294-33 | Resistor, 2.2 megohm, ½ w. | |
| 26 | 39294-34 | Resistor, 3.3 megohm, ½ w. | |
| 27 | 39294-27 | Resistor, 220,000 ohm, ½ w. | |
| 28 | 39294-6 | Resistor, 68 ohm, ½ w. | |
| 29 | 39294-17 | Resistor, 4700 ohm, ½ w. | |
| 30A | B-130520-3 | Control, Volume (1 megohm) | |
| 30B | | Switch (Plate Supply) | Assy. |
| 30C | | Switch (Filament Supply) | |
| * | 39368-8 | Control (Volume) | |
| | 39369-2 | Switch (Plate Supply) | |
| | | Switch (Filament Supply) | |
| 31 | 39294-16 | Resistor, 3300 ohm, ½ w. | |
| 32 | 39294-35 | Resistor, 4.7 megohm, ½ w. | |
| 33 | 39014-25 | Resistor, 1000 ohm, ½ w. | |
| 34 | B-135198 | Control, Tone (100,000 ohm) | |
| * | 39368-5 | Control, (Tone) | |
| 35 | AW-135133 | Coil Assembly (R. F.) | |
| 36 | AW-135147 | Coil Assembly (H. F. Ant.) | |
| 37 | AW-135134 | Coil Assembly (B. C. Ant.) | |
| 38 | AW-135140 | Coil Assembly (H. F. Osc.) | |
| 39 | AW-135141 | Coil Assembly (B. C. Osc.) | |
| 40 | AW-132803 | Transformer (1st I. F.) | |
| 41 | AW-132804 | Transformer (2nd I. F.) | |
| 42 | B-135079 | Switch (Band Change) | |
| 43 | C-135199 | Speaker and Transformer Assembly | |
| 44 | B-130493 | Cable and Plug (Battery) | |
| 45 | W-132822 | Cable and Plug (Speaker) | |
| | W-135371 | Socket (1 LB4 Tube) | |
| | G-39204 | Socket (Tube) | |
| | W-46447-1 | Shield (Tube) | |
| | CR69 | "A-B" Battery Pack | |
| | AW-135172 | Dial Face Assembly | |
| | B-134571 | Pointer (Dial) | |
| | W-134667 | Clip (Dial Pointer) | |
| | W-134917 | Shaft (Drive) | |
| | W-51071 | Ring (Retaining) | |
| | W-134916 | Washer (Spring) | |
| | W-51752 | Spring (Dial Cord) | |
| | D-133928 | Cabinet | |
| | C-132688 | Lens (Dial) | |
| | W-130197 | Knob | |
| | W-45580 | Rubber Mtg. | |
| | 39220-38 | Screw (Chassis Mtg.) | |

*These parts will replace the original equipment parts.

## ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the antenna lead (red) as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

## ALIGNMENT CHART

| Alignment Sequence | Signal Generator Output | | | Position of | | Adjust for Maximum Output |
|---|---|---|---|---|---|---|
| | Frequency in kc. | In Series with | To | Band Switch | Tuning Dial | |
| 1 | 455 | 200 mmf. | Ant. | A | 1,620 | A & B |
| 2 | 1,620 | 200 mmf. | Ant. | A | 1,620 | C |
| 3 | 600 | 200 mmf. | Ant. | A | 600 | D |
| 4 | 1,620 | 200 mmf. | Ant. | A | 1,620 | C |
| 5 | 1,400 | 200 mmf. | Ant. | A | 1,400 | E & F |
| 6 | 600 | 200 mmf. | Ant. | A | 600 | D |
| 7 | 15,300 | 400 ohms | Ant. | O | 15,300 | G* |
| 8 | 15,000 | 400 ohms | Ant. | O | 15,000 | H |

* **NOTE:** When aligning the short-wave oscillator trimmer (G), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

**TYPE:** Five-tube, two-band superheterodyne.

**FREQUENCY RANGE:** American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at 0.)

**INTERMEDIATE FREQUENCY:** 455 kc.

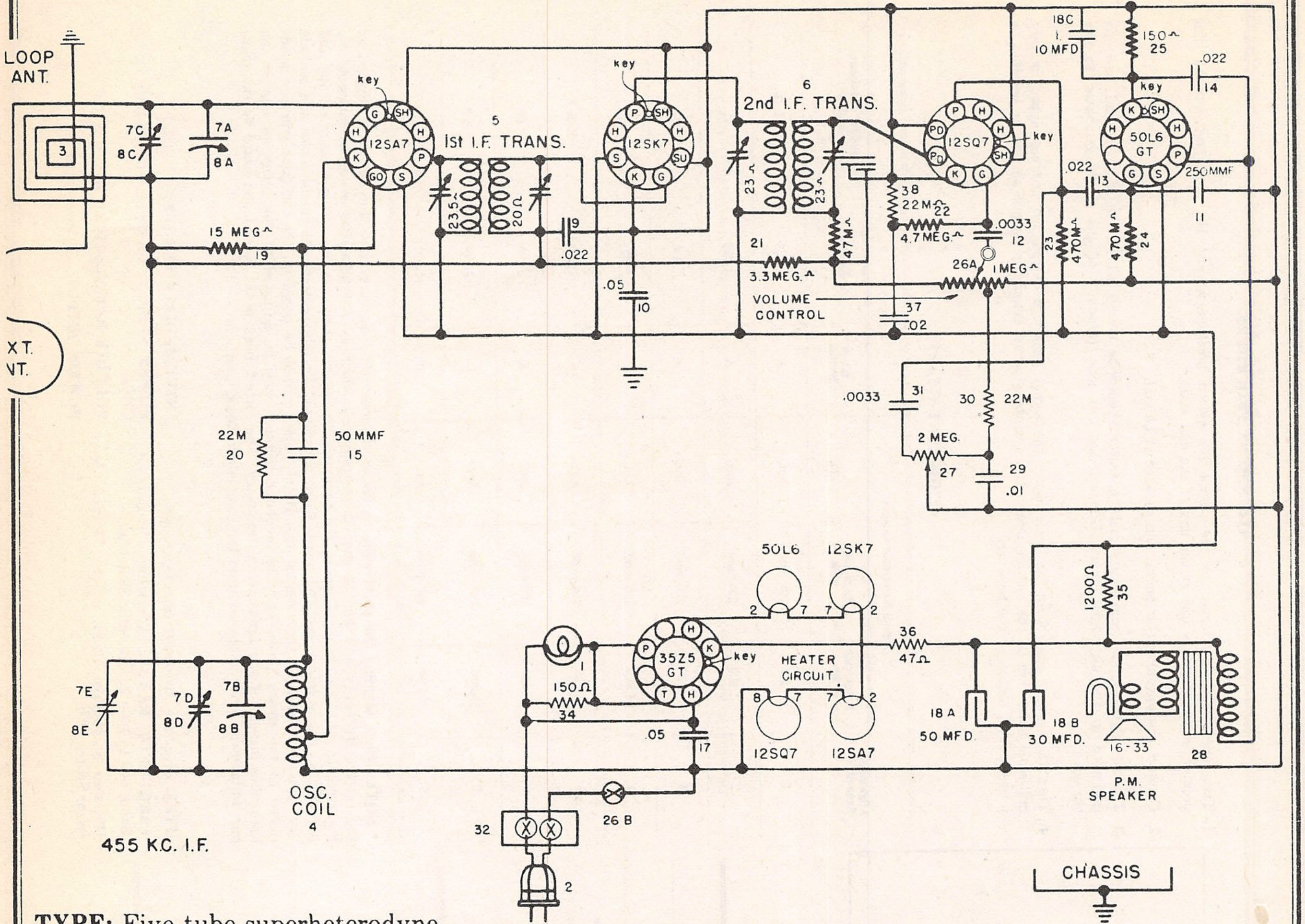
**POWER SUPPLY:** Crosley "A-B" Battery Pack, CR69.

**VOLTAGE RATING:** 1½ v. "A"; 90 v. "B"

**POWER OUTPUT:** 170 mw. minimum.

MODEL 56TD

## CROSLEY DIV.
## AVCO MFG. CORP.


LOOP ANT.
3
7C
8C
7A
8A
key
12SA7
G SH H P S GO K H
5
1st I.F. TRANS.
23.5Ω
20Ω
9
.022
15 MEG Ω
19
key
12SK7
P SH H SU G K S H
.05
10
6
2nd I.F. TRANS.
23Ω
23Ω
21
3.3 MEG. Ω
47MΩ
VOLUME CONTROL
37
.02
38
22 MΩ
22
4.7 MEG. Ω
.0033
12
26A
1 MEG Ω
12SQ7
P PD PD H SH K G H
key
18C
10 MFD
150Ω
25
.022
14
key
50L6 GT
K SH H P S G H
.022
13
250 MMF
11
23
470MΩ
470MΩ
24
XT. NT.
.0033
31
30
22M
2 MEG.
27
29
.01
22M
20
50 MMF
15
50L6
12SK7
2 7 7 2
35Z5 GT
P H K H T
key
HEATER CIRCUIT
8 7 7 2
12SQ7
12SA7
1
150Ω
34
.05
17
36
47Ω
1200Ω
35
18 A
50 MFD.
18 B
30 MFD.
16-33
28
P.M. SPEAKER
7E
8E
7D
8D
7B
8B
OSC. COIL
4
455 KC. I.F.
32
26 B
2
CHASSIS

**TYPE:** Five-tube superheterodyne.

**FREQUENCY RANGE:** 540 to 1600 kc.

**INTERMEDIATE FREQUENCY:** 455 kc.

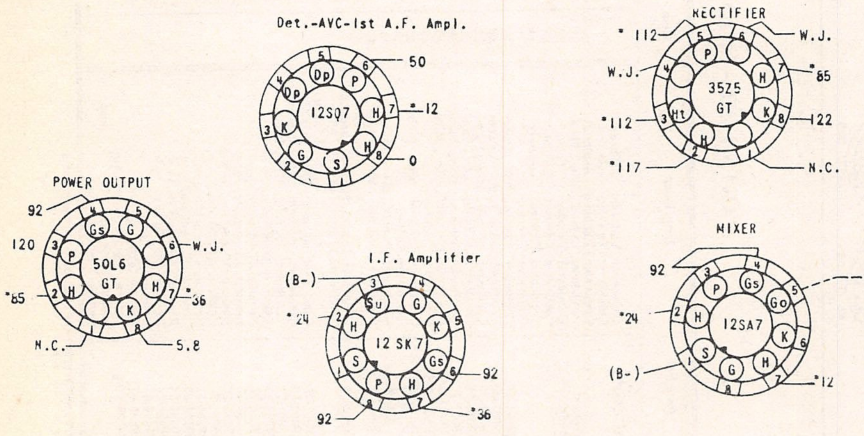
**POWER SUPPLY:** a. c.—d. c.

**VOLTAGE RATING:** 105-125 volts.

**POWER CONSUMPTION:** 30 watts.

**POWER OUTPUT:** 2 watts maximum.

### SOCKET VOLTAGE CHART


Det.-AVC-1st A.F. Ampl.
12SQ7
Dp Dp H H S G K
50
•12
0
RECTIFIER
35Z5 GT
P H K Ht
•112
W.J.
•112
•117
W.J.
•65
122
N.C.
POWER OUTPUT
50L6 GT
Gs G P H H K
92
120
•65
N.C.
W.J.
•36
5.8
I.F. Amplifier
12 SK 7
Su G H K S Gs P H
(B-)
•24
92
92
•36
MIXER
12SA7
P Gs Go H K S G H
92
•24
(B-)
•12

NOTES:

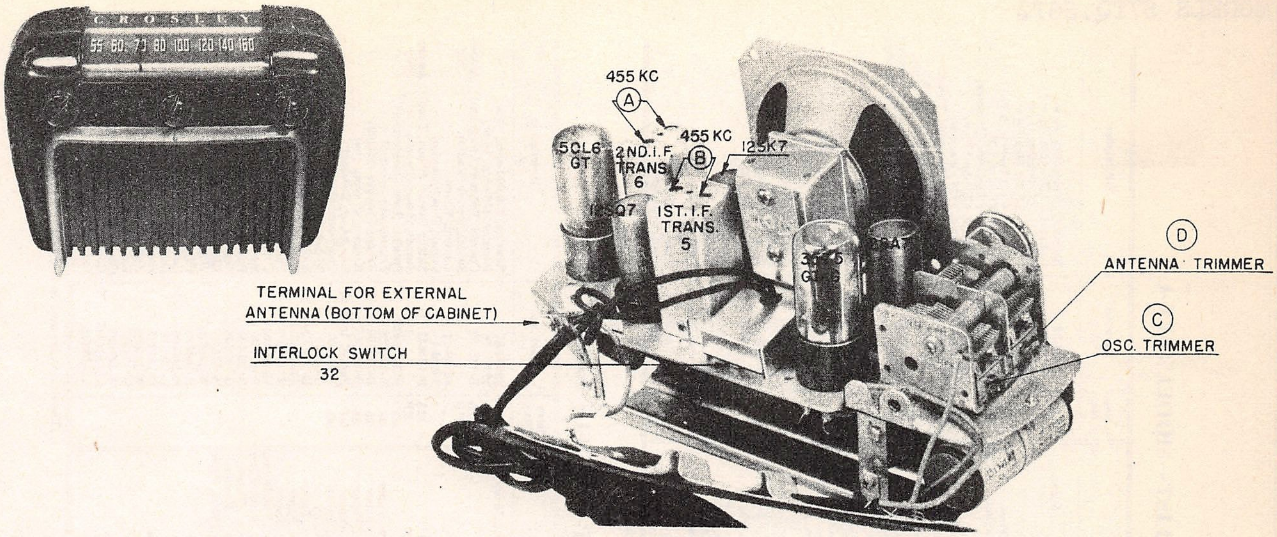
1. Bottom view of tube sockets.
2. Measure voltages from socket lug to (B-) (Pin 3 on the 12SK7).
3. Voltages are measured with an Electronic Voltmeter.
4. W.J. - Wiring Junction.
5. N.C.- No Connection.
6. • - A.C. Voltages
7. Voltage Tolerance, 10%
8. Line Voltage 117 V, 60 A.C.

| OSCILLATOR GRID VOLTS | |
|---|---|
| FREQUENCY | VOLTS |
| 540KC | -7 |

January, 1947

For Parts List, see P. 16-6

CROSLEY DIV.
AVCO MFG. CORP.



When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity.

Reversing the position of the power plug when alternating current is used may reduce power hum. *Under no circumstances should a ground be connected to this receiver.*

When checking or replacing tubes or aligning this receiver, the back of the cabinet must be removed. This is accomplished by removing the two screws located near the top of the cabinet back in the louvre recess. Remove the back carefully and do not exert too much pressure. When the back is removed it disengages the interlock safety switch (item 32 on schematic) and cuts off the power to the receiver. To turn on the radio when the back of the cabinet is removed, it is necessary to hold in the lever on the interlock switch and caution should be exercised not to come in contact with exposed wires on the chassis.

### ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r. f. signal input from the signal generator should be connected to the external antenna terminal screw, as indicated in the alignment chart. Connect the signal generator ground through a 0.1 mfd. condenser to—B (pin 3 on 12SK7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

| Alignment Sequence | Signal Generator Output | | | Position of Tuning Dial KC | Adjust for Maximum Outout |
|---|---|---|---|---|---|
| | Frequency in KC | In Series with | To | | |
| 1 | 455 | 200 mmf. | Ant. | 1620 | A & B |
| 2 | 1620 | 200 mmf. | Ant. | 1620 | C |
| 3 | 1400 | 200 mmf. | Ant. | 1400 | D |

# CROSLEY DIV.
# AVCO MFG. CORP.

## PARTS LIST—MODEL 56TD

| Item No. | Part No. | Description | Item No. | Part No. | Description |
|---|---|---|---|---|---|
| 1 | W-48858 | Bulb (Dial), Type 47, 6.3 v., .15 amp. | * | 39368-18 | Control (Volume) |
| 2 | C-132300-1 | Cable and Plug (Power) | | 39370-2 | Shaft (Plug-in) |
| 3 | AC-136091 | Antenna Loop Assy. | | 39369-1 | Switch (Power) |
| 4 | AW-136058 | Coil Assy. (Oscillator) | 27 | B-135892 | Control, (2 megohm) |
| 5 | AW-137656 | Transformer (1st I. F.) | * | 39368-11 | Control (Tone) |
| 6 | AW-137657 | Transformer (2nd I. F.) | 28 | B-135388 | Transformer (Output) |
| 7 A | B-136810 | Condenser, Variable } Two | 29 | 39001-13 | Condenser, .01 mfd., 600 v., paper |
| 7 B | | Condenser, Variable } Section | 30 | 39294-21 | Resistor, 22,000 ohm, ½ w. |
| 7 C | Part of Item 7A | Condenser, Trimmer | 31 | 39001-76 | Condenser, .003 mfd., 600 v., paper |
| 7 D | Part of Item 7B | Condenser, Trimmer | 32 | W-135355 | Switch (Interlock) |
| 7 E | Part of Item 7B | Condenser, Trimmer | 34 | 39294-8 | Resistor, 150 ohm, ½ w. |
| 9 | 39001-80 | Condenser, .02 mfd., 600 v., paper | 35 | 39015-26 | Resistor, 1200 ohm, 1 w. |
| 10 | 39001-17 | Condenser, .05 mfd., 600 v., paper | 36 | W-137367 | Resistor, 47 ohm, 1 w. |
| 11 | 39001-73 | Condenser, 250 mmf., 600 v., paper | | G-39204 | Socket, Tube |
| 12 | 39001-76 | Condenser, .003 mfd., 600 v., paper | | 39017-4 | Socket, Dial Light |
| 13 | 39001-80 | Condenser, .02 mfd., 600 v., paper | | AW-136809 | Pulley and Pinion Drive Assy. (Var. Cond.) |
| 14 | 39001-80 | Condenser, .02 mfd., 600 v., paper | | | |
| 15 | B-226638-53 | Condenser, 50 mmf., 500 v., ceramic | | C-136827 | Background, Dial |
| 16 | B-136767 | Speaker | | D-136828 | Face, Dial |
| 17 | 39001-17 | Condenser, .05 mfd., 600 v., paper | | W-134681 | Roller, Drive Cord |
| 18 A | B-136771 | Condenser, 50 mfd., 150 w. v. } Three | | W-51752 | Spring, Drive Cord |
| 18 B | | Condenser, 30 mfd., 150 w. v. } Sec. Elec. | | B-134657 | Pointer, Dial |
| 18 C | | Condenser, 10 mfd., 25 w. v. } Filter | | W-135915 | Shaft, Drive |
| 19 | 39294-38 | Resistor, 15 megohm, ½ w. | | W-134916 | Washer, Spring (Drive Shaft) |
| 20 | 39294-21 | Resistor, 22,000 ohm, ½ w. | | W-51071 | Ring, Retaining (Drive Shaft) |
| 21 | 39294-34 | Resistor, 3.3 megohm, ½ w. | | W-134055 | Grommet |
| 22 | 39294-35 | Resistor, 4.7 megohm, ½ w. | | AC-138163-1 | Cabinet Assy. |
| 23 | 39294-29 | Resistor, 470,000 ohm, ½ w. | | W-135387 | Knob |
| 24 | 39294-29 | Resistor, 470,000 ohm, ½ w. | | B-135275 | Lens, Dial |
| 25 | 39294-8 | Resistor, 150 ohm, ½ w. | | W-136630 | Stud, Trimount |
| 26 A | B-135383 | Control, Volume (1 megohm) } Assy. | 37 | 39001-80 | Condenser, .02 mfd., 600 v., paper |
| 26 B | | Switch (Power) } | 38 | 39294-21 | Resisuor, 22,000 ohm, ½ w. |

*These parts will replace the original equipment parts.

## PARTS LIST—MODEL 56TX-L

| Item No. | Part No. | Description | Item No. | Part No. | Description |
|---|---|---|---|---|---|
| 1 | W-48858 | Bulb (Dial), Type 47, 6.3v., .15 amp. | 26 | 39294-38 | Resistor, 15 megohm, ½ w. |
| 2 | C-132300-1 | Cable and Plug (power) | 27 | 39294-21 | Resistor, 22,000 ohm, ½ w. |
| 3 | AC-134618 | Antenna Loop Assembly | 29 | 39294-34 | Resistor, 3.3 megohm, ½ w. |
| 4 | AW-134994 | Antenna Coil Assembly | 30 | 39294-23 | Resistor, 47,000 ohm, ½ w. |
| 5A | AW-134993 | Coil (B. C. Oscillator) } Two | 31 | 39294-35 | Resistor, 4.7 megohm, ½ w. |
| 5B | | Coil (H. F. Oscillator) } Section | 33 | W-137367 | Resistor, 47 ohm, 1 w. |
| 6 | AW-134065 | Transformer (1st I. F.) | 34 | Part of Item #3 | Condenser (Antenna Trimmer) |
| 7 | AW-134158 | Transformer (2nd I. F.) | 35 | 39294-11 | Resistor, 470 ohm, ½ w. |
| 8A | B-134995 | Condenser (Variable) } Two | 36 | 39015-26 | Resistor, 1200 ohm, 1 w. |
| 8B | | Condenser (Variable) } Section | 37A | W-49772-3 | Switch (Band Change) } Three |
| 8C | Part of Item #8B | Condenser (Trimmer) | 37B | | Switch (Band Change) } Section |
| 9A | AB-135088 | Condenser (Trimmer) } Two | 37C | | Switch (Band Change) } Assembly |
| 9B | | Condenser (Trimmer) } Section | 38 | AB-137006 | Speaker and Transformer Assembly |
| 10 | GC-210685-143 | Condenser, 580 mmf., 300v., Mica | 39A | C-46846-6 | Control, Volume (1 megohm) } Assy. |
| 11 | 39004-5 | Condenser, 50 mmf., 500v., Mica | 39B | | Switch (Power) } |
| 12 | 39001-17 | Condenser, .05 mfd., 600v., Paper | * | 39368-8 | Control, Volume |
| 13 | 39001-19 | Condenser, .1 mfd., 600v., Paper | | 39369-1 | Switch, Power |
| 14 | 39001-17 | Condenser, .05 mfd., 600v., Paper | | W-135371 | Socket, Tube |
| 15 | 39001-73 | Condenser, 250 mmf., 600v., Paper | | 39017-4 | Socket Assembly (Dial Light) |
| 16 | 39001-76 | Condenser, .003 mfd., 600v., Paper | | C-135175 | Face (Dial) |
| | | } Two | | B-134952 | Pointer (Dial) |
| 17A | W-134988 | Condenser, 60 mfd., 150v., } Section | | W-134667 | Clip (Dial Pointer) |
| 17B | | Condenser, 20 mfd., 100v., } Elect. | | W-134917 | Shaft (Drive) |
| | | } Filter | | W-51071 | Ring (Retaining) |
| 18 | 39001-80 | Condenser, .02 mfd., 600v., Paper | | W-134916 | Washer (Spring) |
| 19 | 39001-80 | Condenser, .02 mfd., 600v., Paper | | 51752 | Spring (Dial Cord) |
| 20 | 39001-80 | Condenser, .02 mfd., 600v., Paper | | W-134055 | Grommet |
| 21 | 39294-29 | Resistor, 470,000 ohm, ½ w. | | AW-134738 | Cabinet |
| 22 | 39294-29 | Resistor, 470,000 ohm, ½ w. | | B-134610 | Lens (Dial) |
| 23 | 39294-8 | Resistor, 150 ohm, ½ w. | | W-134883 | Knob |
| 24 | 39294-7 | Resistor, 100 ohm, ½ w. | | W-136630 | Stud, Trimount |
| 25 | 39294-28 | Resistor, 330,000 ohm, ½ w. | | W-132124 | Stud, Trimount |

*These parts will replace the original equipment parts.

## PARTS LIST—MODEL 56TN-L

| Item No. | Part No. | Description | Item No. | Part No. | Description |
|---|---|---|---|---|---|
| 1 | W-48858 | Bulb (Dial Light), Type 47, 6.3v., .15 amp. | 29 | W-137367 | Resistor, 47 Ohm, 1 W. |
| | | | 30 | 39281-34 | Resistor, 3.3 megohm, ½ w. |
| 2 | C-132300-1 | Cable and Plug (power) | 31 | 39281-23 | Resistor, 47,000 ohm, ½ w. |
| 3 | AC-134288 | Antenna Loop and Back Assembly | 32 | 39281-35 | Resistor, 4.7 megohm, ½ w. |
| 4 | AW-134994 | Coil (H.F. Antenna) | 33 | 39281-29 | Resistor, 470,000 Ohm, ½ w. |
| 5A | AW-134993 | Coil (B.C. Oscillator) } Two | 34 | 39281-29 | Resistor, 470,000 Ohm, ½ w. |
| 5B | | Coil (H.F. Oscillator) } Section | 35 | 39281-8 | Resistor, 150 Ohm, ½ w. |
| 6 | AW-134065 | Transformer (1st I.F.) | 36 | AD-138073 | Speaker |
| 7 | AW-134158 | Transformer (2nd I.F.) | 37A | B-137026 | Switch (Band Change) } Three |
| 9A | B-134995 | Condenser (Variable) } Two | 37B | | Switch (Band Change) } Section |
| 9B | | Condenser (Variable) } Section | 37C | | Switch (Band Change) } |
| 9C | Part of Item #9B | Condenser, Trimmer (H.F. Oscillator) | 38A | C-46846-6 | Control, Volume (1 Megohm) } Assy. |
| 10 | AB-135088 | Condenser, Trimmer (H.F. Antenna) | 38B | | Switch (Power) } |
| 11 | GC-210685-143 | Condenser, 580 mmf., 300 v., Mica | 39 | Part of Item #3 | B. C. Ant. Trimmer |
| 12 | B-226638-53 | Condenser, 50 mmf., 500 v., Mica | 41 | W-134939 | Switch (Tone) |
| 13 | 39001-63 | Condenser, .022 mfd., 200 v., Paper | 42 | 39001-10 | Condenser, .0033 mfd., 600 v., Paper |
| 14 | 39001-67 | Condenser, .1 mfd., 200 v., Paper | 43 | 39015-26 | Resistor, 1200 Ohm, 1 W. |
| 15 | 39001-65 | Condenser, .05 mfd., 200 v., Paper | | W-135371 | Socket (Tube) |
| 16 | 39001-73 | Condenser, 250 mmf., 500 v., Mica | | 39017-4 | Socket Assembly (Dial Light) |
| 17 | 39001-10 | Condenser, .0033 mfd., 600 v., Paper | | C-135175 | Face (Dial) |
| | | } Two | | B-134570 | Pointer (Dial) |
| 18A | B-138072 | Condenser, 50 mfd.. 140 V. } Section | | W-134667 | Clip (Dial Pointer) |
| 18B | | Condenser, 30 mfd., 120 V. } Elect. | | W-134917 | Shaft (Drive) |
| | | } Filter | | W-51071 | Ring (Retaining) |
| 19 | 39001-63 | Condenser, .022 mfd., 200 v., Paper | | W-134916 | Washer (Spring) |
| 20 | 39001-63 | Condenser, .022 mfd., 200 v., Paper | | W-51752 | Spring (Dial Cord) |
| 22 | 39001-63 | Condenser, .022 mfd., 200 v., Paper | | AB-134697 | Toggle Arm and Link Assembly |
| 23 | Part of Item #10 | Condenser, Trimmer (B.C. Oscillator) | | W-49829 | Spring (Lock) |
| 24 | 39281-11 | Resistor, 470 Ohm, ½ w. | | W-136630 | Stud (Trimount) |
| 25 | 39281-8 | Resistor, 150 Ohm, ½ W. | | D-137113 | Cabinet |
| 26 | 39281-28 | Resistor, 330,000 Ohm, ½ w. | | B-134610 | Lens (Dial) |
| 27 | 39281-38 | Resistor, 15 Megohm, ½ w | | W-134882 | Knob (Small) |
| 28 | 39281-21 | Resistor, 22,000 Ohm, ½ w. | | W-134742 | Knob, Tone (Large) |

## PARTS LIST—MODELS 56TZ, 57TQ

| Item No. | Part No. | Description | Item No. | Part No. | Description |
|---|---|---|---|---|---|
| 1 | W-48858 | Bulb (Dial), Type 47, 6.3 v., .15 amp. | 29 | 39373-87 | Resistor, 470,000 ohm, ½ w. |
| 2 | C-132300-2 | Cable and Plug, Power | 30 | 39373-16 | Resistor, 150 ohm, ½ w. |
| 3 | AC-138333 | Loop Assembly, Antenna | 31A | B-135692 | Control, Volume (1 megohm) } Assembly |
| 4 | AW-135730 | Coil Assembly, Oscillator | 31B | | Switch, Power (Radio) } |
| 5 | AW-135729 | Transformer, 1st I. F. | * | 39368-14 | Control, Volume |
| 6 | AW-135731 | Transformer, 2nd I. F. | | 39369-1 | Switch, Power (Radio) |
| 7A | B-135570 | Condenser, Variable } Two | 32A | B-135641 | Switch (Radio, Phono, Tone) } Assembly |
| 7B | | Condenser, Variable } Section | 32B | | Switch, Power (Phono) } |
| 7C | Part of Item 7B | Condenser, Trimmer | 33 | AD-136420 | Speaker (Less Transformer) |
| 9 | 39001-76 | Condenser, .003 mfd., 600 v., Paper | 34 | B-137723 | Transformer (Output) |
| 10 | 39001-17 | Condenser, .05 mfd., 600 v., Paper | 35 | D-138293 | Record Changer (M-400) |
| 11 | 39001-17 | Condenser, .05 mfd., 600 v., Paper | .38 | W-137367 | Resistor, 47 ohm, 1 w. |
| 12 | 39001-19 | Condenser, .1 mfd., 600 v., Paper | 41 | Part of Item #3 | Condenser, Trimmer |
| 13 | 39001-17 | Condenser, .05 mfd., 600 v., Paper | ‡44 | 39001-80 | Condenser, .02 mfd., 600 v., Paper |
| 14 | 39001-73 | Condenser, 250 mmf., 600 v., Paper | | G-39204 | Socket, Tube |
| 15 | 39001-76 | Condenser, .003 mfd., 600 v., Paper | | D-136565-15 | Socket, Dial Light |
| 16 | 39001-80 | Condenser, .02 mfd., 600 v., Paper | | AB-135575 | Plate and Stud Assembly, Dial |
| 17 | 39001-80 | Condenser, .02 mfd., 600 v., Paper | | W-135074 | Pulley (Wood), Idler |
| ‡18A | B-136770 | Condenser, 50 mfd., 150 w.v. } TwoSection | | W-131154-1 | Cotter, External (Idler Pulley) |
| 18B | | Condenser, 30 mfd., 150 w.v. } Elect. Filter | | W-51752 | Spring, Dial Drive Cord |
| 18A | B-135732 | Condenser, 60 mfd., 150 w.v. } Three | | B-135460 | Pointer, Dial |
| **18B | | Condenser, 20 mfd., 150 w.v. } Section | | B-135568 | Shaft, Drive |
| 18C | | Condenser, 20 mfd., 150 w.v. } Elect. Filter | | W-51071 | Ring, Retaining |
| 19 | 39373-16 | Resistor, 150 ohm, ½ w. | | W-134916 | Washer, Spring |
| ‡20 | 39373-60 | Resistor, 22,000 ohm, ½ w. | | R-138310 | Cabinet (56TZ) |
| 21 | 39373-109 | Resistor, 15 megohm, ½ w. | | R-138396 | Cabinet (57TQ) |
| 22 | 39373-60 | Resistor, 22,000 ohm, ½ w. | | B-138318 | Dial Glass |
| 23 | 39373-80 | Resistor, 220,000 ohm, ½ w. | | D-138295 | Escutcheon |
| 24 | 39373-100 | Resistor, 3.3 megohm, ½ w. | | W-135929 | Knob (Dial or Volume) |
| 25 | 39373-144 | Resistor, 1200 ohm, 1 w. | | W-135930 | Knob (Radio-Phono) |
| 26 | Part of Item #6 | Resistor, 47,000 ohm, ½ w. | | W-131697 | Grommet (Speaker mtg.) |
| 27 | 39373-35 | Resistor, 4.7 megohm, ½ w. | | AB-134935 | Needle, Floating Jewel Assembly |
| 28 | 39373-87 | Resistor, 470,000 ohm, ½ w. | | AB-138321 | Lid Support (56TZ) |

*These parts will replace the original equipment parts.

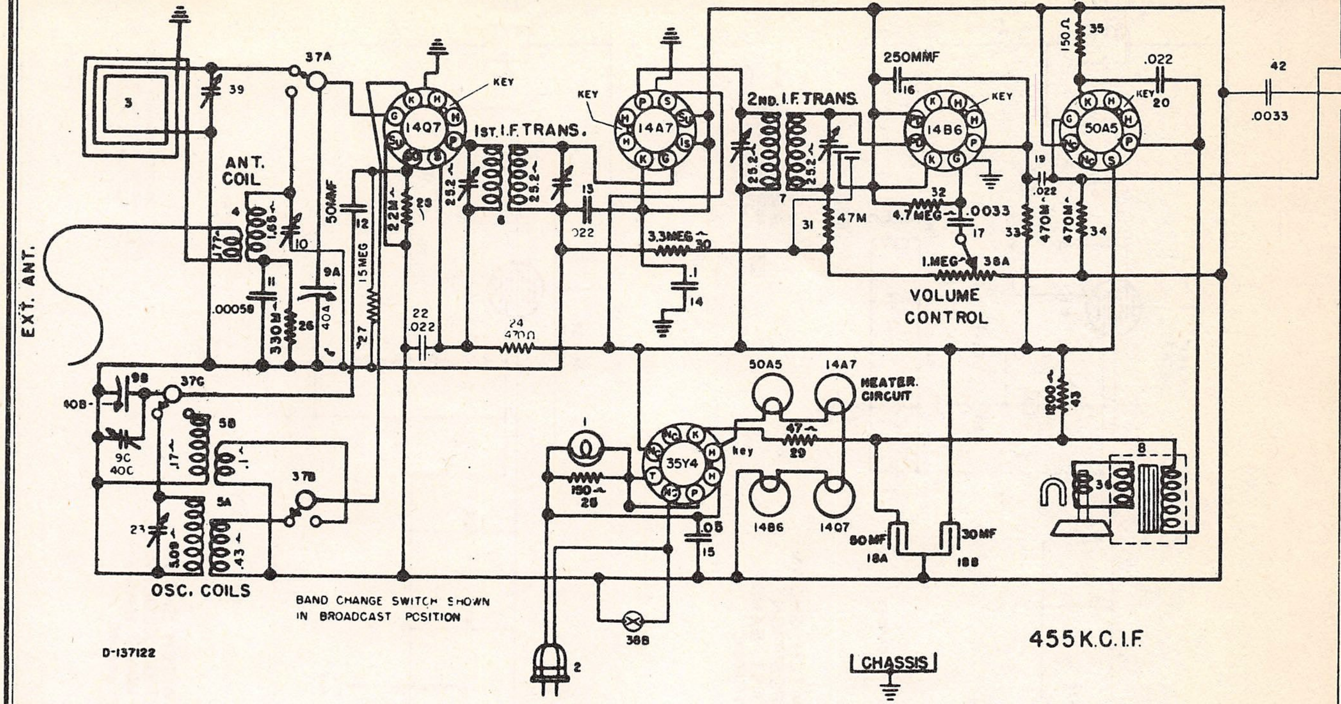
**These parts are used on 1st production models only.

‡These parts are used on 2nd production models only.

# CROSLEY DIV.
# AVCO MFG. CORP.

November, 1946

*Under no circumstances should a ground be connected to this receiver.*


3
39
37A
ANT. COIL
4
10
11
.00058
330M
26
9A
404
50MMF
12
15MEG
27
22M
28
14Q7
KEY
1st I.F. TRANS.
25.2
6
13
.022
22
.022
24
470Ω
14A7
3.3MEG
30
14
2nd I.F. TRANS.
7
31
47M
250MMF
16
14B6
32
4.7MEG
.0033
17
1.MEG
38A
VOLUME CONTROL
150Ω
35
.022
20
50A5
19
.022
33
470M
470M
34
42
.0033
EXT. ANT.
40B
9B
37C
9C
40C
58
5A
23
37B
OSC. COILS
BAND CHANGE SWITCH SHOWN IN BROADCAST POSITION
1
150Ω
25
35Y4
key
.05
15
50A5
14A7
HEATER CIRCUIT
47Ω
29
14B6
14Q7
50MF
18A
30MF
18B
1800Ω
43
8
36
2
38B
D-137122
455 K.C. I.F.
CHASSIS

**TYPE:** Five-tube, two-band, superheterodyne.

**FREQUENCY RANGE:** American Broadcast Band, 540 to 1600 kc. (Selector Switch, Counter-clockwise or Left.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector Switch, Clockwise or Right.)

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** a.c—d.c.

**VOLTAGE RATING:** 105-125 volts.

**POWER CONSUMPTION:** 35 watts nominal.

**POWER OUTPUT:** 1 watt minimum.

**VOLTAGE DROP ACROSS SPEAKER FIELD:** 27 volts. WITH E.M. SPEAKER

**RESISTANCE OF SPEAKER FIELD:** 450 ohms

**SPEAKER FIELD CURRENT:** 60 ma.

**TUBE COMPLEMENT:**

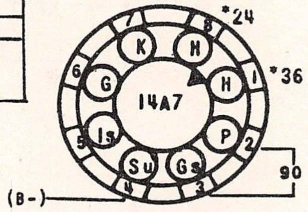
| Type | Function |
|---|---|
| 14Q7 | Mixer |
| 14A7 | I. F. Amplifier |
| 14B6 | Detector, AVC,<br>1st A.F. Amplifier |
| 50A5 | A.F. Power Output |
| 35Y4 | Rectifier |

**DIAL BULB:** Type 47, 6.3 volts, .15 amp.

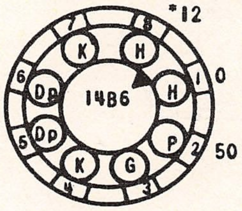
⊕ Oscillator Grid Voltage

| Band | Frequency | Volts |
|---|---|---|
| American | 550KC. | -5.5 |
| Overseas | 5.7MC. | -4 |

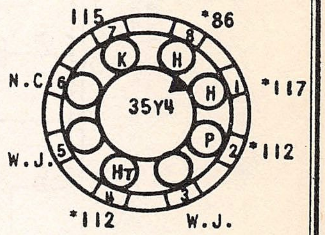
I.F. AMPLIFIER


14A7
K
H
H
P
Gs
Su
Is
G
*24
*36
90
(B-)
1
2
3
4
5
6
7
8

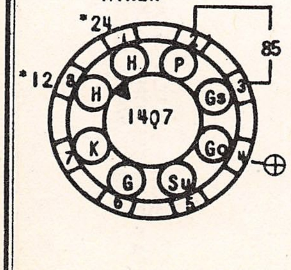
DET.-AVC. 1st A.F.AMPL.


14B6
K
H
H
P
G
K
Dp
Dp
*12
0
50
1
2
3
4
5
6
7
8

RECTIFIER

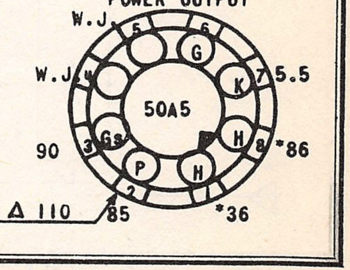

35Y4
K
H
H
P
HT
115
*86
N.C.
*117
W.J.
*112
*112
W.J.
1
2
3
4
5
6
7
8

MIXER


14Q7
H
P
Gs
Go
Su
G
K
H
*24
*12
85
⊕
1
2
3
4
5
6
7
8

NOTES:
1. These are bottom views of sockets.
2. Measure voltages from socket lugs to -B (Pin 4 on the 14A7)
3. These voltages measured using an electronic voltmeter.
4. W.J. - Wiring Junction.
5. N.C.-No Connection.
6. * - 60 Cycle AC voltage.
7. Socket voltage tolerance, 10%.
8. All voltages are the same for receivers using E.M. or P.M. speakers except where marked with Δ ;. This voltages is for P.M. speakers only.

POWER OUTPUT

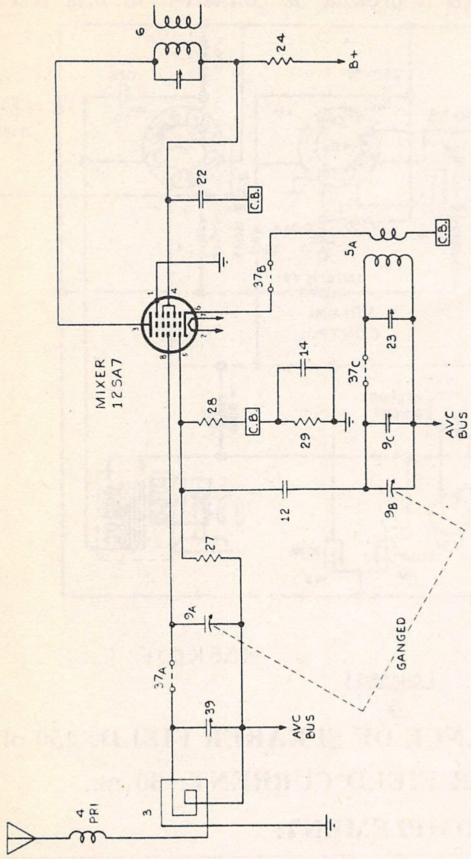

50A5
G
K
H
H
P
Gs
W.J.
W.J.
5.5
*86
90
Δ 110
85
*36
1
2
3
4
5
6
7
8

For Parts List, see P. 16-6

# *"clarified schematics"*

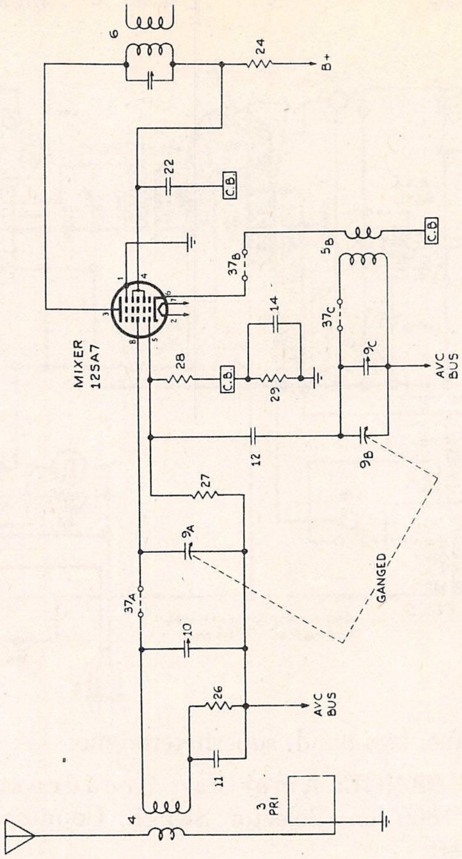
**MODELS 56XTA, 56XTW**
**MODEL 56TN-L**

## CROSLEY DIV.
## AV CO MFG. CORP.


6
24
B+
22
C.B.
C.B.
5A
37B
MIXER
12SA7
14
28
C.B.
29
37C
23
AVC BUS
9C
12
9B
27
9A
GANGED
37A
39
AVC BUS
4
PRI
3

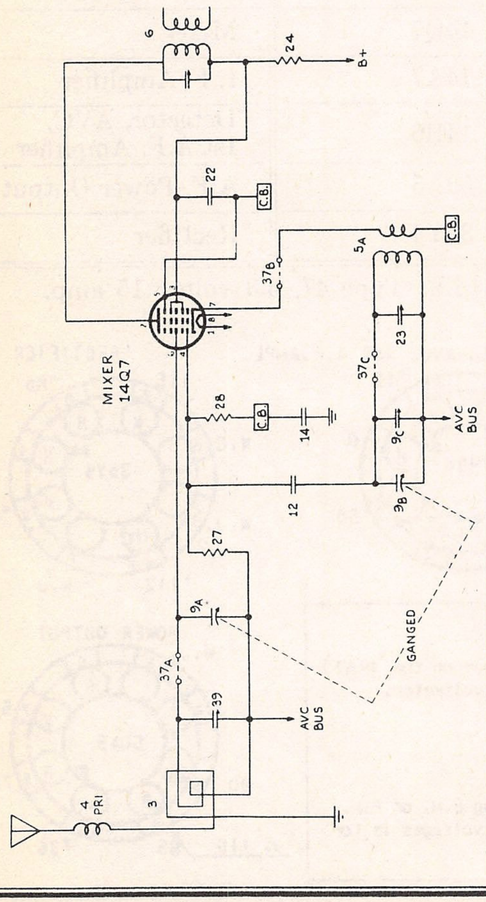
BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600KC

C.B. DENOTES COMMON BUS ABOVE GROUND BY $C_{14}$ (.1 µf) & $R_{29}$ (220k)


6
24
B+
22
C.B.
C.B.
5B
37B
MIXER
12SA7
14
28
C.B.
29
37C
9C
AVC BUS
12
9B
27
9A
GANGED
37A
10
26
AVC BUS
11
4
3
PRI

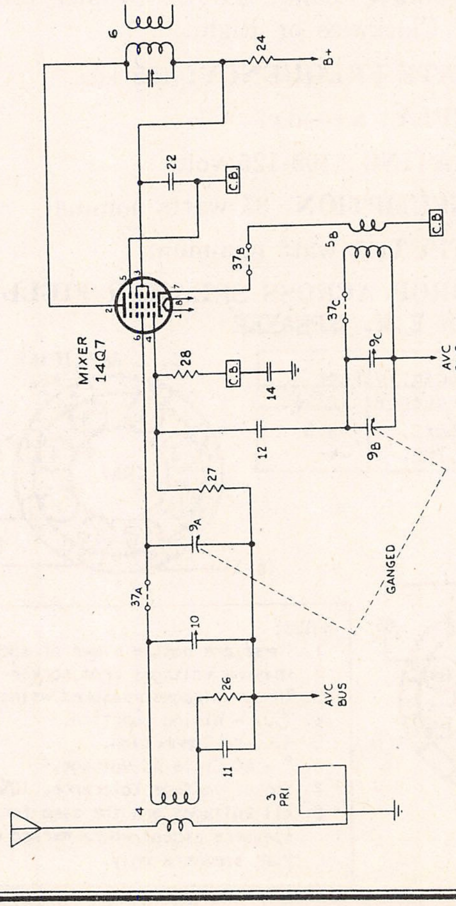
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 5.8 - 15 MC.

C.B. DENOTES COMMON BUS ABOVE GROUND BY $C_{14}$ (.1 µf) & $R_{29}$ (220k)


6
24
B+
22
C.B.
C.B.
5A
37B
MIXER
14Q7
28
C.B.
14
37C
23
9C
AVC BUS
12
9B
27
9A
GANGED
37A
39
AVC BUS
4
PRI
3

BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND 540-1600KC

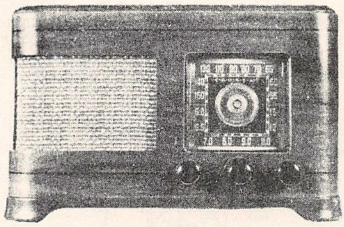
C.B. DENOTES COMMON BUS ABOVE GROUND BY CAP. 14 (.1µf)


6
24
B+
22
C.B.
C.B.
5B
37B
MIXER
14Q7
28
C.B.
14
37C
9C
AVC BUS
12
9B
27
9A
GANGED
37A
10
26
AVC BUS
11
4
3
PRI

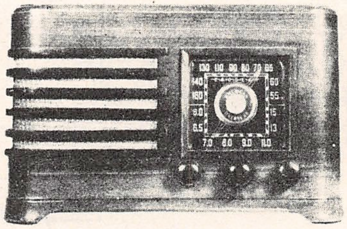
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. SHORT WAVE BAND 5.8 - 15 MC.

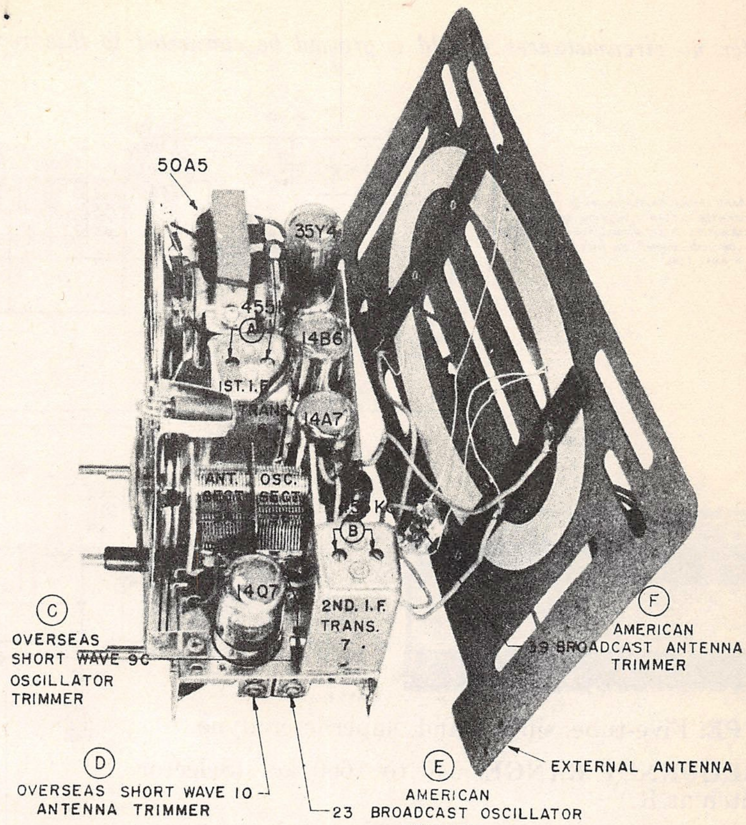
C.B. DENOTES COMMON BUS ABOVE GROUND BY CAP. 14 (.1µf)

# CROSLEY DIV.
# AVCOMFG. CORP.



Alternate Cabinet Design




50A5
35Y4
455 K
A
14B6
1ST. I.F. TRANS.
14A7
ANT.
OSC.
455 K
B
14Q7
2ND. I.F. TRANS. 7
C
OVERSEAS SHORT WAVE 9C OSCILLATOR TRIMMER
F
AMERICAN 39 BROADCAST ANTENNA TRIMMER
EXTERNAL ANTENNA
D
OVERSEAS SHORT WAVE 10 ANTENNA TRIMMER
E
AMERICAN 23 BROADCAST OSCILLATOR TRIMMER

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 4 on 14A7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

| Alignment Sequence | Signal Generator Output | | | Position of | | Adjust for Maximum Output |
|---|---|---|---|---|---|---|
| | Frequency in kc. | In Series with | To | Band Switch | Tuning Dial | |
| 1 | 455 | 200 mmf. | Ant. | A | 1,620 | A & B |
| 2 | 15,300 | 400 ohms | Ant. | O | 15,300 | C |
| 3 | 15,000 | 400 ohms | Ant. | O | 15,000 | D |
| 4 | 1,400 | 200 mmf. | Ant. | A | 1,400 | E & F |

**NOTE:** When aligning the short-wave oscillator trimmer (C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

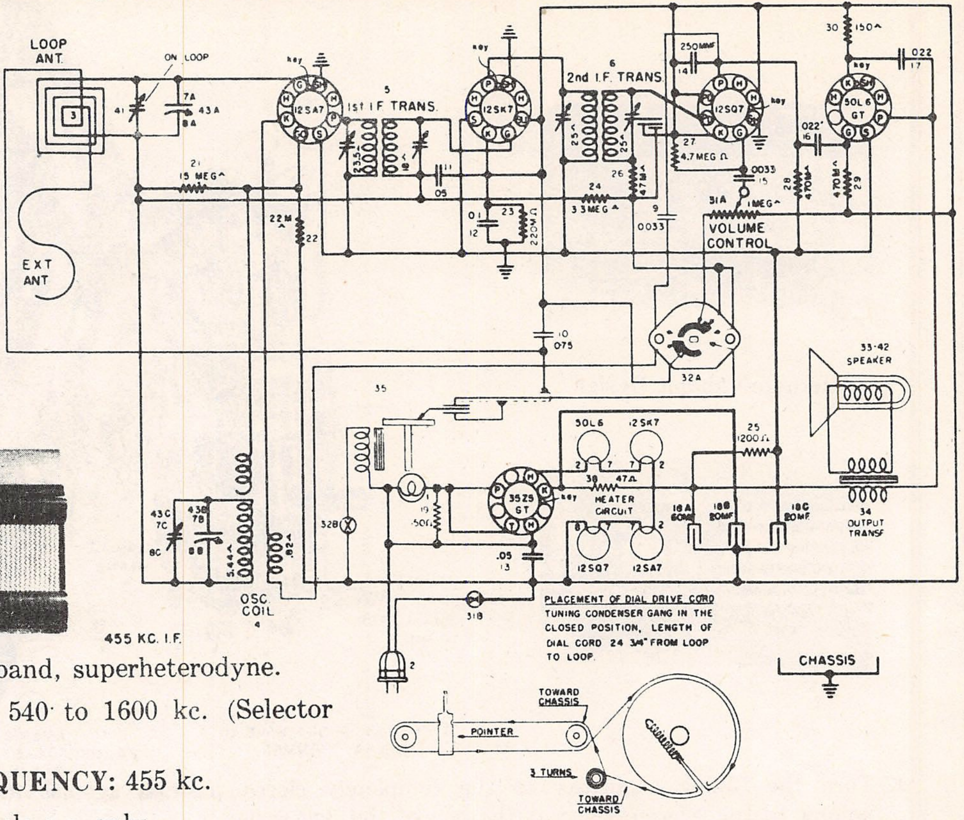
**MODELS 57TQ,56TZ**
**1st and 2nd Production**

## CROSLEY DIV.
## AV CO MFG. CORP.

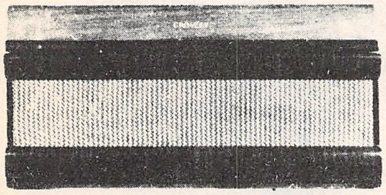
January, 1947

*Under no circumstances should a ground be connected to this receiver.*

BAND CHANGE SWITCH SHOWN IN EXTREME COUNTER-CLOCKWISE POSITION. SWITCH SEQUENCE: RADIO NORMAL TONE, RADIO LOW TONE, PHONO LOW TONE, PHONO NORMAL TONE.


LOOP ANT.
ON LOOP
EXT ANT
12SA7
1st I.F. TRANS.
12SK7
2nd I.F. TRANS.
12SQ7
50L6 GT
35Z5 GT
250MMF
4.7 MEG Ω
15 MEG
22M
3.3MEG
220MΩ
.0033
1MEG
VOLUME CONTROL
150
.022
470M
HEATER CIRCUIT
47Ω
1200Ω
18A 50MF
18B 30MF
18C 30MF
33-42 SPEAKER
34 OUTPUT TRANSF
32A
OSC. COIL
455 KC. I.F.
PLACEMENT OF DIAL DRIVE CORD
TUNING CONDENSER GANG IN THE CLOSED POSITION. LENGTH OF DIAL CORD 24 3/4" FROM LOOP TO LOOP.
CHASSIS
TOWARD CHASSIS
POINTER
3 TURNS

**56TZ**



**TYPE:** Five-tube, single-band, superheterodyne.

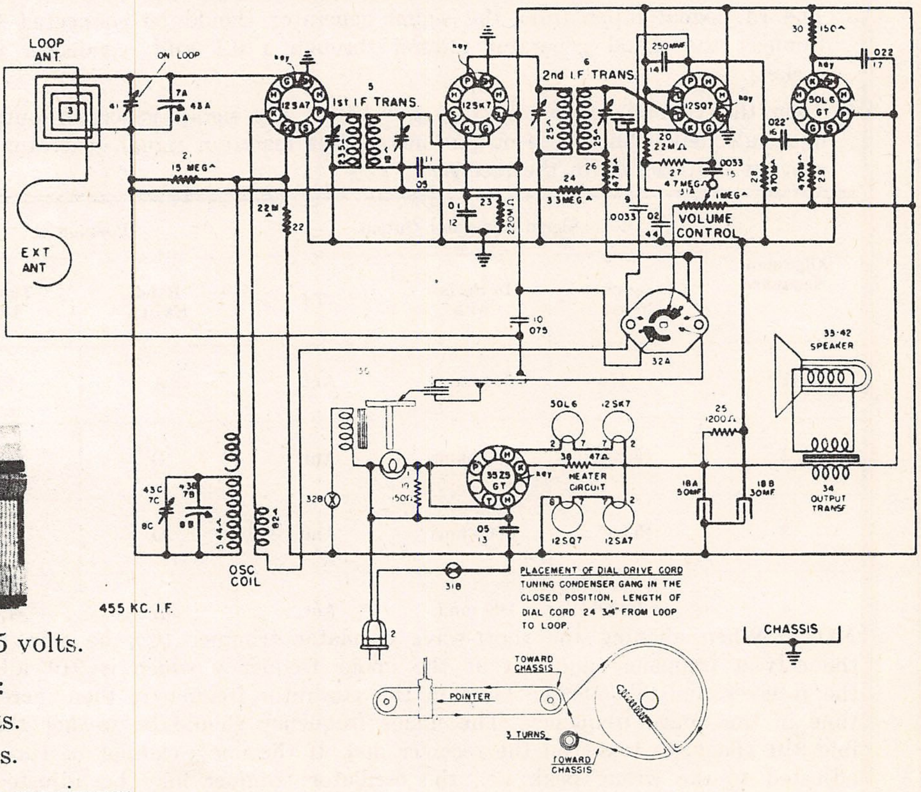
**FREQUENCY RANGE:** 540 to 1600 kc. (Selector switch at R.)

**INTERMEDIATE FREQUENCY:** 455 kc.

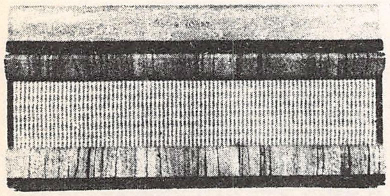
**POWER SUPPLY:** 60 cycle a.c. only.

SCHEMATIC DIAGRAM—MODELS 56TZ, 57TQ, 1st PRODUCTION

BAND CHANGE SWITCH SHOWN IN EXTREME COUNTER-CLOCKWISE POSITION. SWITCH SEQUENCE: RADIO NORMAL TONE, RADIO LOW TONE, PHONO LOW TONE, PHONO NORMAL TONE.


LOOP ANT.
ON LOOP
EXT ANT
12SA7
1st I.F. TRANS.
12SK7
2nd I.F. TRANS.
12SQ7
50L6 GT
35Z5 GT
250MMF
22MΩ
4.7MEG
15 MEG
3.3MEG
220MΩ
.0033
1MEG
VOLUME CONTROL
150
.022
470M
HEATER CIRCUIT
47Ω
1200Ω
18A 50MF
18B 30MF
33-42 SPEAKER
34 OUTPUT TRANSF
32A
OSC. COIL
455 KC. I.F.
PLACEMENT OF DIAL DRIVE CORD
TUNING CONDENSER GANG IN THE CLOSED POSITION. LENGTH OF DIAL CORD 24 3/4" FROM LOOP TO LOOP.
CHASSIS
TOWARD CHASSIS
POINTER
3 TURNS

**57TQ**



**VOLTAGE RATING:** 105-125 volts.

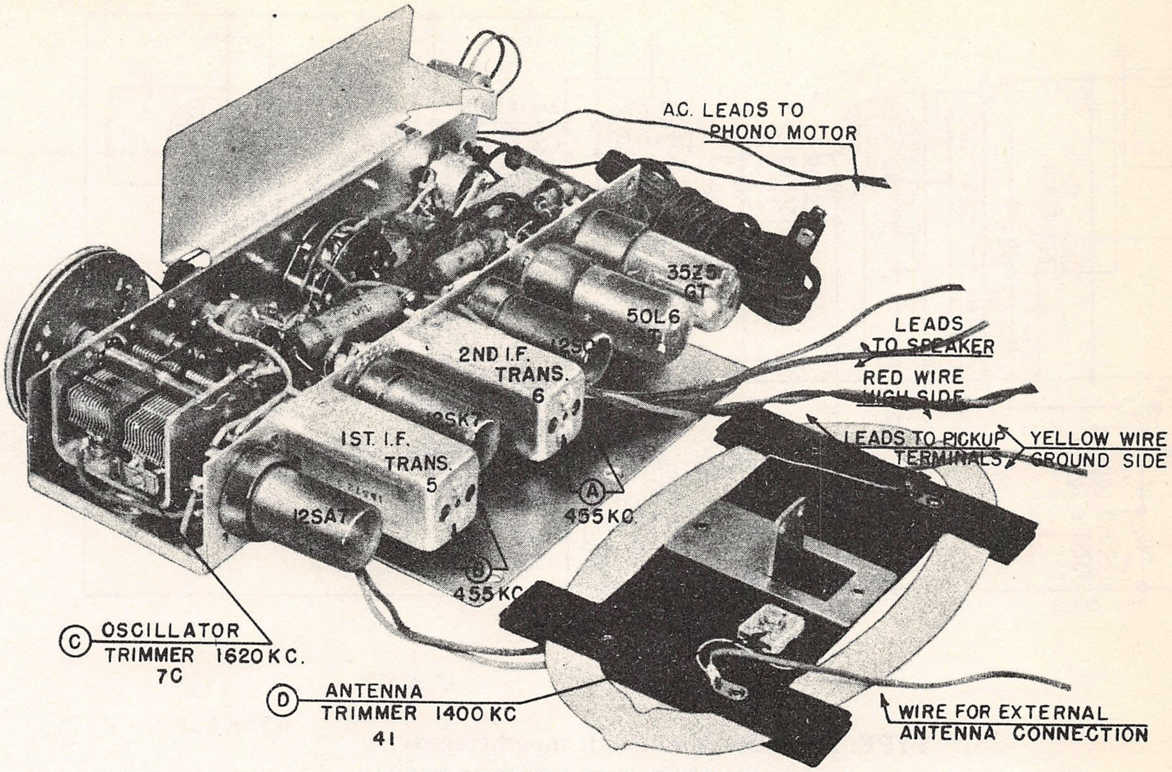
**POWER CONSUMPTION:**
Radio position—30 watts.
Phono position—45 watts.

**POWER OUTPUT:** 1.5 watts maximum.

SCHEMATIC DIAGRAM—MODELS 56TZ, 56TQ, 2nd PRODUCTION

For Parts List, see P. 16-6
RECORD CHANGER: V-M 400, RCD. CH. P.15-1

# CROSLEY DIV.
# AVCO MFG. CORP.


A.C. LEADS TO PHONO MOTOR
35Z5 GT
50L6 GT
12SQ7
LEADS TO SPEAKER
RED WIRE HIGH SIDE
2ND I.F. TRANS. 6
12SK7
1ST. I.F. TRANS. 5
12SA7
LEADS TO PICKUP TERMINALS
YELLOW WIRE GROUND SIDE
Ⓐ 455 KC
Ⓑ 455 KC
Ⓒ OSCILLATOR TRIMMER 1620 KC. 7C
Ⓓ ANTENNA TRIMMER 1400 KC 41
WIRE FOR EXTERNAL ANTENNA CONNECTION

## ALIGNMENT PROCEDURE

Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.

Turn the tone control to the normal tone position.

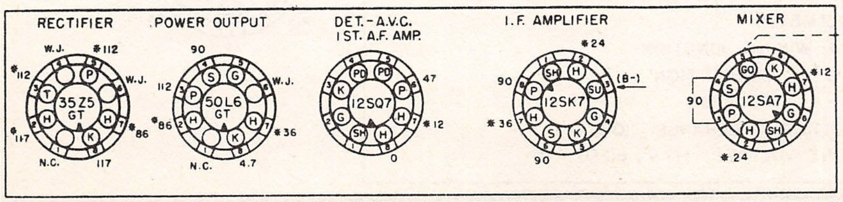
Connect the output meter across the speaker voice coil.

The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to—B (Pin 3 on 12SK7 tube socket).

Turn volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

| Alignment Sequence | Signal Generator Output | | | Position of | | Adjust for Maximum Output |
|---|---|---|---|---|---|---|
| | Frequency in kc. | In Series with | To | Selector Switch | Tuning Dial | |
| 1 | 455 | 200 mmf. | Ant. | R | 1620 | A & B |
| 2 | 1620 | 200 mmf. | Ant. | R | 1620 | C |
| 3 | 1400 | 200 mmf. | Ant. | R | 1400 | D |

| OSCILLATOR GRID VOLTAGE | | |
|---|---|---|
| BAND | FREQUENCY | VOLTS |
| AMERICAN | 540 KC | -5.5 |

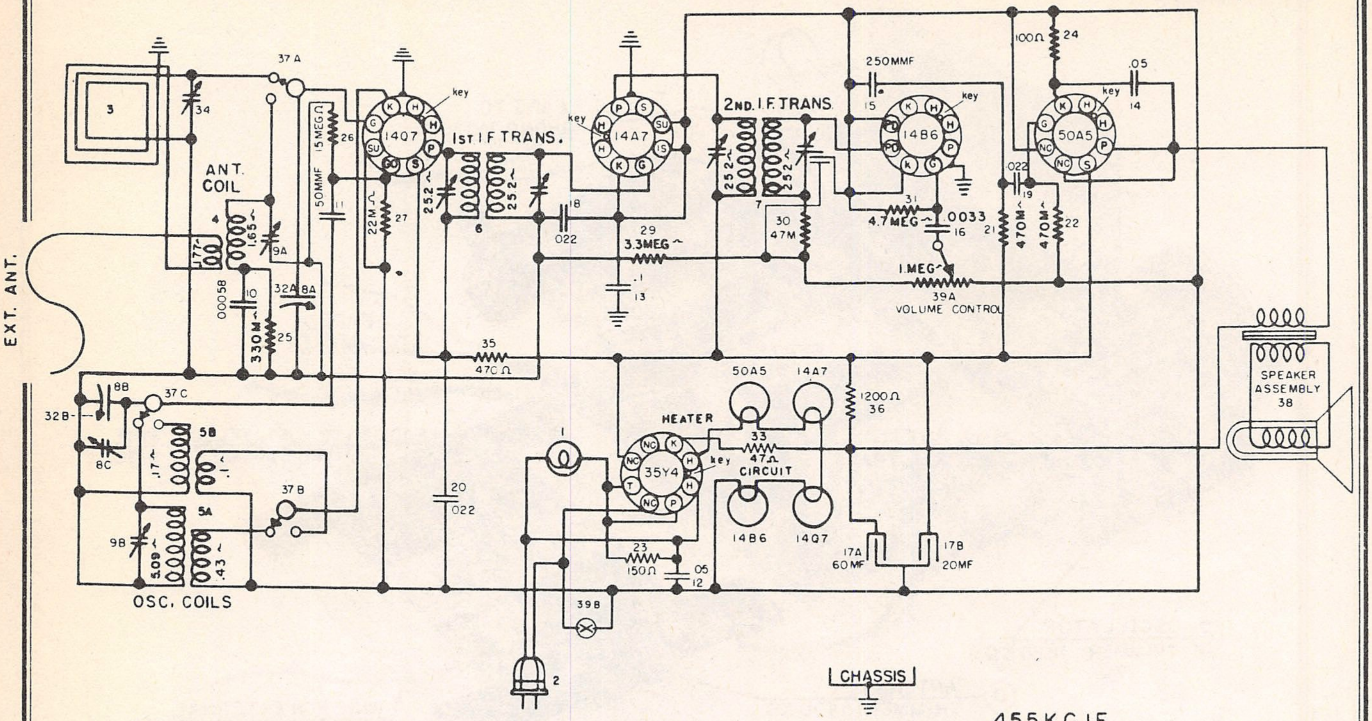

RECTIFIER
35Z5 GT
W.J.
*112
*112
W.J.
*117
*86
N.C.
117
POWER OUTPUT
50L6 GT
90
112
W.J.
*86
*36
N.C.
4.7
DET.-A.V.C. 1ST. A.F. AMP.
12SQ7
47
*12
0
I.F. AMPLIFIER
12SK7
*24
90
(B-)
*36
90
MIXER
12SA7
*12
90
*24

NOTES:
1. THESE ARE BOTTOM VIEWS OF TUBE SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO B-(PIN 3 ON THE 12SK7).
3. THESE VOLTAGES WERE MEASURED USING AN ELECTRONIC VOLTMETER.
4. W.J. – WIRING JUNCTION.
5. N.C. – NO CONNECTION.
6. * – 60 CYCLE A.C. VOLTAGES.
7. SOCKET VOLTAGE TOLERANCE, 10%.
8. LINE VOLTAGE 117 V., 60~ A.C.

# CROSLEY DIV.
# AVCO MFG. CORP.

*Under no circumstances should a ground be connected to this receiver.*

**October, 1946**


EXT. ANT.
3
34
37A
ANT. COIL
4
.77~
1.65~
9A
.00058
10
330M
25
32A
8A
50MMF
15MEGΩ
11
26
14Q7
key
22M
27
1st I.F TRANS.
25.2~
6
25.2~
18
.022
29
3.3MEG
.1
13
14A7
2ND. I.F. TRANS.
25.2~
7
23.2~
30
47M
250MMF
15
14B6
31
4.7MEG
.0033
16
1.MEG
39A
VOLUME CONTROL
100Ω
24
.05
14
50A5
.022
19
21
470M
470M
22
SPEAKER ASSEMBLY
38
35
470Ω
50A5
14A7
1200Ω
36
HEATER
33
47Ω
CIRCUIT
35Y4
1
14B6
14Q7
17A
60MF
17B
20MF
23
150Ω
.05
12
20
.022
32B
8B
37C
8C
5B
.17
.1
37B
9B
5A
5.09
.43
OSC. COILS
39B
2
CHASSIS
455 K.C. I.F

**TYPE:** Five-tube, two-band, superheterodyne.

**FREQUENCY RANGE:** American Broadcast Band, 540 to 1600 kc. (Selector Switch, Counter-clockwise or Left.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector Switch, Clockwise or Right.)

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** a.c—d.c.

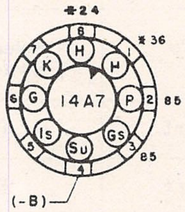
**VOLTAGE RATING:** 105-125 volts.

**POWER CONSUMPTION:** 35 watts nominal.

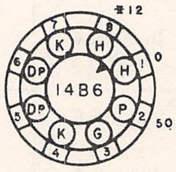
**POWER OUTPUT:** 1.5 watts minimum.

| OSCILLATOR GRID VOLTAGES | | |
|---|---|---|
| BAND | FREQUENCY | VOLTS |
| AMERICAN | 540 KC | - 4.9 |
| OVERSEAS | 5.7 MC | - 3.8 |

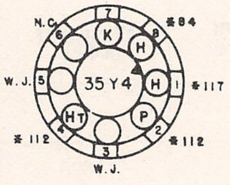
I. F. AMPLIFIER


*24
*36
14A7
85
50
85
(-B)

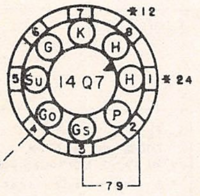
DET.-A.V.C.-1st A.F.



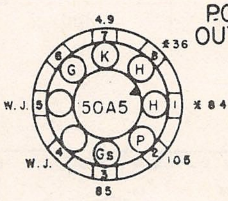
RECTIFIER


N.C.
*84
W.J.
35Y4
*117
*112
*112
W.J.

MIXER


*12
14Q7
*24
7.9

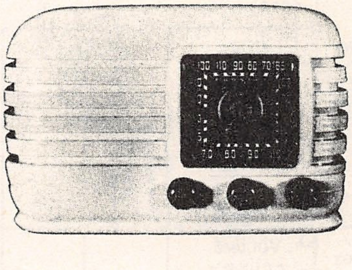
POWER OUTPUT

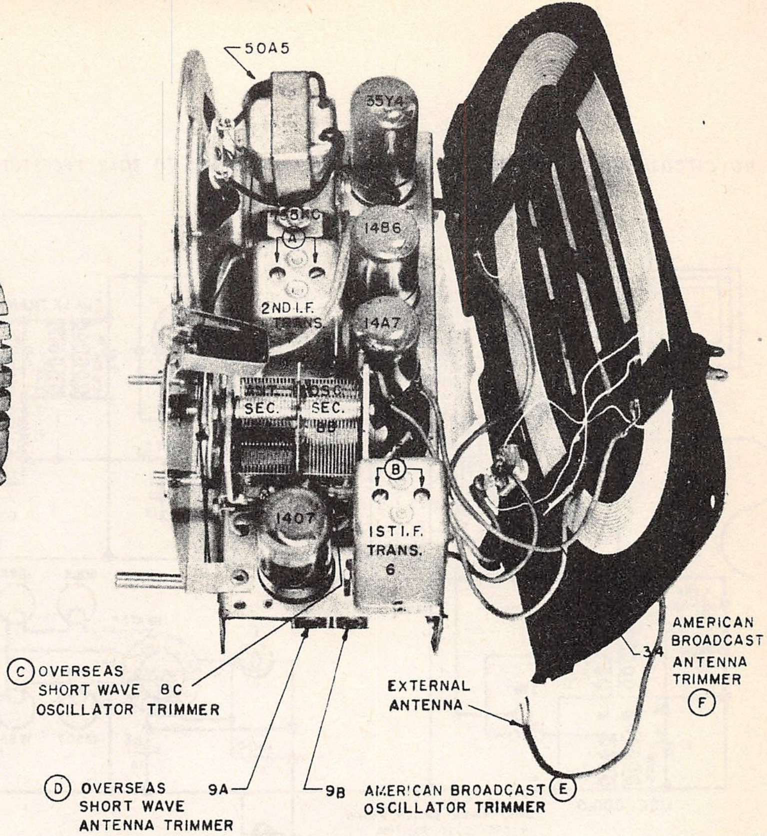

4.9
*36
W.J.
50A5
*84
W.J.
105
85

NOTES:
1. TUBE SOCKETS ARE BOTTOM VIEWS.
2. MEASURE VOLTAGES FROM SOCKET LUG TO -B (PIN 4 ON THE 14A7)
3. VOLTAGES AS MEASURED WITH AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION
5. NC - NO CONNECTION
6. ✱ - AC VOLTAGES
7. VOLTAGE TOLERANCE, 10%
8. LINE VOLTAGE 117V, 60 ∿ AC.

For Parts List, see P. 16-6
For Clarified Schematics, see P. 16-2

CROSLEY DIV.
AV CO MFG. CORP.




50A5
35Y4
KC
Ⓐ
2ND I.F. TRANS.
1486
14A7
SEC.
SEC.
8B
Ⓑ
1407
1ST I.F. TRANS. 6
Ⓒ OVERSEAS SHORT WAVE 8C OSCILLATOR TRIMMER
Ⓓ OVERSEAS SHORT WAVE ANTENNA TRIMMER 9A
9B AMERICAN BROADCAST Ⓔ OSCILLATOR TRIMMER
EXTERNAL ANTENNA
3A
AMERICAN BROADCAST ANTENNA TRIMMER Ⓕ

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 4 on 14A7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

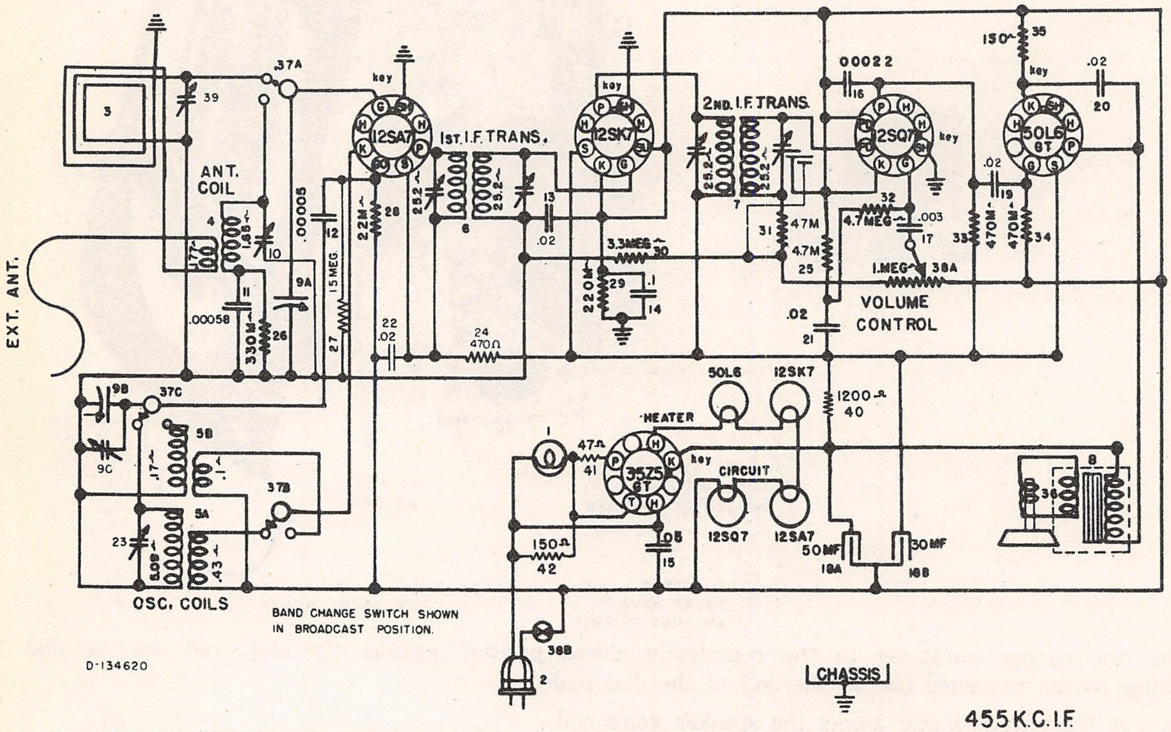
| Alignment Sequence | Signal Generator Output | | | Position of | | Adjust for Maximum Output |
|---|---|---|---|---|---|---|
| | Frequency in kc. | In Series with | To | Band Switch | Tuning Dial | |
| 1 | 455 | 200 mmf. | Ant. | Left | 1,620 | A & B |
| 2 | 15,300 | 400 ohms | Ant. | Right | 15,300 | C |
| 3 | 15,000 | 400 ohms | Ant. | Right | 15,000 | D |
| 4 | 1,400 | 200 mmf. | Ant. | Left | 1,400 | E & F |

**NOTE:** When aligning the short-wave oscillator trimmer (C), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

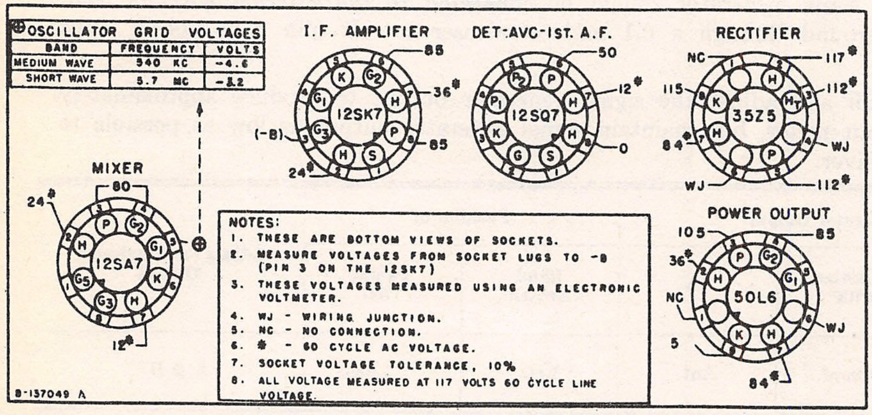
# CROSLEY DIV.
# AVCOMFG. CORP.

*Under no circumstances should a ground be connected to this receiver.*

**November, 1946**


EXT. ANT.
ANT. COIL
3
39
37A
4
.17
1.65
10
.00005
12
.00058
11
9A
15 MEG
330M
26
27
key
12SA7
28
2.2M
1st. I.F. TRANS.
25.2
6
13
.02
22
.02
24
470Ω
12SK7
2nd. I.F. TRANS.
7
3.3MEG
30
220M
29
.1
14
00022
16
12SQ7
31
47M
4.7M
25
4.7MEG
32
.003
17
1.MEG
38A
VOLUME CONTROL
.02
21
150
35
.02
20
50L6 GT
.02
19
33
470M
34
9B
37C
9C
5B
.17
.1
37B
5A
23
5.08
.43
OSC. COILS
BAND CHANGE SWITCH SHOWN IN BROADCAST POSITION.
1
47Ω
41
35Z5 GT
HEATER
50L6
12SK7
CIRCUIT
12SQ7
12SA7
1200Ω
40
.05
15
150Ω
42
50MF
18A
30MF
18B
8
36
38B
2
D-134620
CHASSIS
455 K.C. I.F.

## SOCKET VOLTAGE CHART


I.F. AMPLIFIER
12SK7
85
36*
85
(-B)
24*
DET-AVC-1ST. A.F.
12SQ7
50
12*
0
RECTIFIER
35Z5
NC
117*
112*
115
84*
WJ
WJ
112*
MIXER
12SA7
80
24*
12*
POWER OUTPUT
50L6
105
85
36*
NC
5
WJ
84*
B-137049 A

| ⊕ OSCILLATOR GRID VOLTAGES | | |
|---|---|---|
| BAND | FREQUENCY | VOLTS |
| MEDIUM WAVE | 540 KC | -4.6 |
| SHORT WAVE | 5.7 MC | -3.2 |

NOTES:
1. THESE ARE BOTTOM VIEWS OF SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO -B (PIN 3 ON THE 12SK7)
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. * - 60 CYCLE AC VOLTAGE.
7. SOCKET VOLTAGE TOLERANCE, 10%
8. ALL VOLTAGE MEASURED AT 117 VOLTS 60 CYCLE LINE VOLTAGE.

**For English translation of Spanish, see Crosley Model 56TX-L**

*Notas*: El diagrama muestra el chasis visto por debajo, medir los voltajes de cada punto a B– (espiga 3 en el 12SK7) todos los valores de voltajes medidos con voltimetro al vacio.

WJ = borne de conexiones

NC = Sin conectar

* = Voltaje C. A.

Tolerancia—10%

Voltaje de linea: 117 voltios, 60 ciclos.

Voltaje de rejilla osciladora: onda media, 540 KC:—4.9
onda corta, 5.7 mc: 3.8

**TIPO:** Superheterodino, cinco tubos, dos bandas.

**FRECUENCIAS:** Banda de onda media 540 a 1600 KC (Interruptor de bandas hacia la izquierda)
Banda de onda corta: 5.8 a 15 mc (Interruptor de bandas hacia la derecha)

**FRECUENCIA INTERMEDIA:** 455 KC.

**FUENTE DE ALIMENTACION:** Corriente alterna y directa.

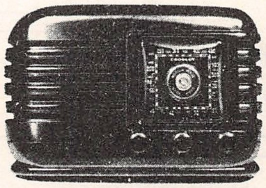
**VOLTAJE:** 105-125 voltios

**CONSUMO:** 35 watts.

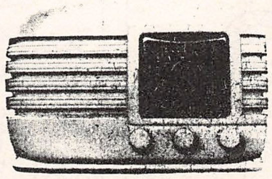
**POTENCIA DE SALIDA:** 1.5 watts mínima.

For Parts List, see P. 16-19
For clarified schematics, see P.16-8

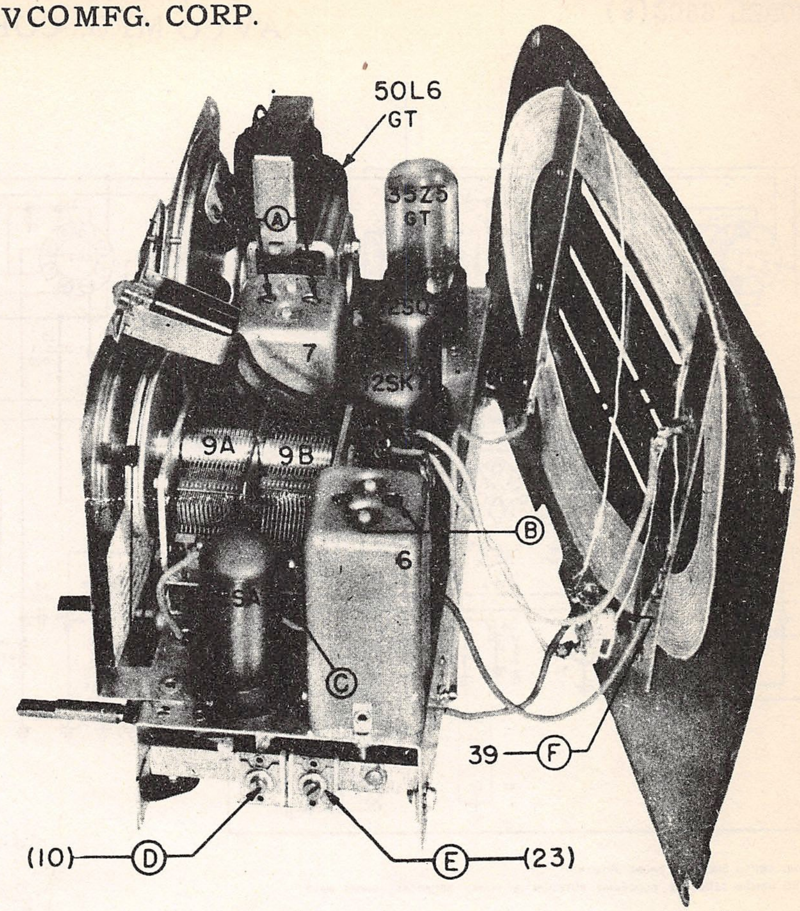
# CROSLEY DIV.
# AVCOMFG. CORP.



56XTA



56XTW



1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 3 on 12SK7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

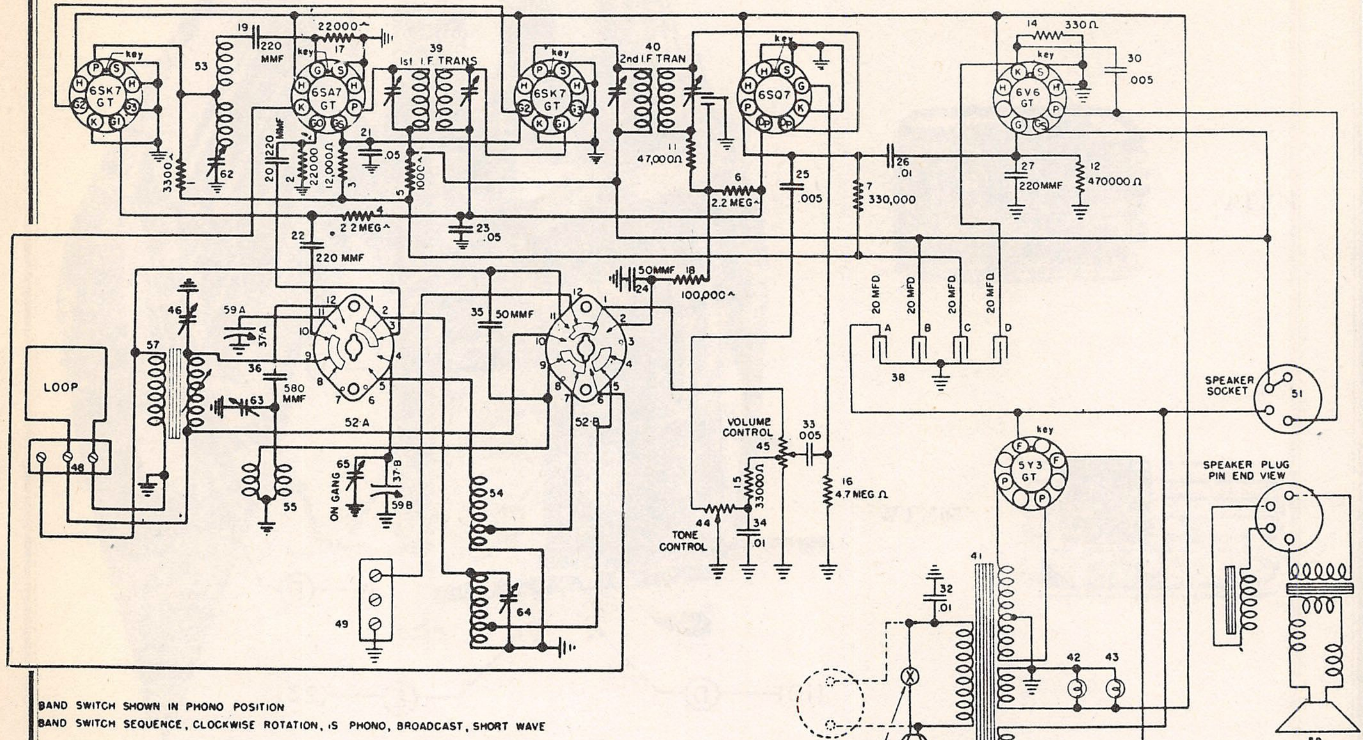
For English translation, see Crosley 56TX-L

| Orden de Ajustes | SALIDA DEL OSCILADOR | | | Interruptor de Bandas | Sintonia Cuadrante | Ajuste a Maximum |
|---|---|---|---|---|---|---|
| | Frecuencia en KC | En serie con | A | | | |
| 1 | 455 | 200 mmfd | Ant | Izquierda | 1,620 | A y B |
| 2 | 15,300 | 400 ohms | Ant | Derecha | 15,300 | C |
| 3 | 15,000 | 400 ohms | Ant | Derecha | 15,000 | D |
| 4 | 1,400 | 200 mmfd | Ant | Izquierda | 1,400 | E y F |

**Nota:** Cuando ajuste el trimer (C) de onda corta asegúrese que el circuito sea ajustado a la frecuencia correcta y nó en la imagen que es 910 kilociclos más baja en el receptor. Para chequear: Sintonice la frecuencia del oscilador, aumente la salida del oscilador y sintonice la imagen en el receptor, la imagen debe ser más débil que la fundamental y estar 910 KC más abajo. Si no se puede sintonizar la imagen, el trimer del oscilador está mal ajustado, es decir el oscilador quizás esté ajustado a la imagen o algun harmónico de la frecuencia del oscilador. El pico correcto es el segundo que se escuche cuando se abre el tornillo de ajuste después de cerrarlo por completo.

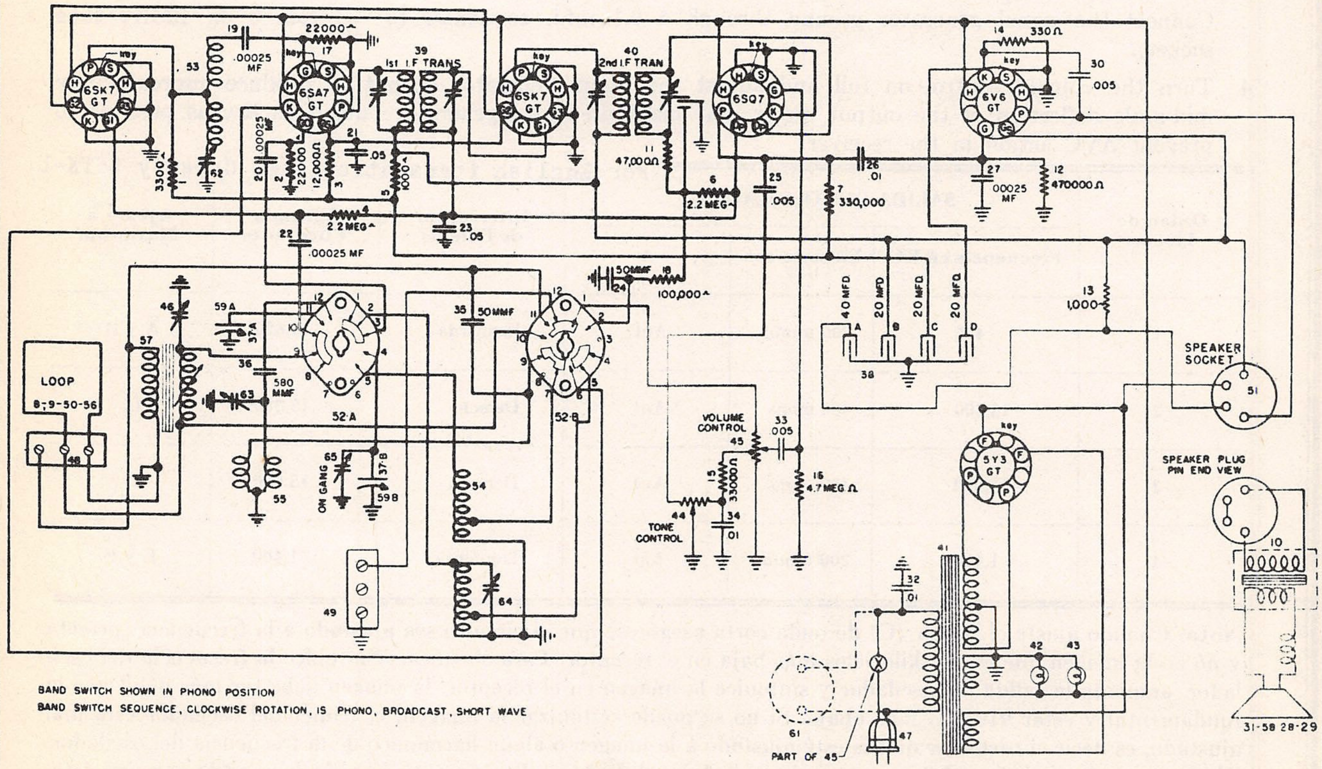
MODELS 66CS,66CSM
MODEL 66CS(s)

## CROSLEY DIV.
## AVCO MFG. CORP.


6SK7 GT
key
53
19
220 MMF
22000
17
6SA7 GT
39
1st I.F TRANS
6SK7 GT
40
2nd I.F TRAN
6SQ7
14
330Ω
30
.005
6V6 GT
3300
62
20
220 MMF
2
22000
12,000Ω
3
21
.05
1000
5
11
47,000Ω
6
2.2 MEG
25
.005
26
.01
7
330,000
27
220MMF
12
470000Ω
4
2.2 MEG
23
.05
22
220 MMF
50MMF
18
24
100,000
46
59A
37A
36
580 MMF
63
57
LOOP
48
65
ON GANG
37B
59B
55
35
50MMF
52A
52B
54
64
49
20 MFD
20 MFD
20 MFD
20 MFD
A
B
C
D
38
SPEAKER SOCKET
51
VOLUME CONTROL
45
33
.005
15
3300Ω
16
4.7 MEG Ω
44
34
.01
TONE CONTROL
5Y3 GT
SPEAKER PLUG PIN END VIEW
32
.01
41
42
43
61
47
PART OF 45
58

BAND SWITCH SHOWN IN PHONO POSITION
BAND SWITCH SEQUENCE, CLOCKWISE ROTATION, IS PHONO, BROADCAST, SHORT WAVE

**September, 1946 SCHEMATIC DIAGRAM—MODELS 66CS, 66CSM**

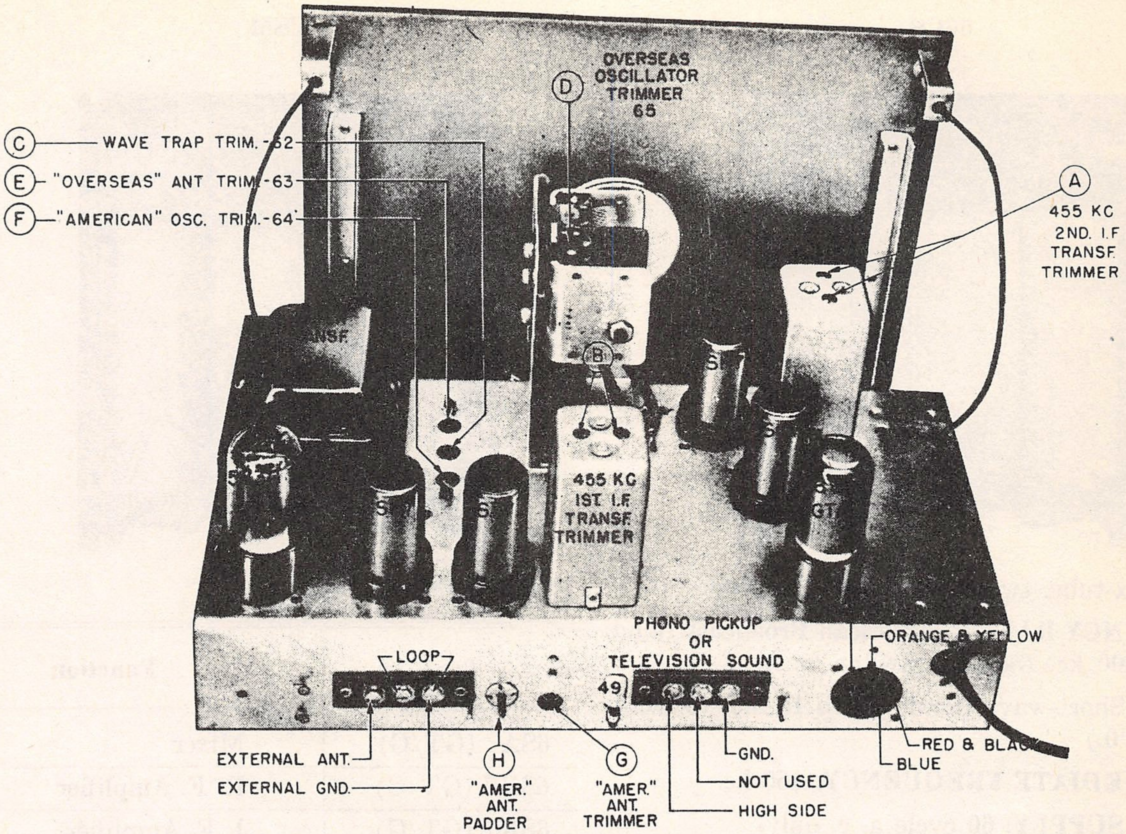

6SK7 GT
key
53
19
.00025 MF
22000
17
6SA7 GT
39
1st I.F TRANS
6SK7
40
2nd I.F TRAN
6SQ7
14
330Ω
30
.005
6V6 GT
3300
62
20
.00025 MF
2
22000
12,000Ω
3
21
.05
1000
5
11
47,000Ω
6
2.2 MEG
25
.005
26
.01
7
330,000
27
.00025 MF
12
470000Ω
4
2.2 MEG
23
.05
22
.00025 MF
50MMF
18
24
100,000
46
59A
37A
36
580 MMF
63
57
LOOP
8;9-50-56
48
65
ON GANG
37B
59B
55
35
50MMF
52A
52B
54
64
49
40 MFD
20 MFD
20 MFD
20 MFD
A
B
C
D
38
13
1,000
SPEAKER SOCKET
51
VOLUME CONTROL
45
33
.005
15
3300Ω
16
4.7 MEG Ω
44
34
.01
TONE CONTROL
5Y3 GT
SPEAKER PLUG PIN END VIEW
10
32
.01
41
42
43
61
47
PART OF 45
31-58 28-29

BAND SWITCH SHOWN IN PHONO POSITION
BAND SWITCH SEQUENCE, CLOCKWISE ROTATION, IS PHONO, BROADCAST, SHORT WAVE

**December, 1946** **MODEL 66CS (s)**

RECORD CHANGER: Seeburg K, RCD. CH. P.15-2

For Parts List, see P. 16-19


D
OVERSEAS OSCILLATOR TRIMMER 65
C
WAVE TRAP TRIM.-62
E
"OVERSEAS" ANT TRIM.-63
F
"AMERICAN" OSC. TRIM.-64
A
455 KC 2ND. I.F TRANSF. TRIMMER
B
455 KC 1ST. I.F TRANSF TRIMMER
LOOP
PHONO PICKUP OR TELEVISION SOUND
49
ORANGE & YELLOW
RED & BLACK
BLUE
EXTERNAL ANT.
EXTERNAL GND.
H
"AMER." ANT. PADDER
G
"AMER." ANT. TRIMMER
GND.
NOT USED
HIGH SIDE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r. f. signal input from the signal generator should be connected to the external antenna post as indicated in the alignment chart. Connect the low side (ground) of the signal generator to the chassis.
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain the signal generator output as low as possible to prevent AVC action in the receiver.

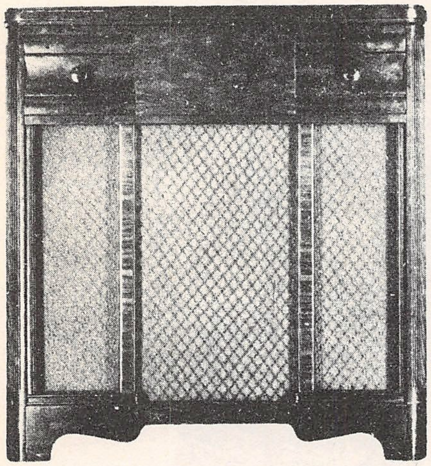
| Alignment Sequence | Signal Generator Output | | | Position of | | Adjust for Maximum Output |
|---|---|---|---|---|---|---|
| | Frequency in kc. | In Series With | To | Band Switch | Tuning Dial | |
| 1 | 455 | 200 mmf. | Ant. | A | 1620 | A & B |
| 2 | 455 | 200 mmf. | Ant. | A | 1620 | C* |
| 3 | 15,300 | 400 ohms | Ant. | O | 15,300 | D |
| 4 | 15,000 | 400 ohms | Ant. | O | 15,000 | E |
| 5 | 1620 | 200 mmf. | Ant. | A | 1620 | F |
| 6 | 1400 | 200 mmf. | Ant. | A | 1400 | G |
| 7 | 600 | 200 mmf. | Ant. | A | 600 | H |
| 8 | 1400 | 200 mmf. | Ant. | A | 1400 | Recheck G |

*Adjust for Minimum Output (Wave Trap).

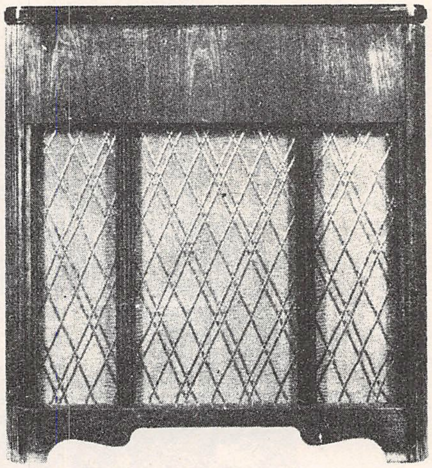
NOTE: When aligning the "Overseas" oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak of the trimmer from the closed position.

## CROSLEY DIV.
## AV CO MFG. CORP.

66CS



66CSM



**TYPE:** Six-tube, two-band, superheterodyne.

**FREQUENCY RANGE:** American Broadcast Band, 540 to 1600 kc. (Selector Switch at A.)

Overseas Short-wave Band, 5.8 to 15 mc. (Selector Switch at 0.)

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** 60 cycle a. c. only.

**VOLTAGE RATING:** 105-125 volts.

**POWER CONSUMPTION:** 60 watts maximum.

**POWER OUPUT:** 4.5 watts minimum.

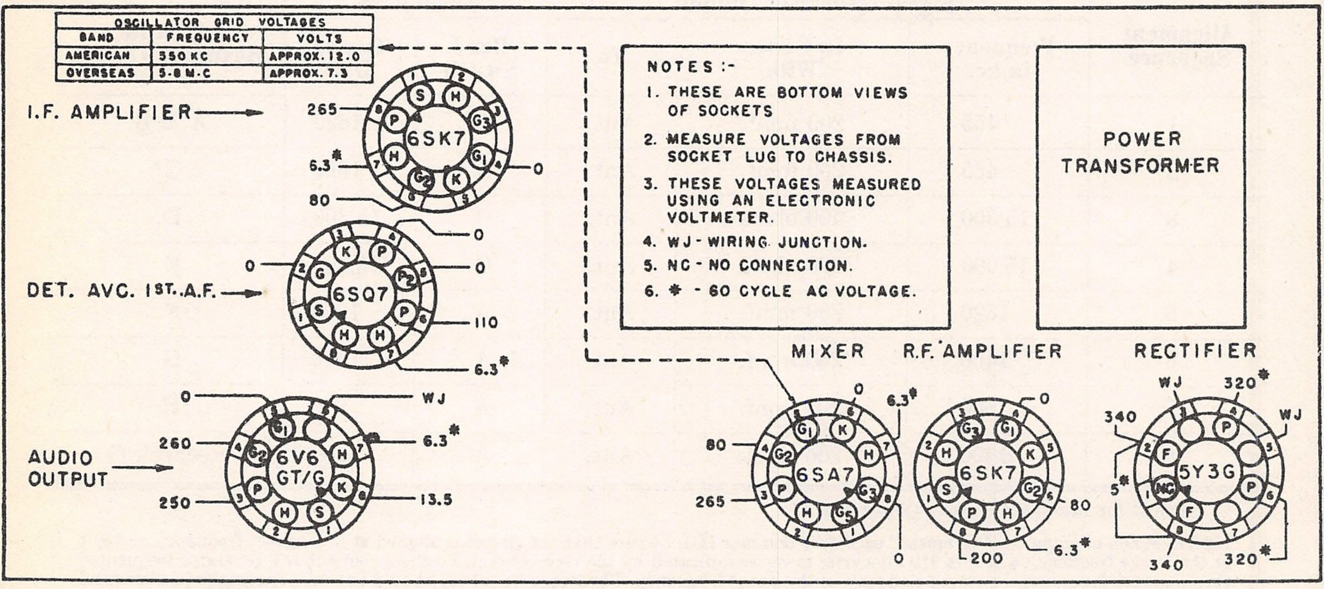
**VOLTAGE DROP ACROSS SPEAKER FIELD:** 76 volts.

**RESISTANCE OF SPEAKER FIELD:** 900 ohms.

**TUBE COMPLEMENT:**

| Type | Function |
|---|---|
| 6SA7 (GT/G) | Mixer |
| 6SK7 (GT/G) | R. F. Amplifier |
| 6SK7 (GT/G) | I. F. Amplifier |
| 6SQ7 (GT/G) | Detector, AVC, 1st A.F Amplifier |
| 6V6 (GT/G) | A. F. Power Output |
| 5Y3 GT/G | Rectifier |

**DIAL BULB:** Type 51, 7.5 volts, .25 amp.



| OSCILLATOR GRID VOLTAGES | | |
|---|---|---|
| BAND | FREQUENCY | VOLTS |
| AMERICAN | 550 KC | APPROX. 12.0 |
| OVERSEAS | 5.8 M.C | APPROX. 7.3 |

NOTES :-
1. THESE ARE BOTTOM VIEWS OF SOCKETS
2. MEASURE VOLTAGES FROM SOCKET LUG TO CHASSIS.
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. * - 60 CYCLE AC VOLTAGE.

I.F. AMPLIFIER
6SK7
265
6.3*
80
0
DET. AVC. 1ST. A.F.
6SQ7
0
0
0
110
6.3*
AUDIO OUTPUT
6V6 GT/G
0
WJ
260
6.3*
250
13.5
POWER TRANSFORMER
MIXER
6SA7
0
6.3*
80
265
0
R.F. AMPLIFIER
6SK7
0
80
200
6.3*
RECTIFIER
5Y3G
WJ
320*
340
WJ
5*
340
320*
NC

**SOCKET VOLTAGE TOLERANCE: 10%**

MODELS 66CS,66CSM
MODEL 66CS(s)
MODEL 66TC-S
MODELS 56XTA,56XTW

# CROSLEY DIV.
# AVCO MFG. CORP.

## PARTS LIST—MODELS 66CS, 66CSM

**Figures in first column correspond to figures in Schematic Diagram.**

| Item No. | Part Number | Description |
|---|---|---|
| 1 | 39281-16 | Resistor, 3300 ohm, ½ w. |
| 2 | 39281-21 | Resistor, 22,000 ohm, ½ w. |
| 3 | 39016-38 | Resistor, 12,000 ohm, 2 w. |
| 4 | 39281-33 | Resistor, 2.2 megohm, ½ w. |
| 5 | 39040-13 | Resistor, 1,000 ohm, 1 w. |
| 6 | 39281-33 | Resistor, 2.2 megohm, ½ w. |
| 7 | 39281-28 | Resistor, 330,000 ohm, ½ w. |
| 11 | 39281-23 | Resistor, 47,000 ohm, ½ w. |
| 12 | 39281-29 | Resistor, 470,000 ohm, ½ w. |
| 14 | 39015-19 | Resistor, 330 ohm, 1 w. |
| 15 | 39281-22 | Resistor, 33,000 ohm, ½ w. |
| 16 | 39281-35 | Resistor, 4.7 megohm, ½ w. |
| 17 | 39281-21 | Resistor, 22,000 ohm, ½ w. |
| 18 | 39281-25 | Resistor, 100,000 ohm, ½ w. |
| 19 | 39004-9 | Condenser, 220 mmf., 500 v., Mica |
| 20 | 39004-9 | Condenser, 220 mmf., 500 v., Mica |
| 21 | 39001-41 | Condenser, .05 mfd., 400 v., Paper |
| 22 | 39004-9 | Condenser, 220 mmf., 500 v., Mica |
| 23 | 39001-65 | Condenser, .05 mfd., 200 v., Paper |
| 24 | 39004-5 | Condenser, 50 mmf., 500 v., Mica |
| 25 | 39001-11 | Condenser, .005 mfd., 600 v., Paper |
| 26 | 39001-37 | Condenser, .01 mfd., 400 v., Paper |
| 27 | 39004-9 | Condenser, 220 mmf., 500 v., Mica |
| 30 | 39001-11 | Condenser, .005 mfd., 600 v., Paper |
| 32 | W-30805 | Condenser, .01 mfd., 400 v., Paper |
| 33 | 39001-11 | Condenser, .005 mfd., 600 v., Paper |
| 34 | 39001-61 | Condenser, .01 mfd., 200 v., Paper |
| 35 | 39004-5 | Condenser, 50 mmf., 500 v., Mica |
| 36 | GC-210685-143 | Condenser, 580 mmf., 300 v., Mica |
| 37A | B-134995 | Condenser (variable) Two |
| 37B | | Condenser (variable) Section |
| 38A | B-132807 | Condenser, 20 mfd., 360 w.v. Four |
| 38B | | Condenser, 20 mfd., 275 w.v. Section |
| 38C | | Condenser, 20 mfd., 245 w.v. Elect. |
| 38D | | Condenser, 20 mfd., 25 w.v. Filter |
| 39 | AW-134065 | Transformer (1st I. F.) |
| 40 | AW-134158 | Transformer (2nd I. F.) |
| 41 | B-134625 | Transformer (Power) |
| 42 | W-43567 | Bulb (Dial Light, Type 51, 7.5 v., .25 amp.) |
| 43 | W-43567 | Bulb (Dial Light, Type 51, 7.5 v., .25 amp.) |
| 44 | B-135651 | Control, Tone (3 megohm) |
| 45 | B-135859 | Control, Volume (1 megohm) & Switch |
| 46 | W-132267-1 | Condenser (Trimmer) |
| 47 | B-132300-1 | Cable and Plug (Power) |
| 48 | 39019-3 | Terminal Board Assembly |
| 49 | 39019-3 | Terminal Board Assembly |
| 51 | W-134968-1 | Socket (Speaker) |
| 52A | B-134639 | Switch (Band Change) Two |
| 52B | | Switch (Band Change) Section |
| 53 | AW-135907 | R. F. Coil Assembly |
| 54 | AW-135908 | Oscillator Coil Assembly |
| 55 | AW-135909 | Antenna Coil Assembly |
| 57 | AW-135910 | Antenna Loading Coil Assembly |
| 58 | B-134700 | Speaker |
| 62 | B-132386-7 | Condenser (Trimmer) Three |
| 63 | | Condenser (Trimmer) Section |
| 64 | | Condenser (Trimmer) Assembly |
| | G-39012-8 | Core (Iron) |
| | G-39204 | Socket (Tube) |
| | 39017-3 | Socket (Dial Light) |
| | AW-134793 | Dial Face Assembly |
| | B-134571 | Pointer (Dial) |
| | W-134667 | Clip (Dial Pointer) |
| | W-51752 | Spring (Dial Cord) |
| | W-134917 | Shaft (Drive) |
| | W-51071 | Ring (Retaining) |
| | W-134916 | Washer (Spring) |
| | W-132366-2 | Nut (Iron Core Locking) |
| | 39196-29 | Screw (Dial Mtg.) |
| | W-134055 | Grommet (Variable Condenser Mtg.) |
| | R-137873 | Cabinet (66CS) |
| | R-137917 | Cabinet (66CSM) |
| | C-134773 | Lens (Dial) |
| | AC-134782 | Antenna Loop Assembly |
| | D-134945-1 | Record Changer |
| | AB-134935 | Floating Jewel Needle Assembly |
| | W-134959 | Cable, Phono |
| | W-135248 | Knob |
| | W-45580 | Rubber Mtg. (Speaker and Chassis Mtg.) |
| | W-136539 | Lid Support, Cabinet |
| | AW-134972 | Screw and Washer Assembly (Record Changer Mtg., 66CS) |
| | W-134966 | Nut, Spring Lock (Record Changer Mtg.) |
| | W-134956 | Nut, Tee (Record Changer Mtg.) |
| | AW-134961 | Lead Assembly, Shielded (Record Changer) |
| | W-23880 | Thumbscrew (Chassis Mtg., 66CS) |

## MODEL 66CS (s) PARTS LIST

| Item No. | Part Number | Description |
|---|---|---|
| 13 | B-210735-32 | Resistor, 1000 ohm, 5 w. |
| 38A | B-137076 | Condenser, 40 mfd., 450 w. v. Four |
| 38B | | Condenser, 20 mfd., 450 w. v. Section |
| 38C | | Condenser, 20 mfd., 450 w. v. Elect. |
| 38 D | | Condenser, 20 mfd., 25 w. v. Filter |
| 58 | C-135974 | Speaker |
| 8 | W-137143 | Antenna (Transmission Line, 116″) |

NOTE—All other parts and service information are the same as used on models "66CS" and "66CSM",

**NOTE:**

The above models use the Model K (Part No. D-134945-1) automatic record changer.

**Figures in first column correspond to figures in Schematic Diagram**

## PARTS LIST—MODEL 66TC-S

### CHASSIS PARTS

| Item No. | Part No. | Description |
|---|---|---|
| 1 | 39281-16 | Resistor, 3,300 Ohm, ½ W. |
| 2 | 39281-21 | Resistor, 22,000 Ohm, ½ W. |
| 3 | 39016-38 | Resistor, 12,000 Ohm, 2 W. |
| 4 | 39281-33 | Resistor, 2.2 Megohm, ½ W. |
| 5 | 39040-13 | Resistor, 1,000 Ohm, 1 W. |
| 6 | 39281-33 | Resistor, 2.2 Megohm, ½ W. |
| 7 | 39281-28 | Resistor, 330,000 Ohm, ½ W. |
| 11 | 39281-23 | Resistor, 47,000 Ohm, ½ W. |
| 12 | 39281-29 | Resistor, 470,000 Ohm, ½ W. |
| 13 | B-210735-32 | Resistor, 1000 ohm, 5 W. |
| 14 | 39015-19 | Resistor, 330 Ohm, 1 W. |
| 15 | 39281-22 | Resistor, 33,000 Ohm, ½ W. |
| 16 | 39281-35 | Resistor, 4.7 Megohm, ½ W. |
| 17 | 39281-21 | Resistor, 22,000 Ohm, ½ W. |
| 18 | 39281-25 | Resistor, 100,000 Ohm, ½ W. |
| 19 | 39004-9 | Condenser, 220 mmf., Mica |
| 20 | 39004-9 | Condenser, 220 mmf., Mica |
| 21 | 39001-41 | Condenser, .05 mfd., 400 V., Paper |
| 22 | 39004-9 | Condenser, 220 mmf., Mica |
| 23 | 39001-65 | Condenser, .05 mfd., 200 V., Paper |
| 24 | 39004-5 | Condenser, 50 mmf., Mica |
| 25 | 39001-11 | Condenser, .005 mfd., 600 V., Paper |
| 26 | 39001-37 | Condenser, .01 mfd., 400 V., Paper |
| 27 | 39004-9 | Condenser, 220 mmf., Mica |
| 30 | 39001-11 | Condenser, .005 mfd., 600 V., Paper |
| 32 | W-30805 | Condenser, .01 mfd., 400 V., Paper |
| 33 | 39001-11 | Condenser, .005 mfd., 600 V., Paper |
| 34 | 39001-61 | Condenser, .01 mfd., 200 V., Paper |
| 35 | 39004-5 | Condenser, 50 mmf., Mica |
| 36 | GC-210685-143 | Condenser, 580 mmf., Mica |
| 37A | B-134995 | Variable Condenser |
| 37B | | Variable Condenser |
| 38A | D-132807 | Condenser, 20 mfd., 360 W.V. Four |
| 38B | | Condenser, 20 mfd., 275 W.V. Section |
| 38C | | Condenser, 20 mfd., 245 W.V. Elect. |
| 38D | | Condenser, 20 mfd., 25 W.V. Filter |
| 39 | AW-134065 | 1st I. F. Coil Assembly |
| 40 | AW-134158 | 2nd I. F. Coil Assembly |
| 41 | B-134625 | Power Transformer |
| 42 | W-43567 | Dial Light, Type 51, 7.5 V., 0.2 Amp. |
| 43 | W-43567 | Dial Light, Type 51, 7.5 V., 0.2 Amp. |
| 44 | B-135651 | Tone Control, 3 Megohm |
| 45 | B-135859 | Volume Control (1 Megohm) and Switch |
| 46 | W-132267-1 | Condenser (Trimmer) |
| 47 | B-132300-1 | Cable and Plug |
| 48 | 39019-3 | Terminal Board Assembly |
| 49 | 39019-3 | Terminal Board Assembly |
| 51 | W-134968-1 | Speaker Socket |
| 52A | B-134639 | Two Section Band |
| 52B | | Change Switch |
| 53 | AW-135907 | R. F. Coil Assembly |
| 54 | AW-135908 | Oscillator Coil Assembly |
| 55 | AW-135909 | Antenna Coil Assembly |
| 56 | C-137339 | Speaker |
| 57 | AW-135910 | Antenna Loading Coil Assembly |
| 62 | B-132386-7 | Three Section |
| 63 | | Trimmer |
| 64 | | Condenser |
| 66 | B-137077 | Condenser. 20 mfd.. 450 W.V., Elect. |

### CABINET PARTS

| Part No. | Description |
|---|---|
| R-135025 | Wood Cabinet |
| AC-134672 | Antenna Loop and Back Assembly |
| C-132688 | Dial Lens |
| W-130197 | Knob |
| 39220-38 | Screw Mounting—8 x 1¼ Hex. Hd. |
| W-45580 | Rubber Mounting |

### MECHANICAL PARTS

| Part No. | Description |
|---|---|
| W-47577 | Cable Lock Plate |
| AW-134807 | Dial Face Assembly |
| W-51752 | Dial Cord Spring |
| B-134571 | Dial Pointer |
| G-39012-8 | Iron Core |
| W-132366-2 | Locking Nut |
| W-134667 | Dial Pointer Clip |
| 39017-3 | Dial Light Socket |
| G-39204 | Tube Socket |
| 39196-29 | Screw, Dial Mounting |
| W-46662 | Palnut ⅜-32 |
| W-134055 | Grommet |
| B-134896 | Transformer Shield |
| W-134917 | Drive Shaft |
| W-51071 | Retaining Ring |
| W-134916 | Spring Washer |

## ARTS LIST—MODELS 56XTA, 56XTW

| Item No. | Part No. | Description |
|---|---|---|
| 1 | W-48858 | Bulb (Dial), Type 47, 6.3 v., .15 amp. |
| 2 | C-132300-1 | Cable and Plug (power) |
| 3 | AC-135817 | Antenna Loop and Back Assembly |
| 4 | AW-134994 | Coil, Antenna (H. F.) |
| 5A | AW-134993 | Coil, Oscillator (B. C.) Two |
| 5B | | Coil, Oscillator (H. F.) Section |
| 6 | AW-137495 | Transformer (1st I. F.) |
| 7 | AW-134158 | Transformer (2nd I. F.) |
| 9A | B-135165 | Condenser, Variable Two |
| 9B | | Condenser, Variable Section |
| 9C | Part of Item #9B | Condenser (Trimmer) |
| 10 | AB-135088 | Condenser Assy. (Trimmer) |
| 11 | GC-210685-143 | Condenser, 580 mmf., Mica |
| 12 | 39004-5 | Condenser, 50 mmf., Mica |
| 13 | 39001-80 | Condenser, .02 mfd., 600v., paper |
| 14 | 39001-19 | Condenser, .1 mfd., 600 v., paper |
| 15 | 39001-17 | Condenser, .05 mfd., 600 v., paper |
| 16 | 39004-9 | Condenser, 220 mmf., Mica |
| 17 | 39001-76 | Condenser, .003 mfd., 600 v., paper |
| 18A | B-137649 | Condenser, 50 mfd., 150 v. Two Section |
| 18B | | Condenser, 30 mfd., 150 v. Elect. Filter |
| 19 | 39001-80 | Condenser, .02 mfd., 600 v., paper |
| 20 | 39001-80 | Condenser, .02 mfd., 600 v., paper |
| 21 | 39001-80 | Condenser, .02 mfd., 600 v., paper |
| 22 | 39001-80 | Condenser, .02 mfd., 600 v., paper |
| 23 | Part of Item #10 | Condenser (Trimmer) |
| 24 | 39294-11 | Resistor, 470 ohm, ½ w. |
| 25 | 39294-17 | Resistor, 4700 ohm, ½ w. |
| 26 | 39294-28 | Resistor, 330,000 ohm, ½ w. |
| 27 | 39294-38 | Resistor, 15 megohm, ½ w. |
| 28 | 39294-21 | Resistor, 22,000 ohm, ½ w. |
| 29 | 39294-27 | Resistor, 220,000 ohm, ½ w. |
| 30 | 39294-34 | Resistor, 3.3 megohm, ½ w. |
| 31 | 39294-23 | Resistor, 47,000 ohm, ½ w. |
| 32 | 39294-35 | Resistor, 4.7 megohm, ½ w. |
| 33 | 39294-29 | Resistor, 470,000 ohm, ½ w. |
| 34 | 39294-29 | Resistor, 470,000 ohm, ½ w. |
| 35 | 39294-8 | Resistor, 150 ohm, ½ w. |
| 36 | AD-137664 | Speaker and Transformer Assy. |
| 37A | W-135808 | Switch, Band Change Three |
| 37B | | Switch, Band Change Section |
| 37C | | Switch, Band Change Assy. |
| 38A | C-46846-6 | Control (1 megohm), Volume Assem |
| 38B | | Switch, Power bly |
| * | 39368-8 | Control, Volume |
| * | 39369-1 | Switch, Power |
| 39 | Part of Item #3 | Condenser (Trimmer) |
| 40 | 39015-26 | Resistor, 1200 ohm, 1 w. |
| 41 | 39015-9 | Resistor, 47 ohm, 1 w. |
| 42 | 39294-8 | Resistor, 150 ohm, ½ w. |
| | 39388 | Socket, Tube |
| | 39017-4 | Socket Assy., Dial Light |
| | C-136962 | Chart, Dial Face |
| | C-136721 | Background, Dial |
| | B-134570 | Pointer, Dial |
| | W-134667 | Clip, Dial Pointer |
| | 51752 | Spring, Dial Cord |
| | W-134917 | Shaft, Drive |
| | W-134916 | Washer, Spring |
| | W-51071 | Ring, Retaining |
| | W-49770 | Stud, Trimount |
| | W-135164 | Bumper, Rubber |
| | W-134055 | Grommet |
| | AW-136464 | Resistor (Line Voltage Reducing, 230 v. to 115 v.) |
| | AW-134738 | Cabinet (56XTW) |
| | D-132136-1 | Cabinet (56XTA) |
| | B-134610 | Lense, Dial |
| | W-134882 | Knob (56XTA) |
| | W-134883 | Knob (56XTW) |
| | W-132124 | Stud, Trimount |

*These parts will replace the original equipment parts.

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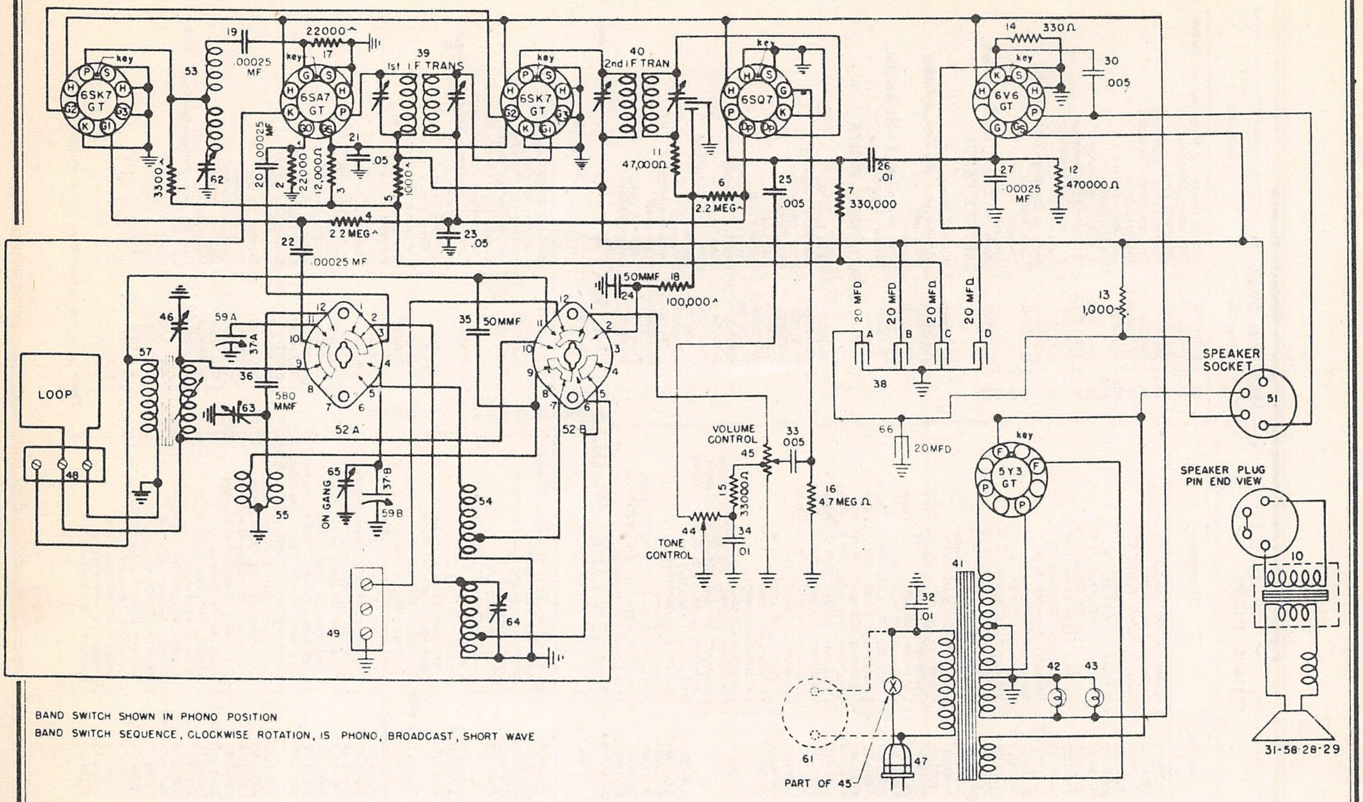

6SK7 GT
6SA7 GT
6SK7 GT
6SQ7
6V6 GT
5Y3 GT
key
19 .00025 MF
22000^ 17
39 1st I.F. TRANS
40 2nd I.F. TRAN
53
62
3300^
20 .00025 MF
2 22000Ω
3 12,000Ω
21 .05
5 1000^
4 2.2 MEG^
23 .05
22 .00025 MF
11 47,000Ω
6 2.2 MEG^
25 .005
26 .01
7 330,000
27 .00025 MF
12 470000Ω
14 330Ω
30 .005
50MMF 18 24 100,000^
13 1,000
20 MFD A B C D
38
SPEAKER SOCKET
51
46
59A
37A
36
580 MMF
63
57
LOOP
48
52A
35 50MMF
52B
55
65 ON GANG
37B
59B
54
64
49
VOLUME CONTROL 45
33 .005
15 3300Ω
44
34 .01
TONE CONTROL
16 4.7 MEG Ω
66 20MFD
41
32 .01
42 43
61
47
PART OF 45
SPEAKER PLUG PIN END VIEW
10
31-58-28-29

BAND SWITCH SHOWN IN PHONO POSITION
BAND SWITCH SEQUENCE, CLOCKWISE ROTATION, IS PHONO, BROADCAST, SHORT WAVE

**TYPE:** Six-tube, two-band superheterodyne with terminals provided for record player or television sound.

**FREQUENCY RANGE:** American Broadcast Band: 540 to 1600 kc. (Selector switch at A.)

Overseas Short-wave Band: 5.8 to 15 mc. (Selector switch at 0.)

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** 60 cycle a.c. only.

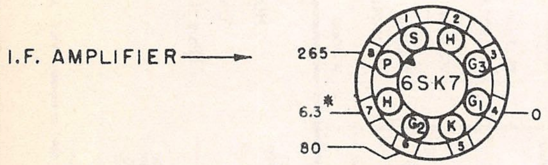
**VOLTAGE RATING:** 110-120 volts.

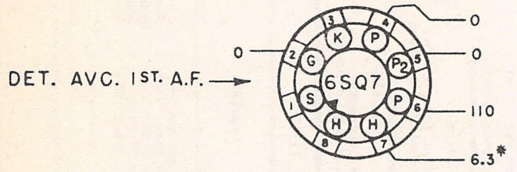
**POWER CONSUMPTION:** 60 watts maximum.

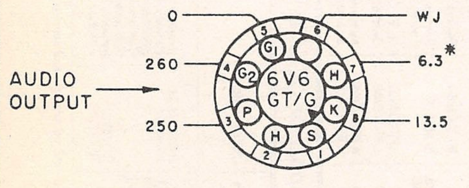
**POWER OUTPUT:** 4.5 watts minimum.

**VOLTAGE DROP ACROSS SPEAKER FIELD:** 76 volts. WITH E.M. SPEAKER

**RESISTANCE OF SPEAKER FIELD:** 900 ohms.

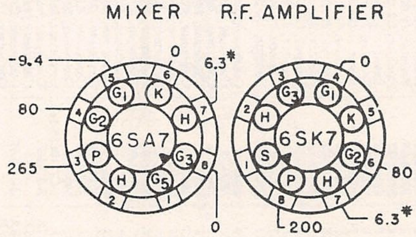

I.F. AMPLIFIER
6SK7
265
6.3*
80
0
S H G3 G1 K G2 H P

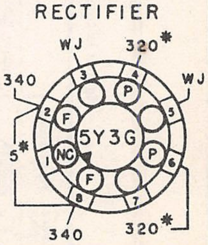

DET. AVC. 1ST. A.F.
6SQ7
0
0
0
110
6.3*
K P G P2 S P H H


AUDIO OUTPUT
6V6 GT/G
0
WJ
260
6.3*
250
13.5
G1 G2 H P K H S

NOTES :-
1. THESE ARE BOTTOM VIEWS OF SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUG TO CHASSIS.
3. THESE VOLTAGES MEASURED USING AN ELECTRONIC VOLTMETER.
4. WJ - WIRING JUNCTION.
5. NC - NO CONNECTION.
6. * - 6C CYCLE AC VOLTAGE.

POWER TRANSFORMER


MIXER
R.F. AMPLIFIER
6SA7
6SK7
-9.4
0
6.3*
80
265
0
0
80
200
6.3*
G1 K G2 H P G3 H G5
G3 G1 H K S G2 P H


RECTIFIER
5Y3G
WJ
320*
340
WJ
5*
340
320*
P F NC F P

Socket Voltage Tolerance: 10%

For Parts List, see P. 16-19

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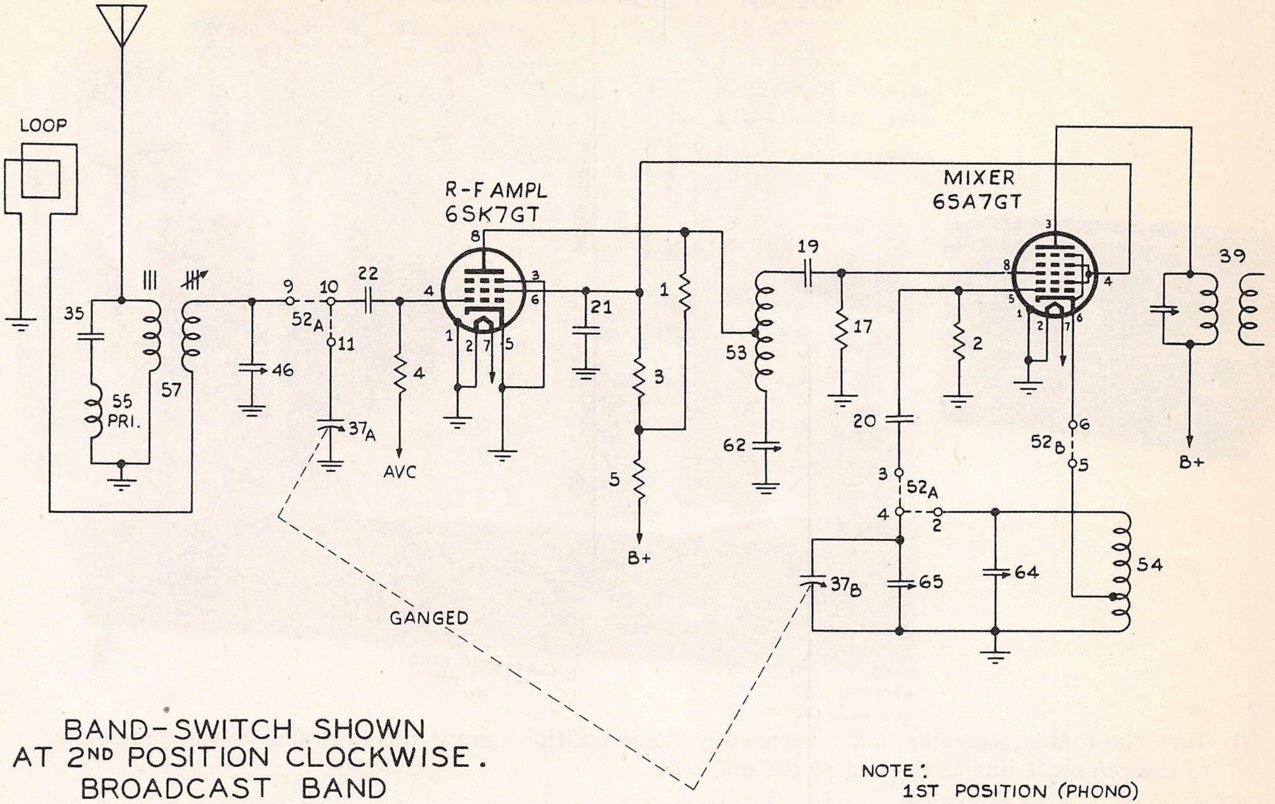
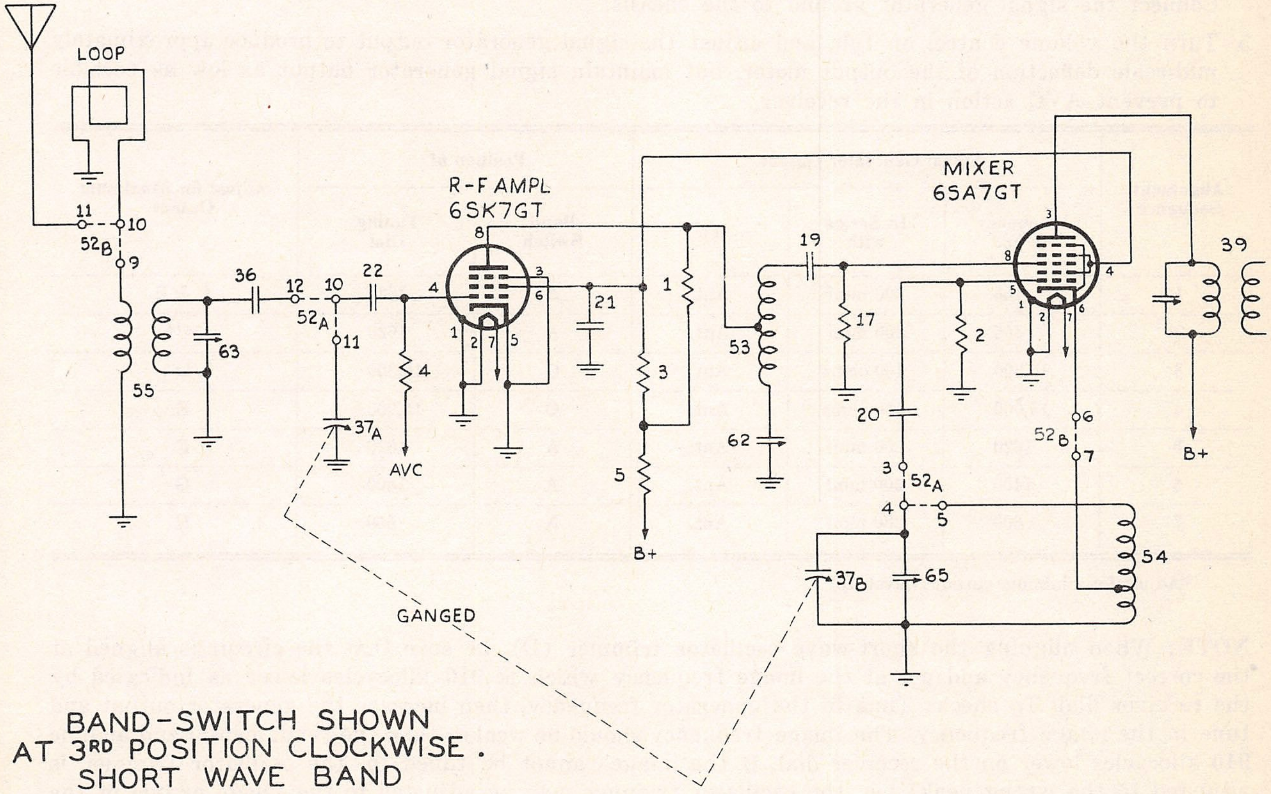

LOOP
35
55
PRI.
57
46
9
10
52A
11
22
37A
AVC
4
R-F AMPL
6SK7GT
8
1
2
7
5
3
6
21
1
3
5
B+
GANGED
19
53
62
17
20
2
MIXER
6SA7GT
3
8
4
5
1
2
7
6
52B
6
5
B+
3
52A
4
2
37B
65
64
54
39

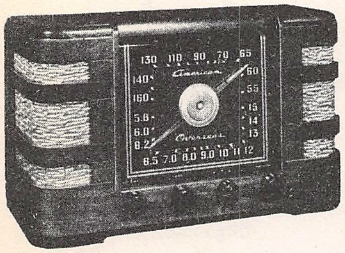
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
540 - 1600 KC

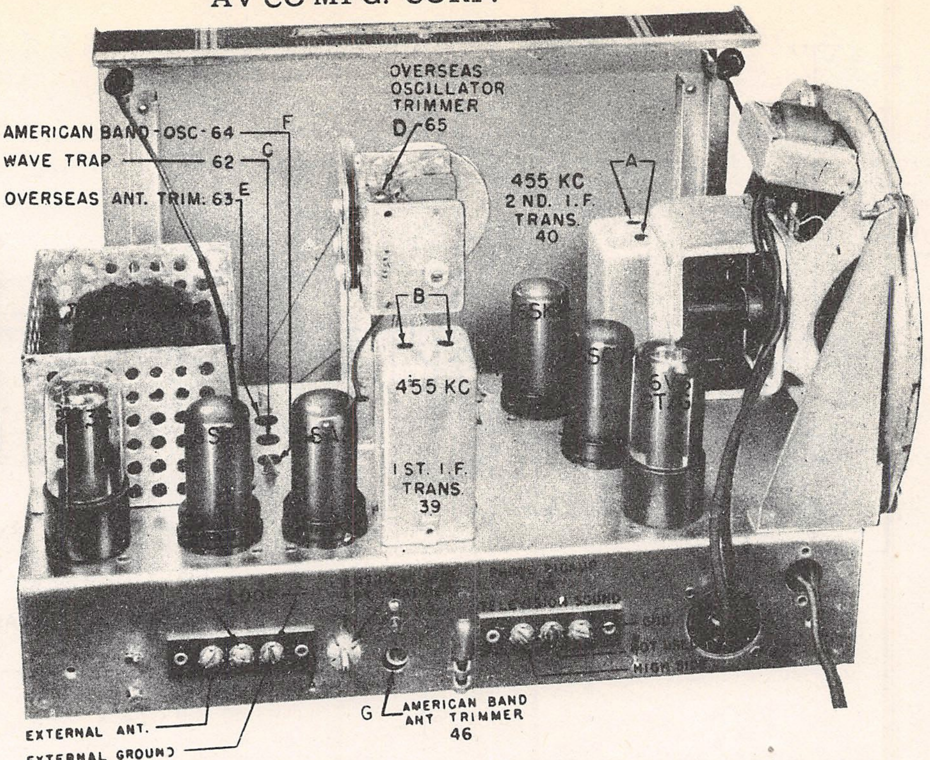
NOTE:
1ST POSITION (PHONO)
NOT SHOWN


LOOP
11
10
52B
9
55
63
36
12
10
52A
11
22
37A
AVC
4
R-F AMPL
6SK7GT
8
1
2
7
5
3
6
21
1
3
5
B+
GANGED
19
53
62
17
20
2
MIXER
6SA7GT
3
8
4
5
1
2
7
6
52B
6
7
B+
3
52A
4
5
37B
65
54
39

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
5.8 - 15 MC

# CROSLEY DIV.
# AVCO MFG. CORP.





1. Turn the tuning capacitor to the completely closed position against the stop, and set the dial pointer to the reference line at the end of the dial scale.
2. Turn the tone control to the high or treble position.
3. Connect the output meter across the speaker voice coil.
4. The r.f. signal input from the signal generator should be connected to the external antenna post. Connect the signal generator ground to the chassis.
5. Turn the volume control on full, and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

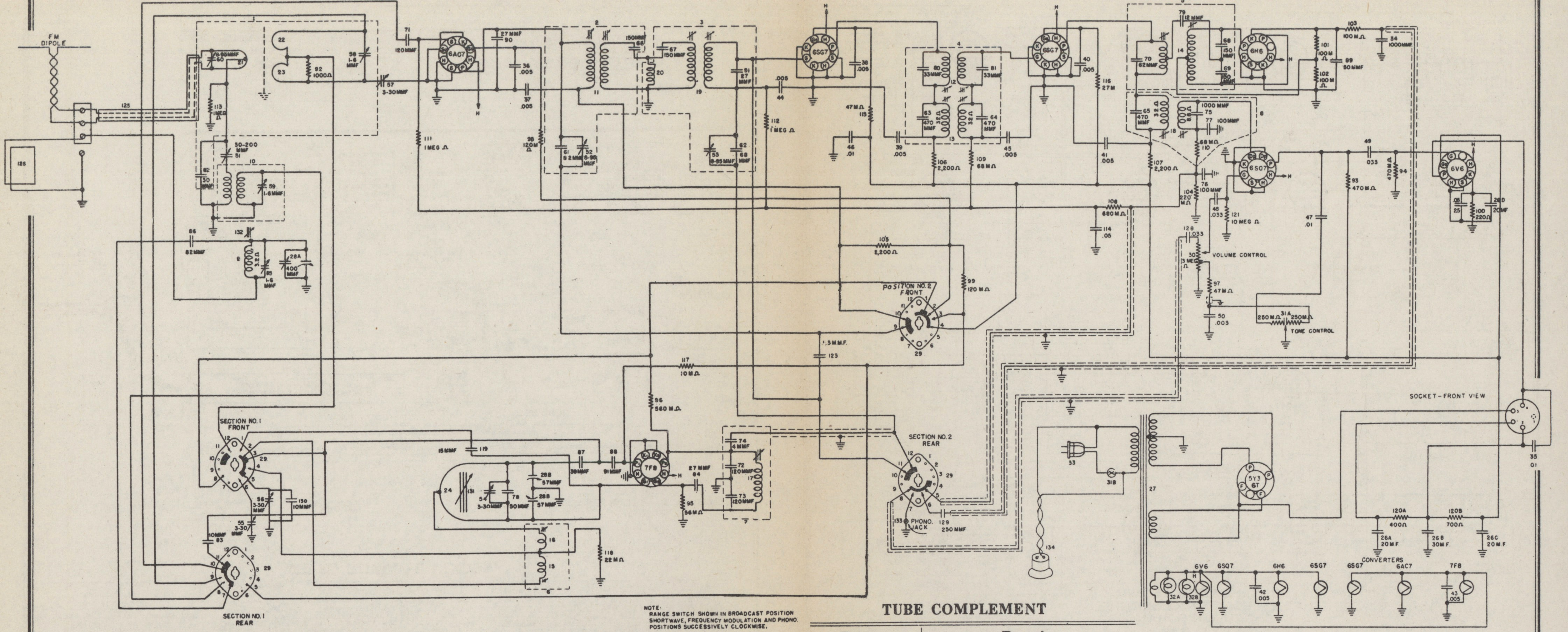
| Alignment Sequence | Signal Generator Output | | | Position of | | Adjust for Maximum Output |
|---|---|---|---|---|---|---|
| | Frequency in kc. | In Series with | To | Band Switch | Tuning Dial | |
| 1 | 455 | 200 mmf | Ant. | A | 1620 | A & B |
| 2 | 455 | 200 mmf | Ant. | A | 1620 | C* |
| 3 | 15,300 | 400 ohms | Ant. | O | 15,300 | D |
| 4 | 15,000 | 400 ohms | Ant. | O | 15,000 | E |
| 5 | 1620 | 200 mmf | Ant. | A | 1620 | F |
| 6 | 1400 | 200 mmf | Ant. | A | 1400 | G |
| 7 | 600 | 200 mmf | Ant. | A | 600 | H |

*Adjust for minimum output (wavetrap).

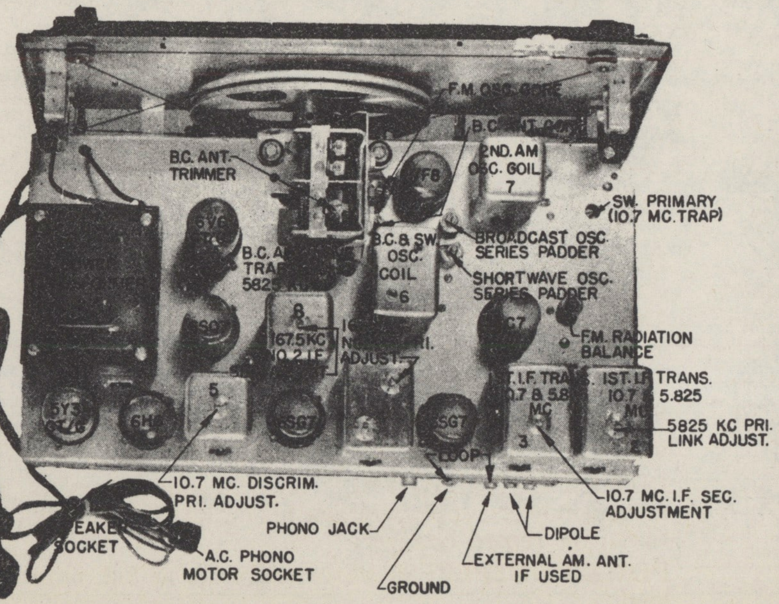
**NOTE:** When aligning the short-wave oscillator trimmer (D), be sure that the circuit is aligned at the correct frequency and not at the image frequency which is 910 kilocycles lower as indicated by the receiver dial. To check: Tune in the generator frequency, then increase the generator output and tune in the image frequency. The image frequency should be weaker than the fundamental and audible 910 kilocycles lower on the receiver dial. If the image cannot be tuned in, the oscillator trimmer is adjusted to the wrong peak; i.e., the oscillator trimmer may be adjusted to the image or one of the harmonics instead of the fundamental frequency. The correct peak is the second one heard as the trimmer adjustment screw is opened from the completely closed position.

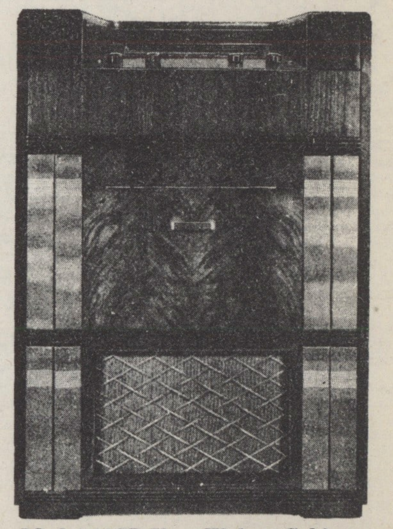
# CROSLEY DIV.
# AVCO MFG. CORP.

November, 1946


FM DIPOLE
125
126
6AC7
6SG7
6SG7
6H6
6SQ7
6V6
7F8
5Y3 GT
SECTION NO. 1 FRONT
SECTION NO. 1 REAR
SECTION NO. 2 FRONT
SECTION NO. 2 REAR
VOLUME CONTROL
TONE CONTROL
PHONO JACK
SOCKET-FRONT VIEW
CONVERTERS
H

NOTE:
RANGE SWITCH SHOWN IN BROADCAST POSITION
SHORTWAVE, FREQUENCY MODULATION AND PHONO.
POSITIONS SUCCESSIVELY CLOCKWISE.


F.M. OSC. CORE
B.C. ANT. CORE
B.C. ANT. TRIMMER
2ND. AM OSC. COIL 7
SW. PRIMARY (10.7 MC. TRAP)
B.C. & SW. OSC. COIL 6
BROADCAST OSC. SERIES PADDER
SHORTWAVE OSC. SERIES PADDER
B.C. A TRAP 5825
8
167.5 KC NO. 2 I.F.
NO. PRI. ADJUST.
F.M. RADIATION BALANCE
1ST. I.F. TRANS. 10.7 & 5.8 MC
1ST. I.F. TRANS. 10.7 & 5.825 MC
5825 KC PRI. LINK ADJUST.
6V6
7F8
6SQ7
6SG7
6SG7
6AC7
6H6
5Y3 GT/G
5
3
LOOP
10.7 MC. DISCRIM. PRI. ADJUST.
10.7 MC. I.F. SEC. ADJUSTMENT
PHONO JACK
DIPOLE
SPEAKER SOCKET
A.C. PHONO MOTOR SOCKET
EXTERNAL AM. ANT. IF USED
GROUND



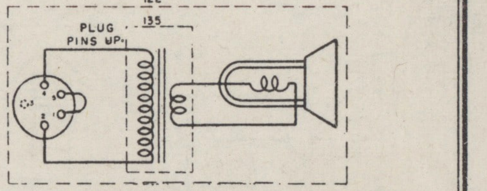
**Model 86CR Uses Walnut Cabinet**
**Model 86CS Uses Mahogany Cabinet**

## TUBE COMPLEMENT

| Type | Function |
|---|---|
| 6AC7 | 1st A.M. Mixer—FM Mixer |
| 7F8 | 1st and 2nd A.M. OSC.—<br>F.M. OSC. |
| 6SG7 | 2nd A.M. Mixer—<br>1st I. F. Ampl. F.M. |
| 6SG7 | I. F. Ampl. A. M.,<br>2nd I. F. Ampl. F. M. |
| 6H6 | F. M. Detector (Discriminator) |
| 6SQ7 | A. M. Det. AVC,<br>1st A. F. Ampl. |
| 6V6 GT/G | Output |
| 5Y3 GT/G | Rectifier |

**TYPE:** Eight-tube, three-band, Superheterodyne.

**FREQUENCY RANGE:** American Broadcast Band, 540 to 1600 kc. (Selector Switch at AM position). Overseas Short-Wave Band: 9.45 to 11.9 mc. (Selector Switch at SW position). Frequency Modulated Band: 88.1 to 107.9 mc. Channel 201 to 300 (Selector Switch at FM position).


122
135
PLUG PINS UP

**INTERMEDIATE FREQUENCY:** Broadcast Band: 167.5 and 5825 kc

**FREQUENCY MODULATION BAND:** 10.7 mc.

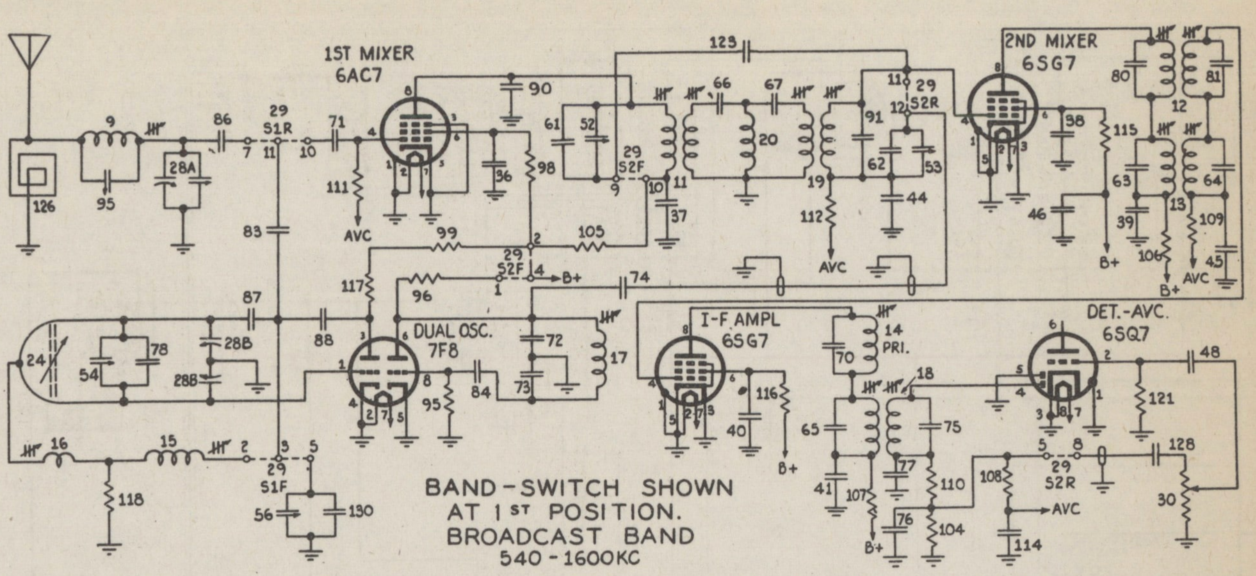
**POWER SUPPLY:** 60 cycle a.c. only.

**VOLTAGE RATING:** 105-125 volts.

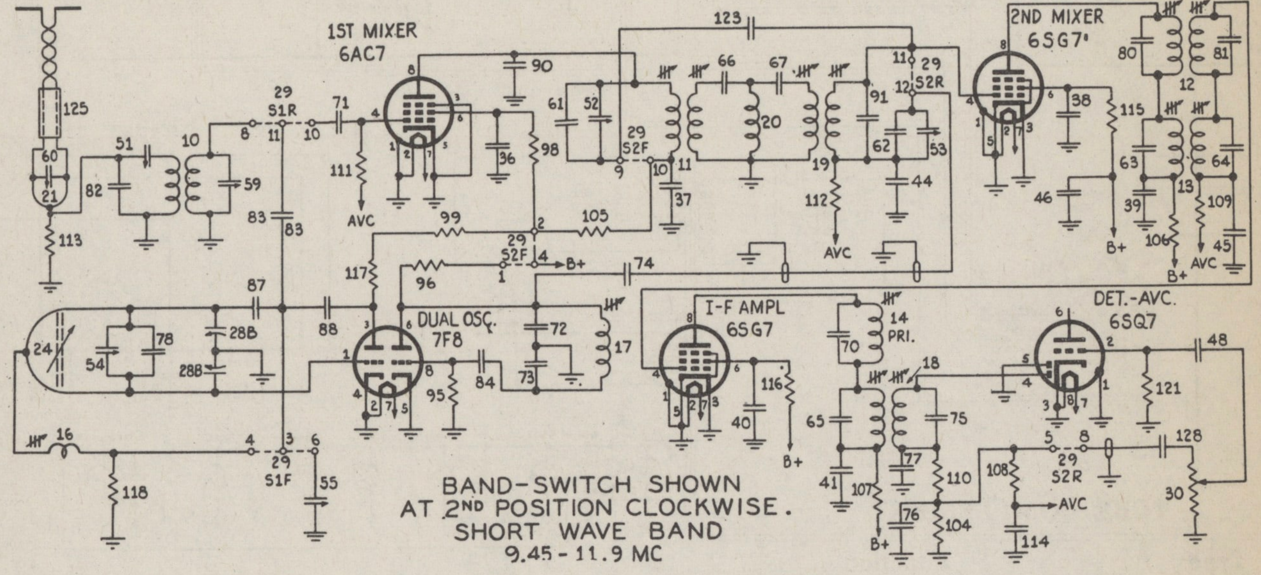
**POWER CONSUMPTION:** 85 watts maximum at normal power supply voltage (117), 20 watts additional for record changer.

**POWER OUTPUT:** 80 watts minimum at 3.2, ohm load.

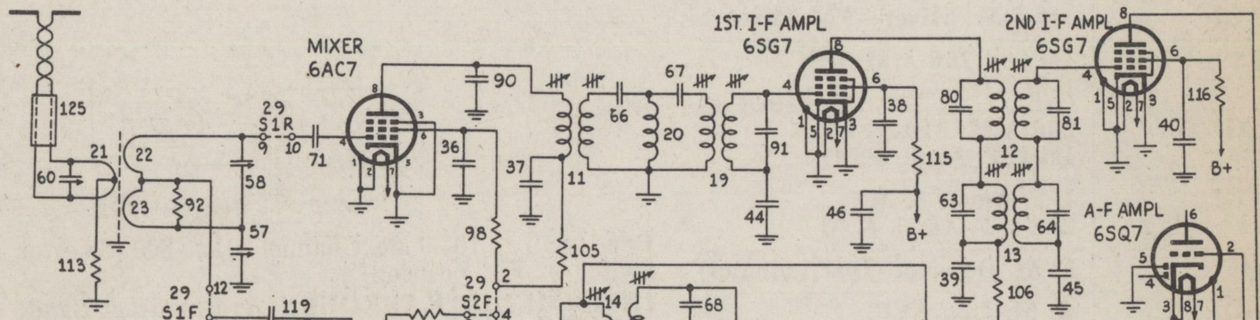
# CROSLEY DIV.
# AV CO MFG. CORP.


1ST MIXER
6AC7
DUAL OSC.
7F8
2ND MIXER
6SG7
I-F AMPL
6SG7
DET.-AVC.
6SQ7
AVC
B+
29
S1R
S1F
S2F
S2R
14
PRI.
123
126
24
16
15
118
56
130

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1600KC


1ST MIXER
6AC7
DUAL OSC.
7F8
2ND MIXER
6SG7
I-F AMPL
6SG7
DET.-AVC.
6SQ7
AVC
B+
29
S1R
S1F
S2F
S2R
125
60
21
113
14
PRI.
55

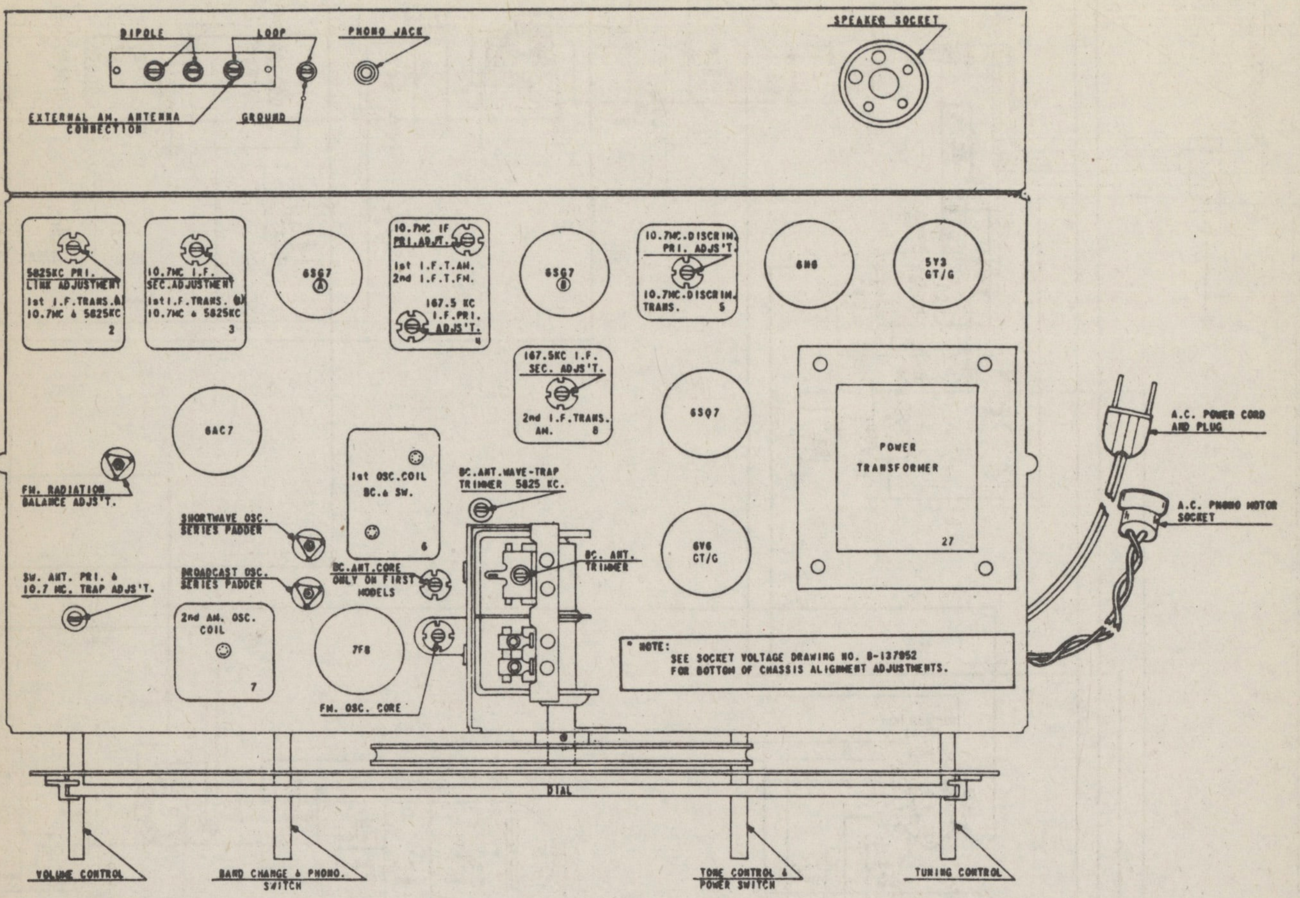
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND
9.45-11.9 MC


MIXER
6AC7
OSC.
7F8
1ST. I-F AMPL
6SG7
2ND I-F AMPL
6SG7
A-F AMPL
6SQ7
F-M DET.
6H6
18
PRI.
B+
29
S1R
S1F
S2F
S2R

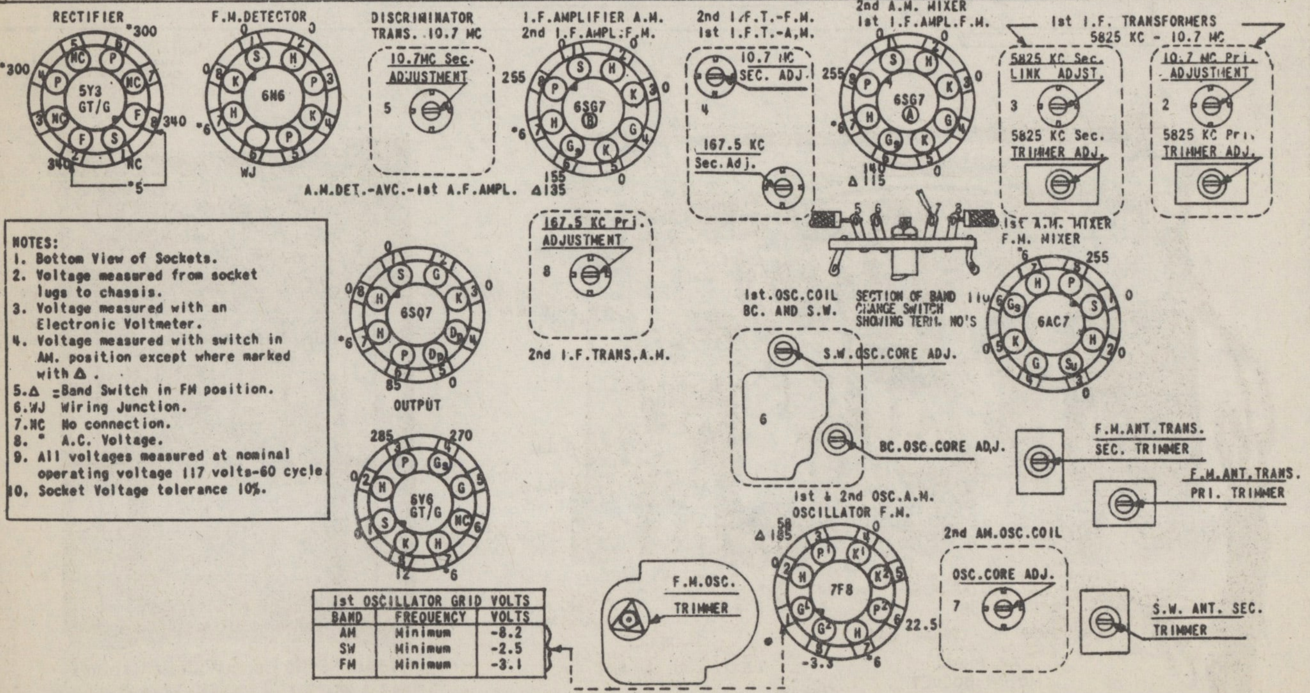
BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
F M BAND
88.1-107.9MC

**MODELS 86CR,86CS**

# CROSLEY DIV.
# AVCOMFG. CORP.


DIPOLE
LOOP
PHONO JACK
SPEAKER SOCKET
EXTERNAL AM. ANTENNA CONNECTION
GROUND
5825KC PRI. LINK ADJUSTMENT
1st I.F.TRANS.A) 10.7MC & 5825KC 2
10.7MC I.F. SEC.ADJUSTMENT
1st I.F.TRANS. B) 10.7MC & 5825KC 3
6SG7 A
10.7MC IF PRI.ADJ'T.
1st I.F.T.AM.
2nd I.F.T.FM.
167.5 KC I.F.PRI. ADJS'T. 4
6SG7 B
10.7MC.DISCRIM. PRI. ADJS'T.
10.7MC.DISCRIM. TRANS. 5
6H6
5Y3 GT/G
167.5KC I.F. SEC. ADJS'T.
2nd I.F.TRANS. AM. 8
6AC7
6SQ7
A.C. POWER CORD AND PLUG
POWER TRANSFORMER 27
FM. RADIATION BALANCE ADJS'T.
1st OSC.COIL BC.& SW. 6
BC.ANT.WAVE-TRAP TRIMMER 5825 KC.
A.C. PHONO MOTOR SOCKET
SHORTWAVE OSC. SERIES PADDER
BC. ANT. TRIMMER
6V6 GT/G
SW. ANT. PRI. & 10.7 MC. TRAP ADJS'T.
BROADCAST OSC. SERIES PADDER
BC.ANT.CORE ONLY ON FIRST MODELS
2nd AM. OSC. COIL 7
7F8
FM. OSC. CORE
* NOTE: SEE SOCKET VOLTAGE DRAWING NO. 8-137952 FOR BOTTOM OF CHASSIS ALIGNMENT ADJUSTMENTS.
DIAL
VOLUME CONTROL
BAND CHANGE & PHONO. SWITCH
TONE CONTROL & POWER SWITCH
TUNING CONTROL

## SOCKET VOLTAGE CHART


RECTIFIER
5Y3 GT/G
*300
*300
340
340
NC
*5
F.M.DETECTOR
6H6
WJ
DISCRIMINATOR TRANS. 10.7 MC
10.7MC Sec. ADJUSTMENT
5
I.F.AMPLIFIER A.M. 2nd I.F.AMPL.F.M.
6SG7 B
255
155
Δ135
A.M.DET.-AVC.-1st A.F.AMPL.
2nd I.F.T.-F.M. 1st I.F.T.-A.M.
10.7 MC SEC. ADJ.
4
167.5 KC Sec.Adj.
2nd A.M. MIXER 1st I.F.AMPL.F.M.
6SG7 A
255
140
Δ115
1st I.F. TRANSFORMERS 5825 KC - 10.7 MC
5825 KC Sec. LINK ADJST.
3
5825 KC Sec. TRIMMER ADJ.
10.7 MC Pri. ADJUSTMENT
2
5825 KC Pri. TRIMMER ADJ.
167.5 KC Pri. ADJUSTMENT
8
2nd I.F.TRANS.A.M.
6SQ7
85
OUTPUT
6V6 GT/G
285
270
12
1st.OSC.COIL BC. AND S.W.
SECTION OF BAND CHANGE SWITCH SHOWING TERM. NO'S
S.W.OSC.CORE ADJ.
6
BC.OSC.CORE ADJ.
1st A.M. MIXER F.M. MIXER
6AC7
255
F.M.ANT.TRANS. SEC. TRIMMER
F.M.ANT.TRANS. PRI. TRIMMER
1st & 2nd OSC.A.M. OSCILLATOR F.M.
7F8
Δ185
58
22.5
-3.3
2nd AM.OSC.COIL
OSC.CORE ADJ.
7
F.M.OSC. TRIMMER
S.W. ANT. SEC. TRIMMER

NOTES:
1. Bottom View of Sockets.
2. Voltage measured from socket lugs to chassis.
3. Voltage measured with an Electronic Voltmeter.
4. Voltage measured with switch in AM. position except where marked with Δ.
5. Δ = Band Switch in FM position.
6. WJ Wiring Junction.
7. NC No connection.
8. * A.C. Voltage.
9. All voltages measured at nominal operating voltage 117 volts-60 cycle.
10. Socket Voltage tolerance 10%.

| 1st OSCILLATOR GRID VOLTS | | |
|---|---|---|
| BAND | FREQUENCY | VOLTS |
| AM | Minimum | -8.2 |
| SW | Minimum | -2.5 |
| FM | Minimum | -3.1 |

# CROSLEY DIV.
# AVCOMFG. CORP.

## ALIGNMENT CHART (Output Meter Method)

| Alignment Sequence | Signal Frequency | Generator Output in Series with | To | Position of Range Tuning Dial Switch or Tuning Cap. | | Adjust | Osc. Freq. | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1. | 167.5 KC. | 0.1 MFD | 2nd I.F. Grid 6SG7 B | S. W. | Open | 2nd I.F. Trans. 8 | ........ | .................. |
| 2. | 167.5 KC. | 0.1 MFD | 1st I.F. Grid 6SG7 A | S. W. | Open | 1st I.F. Trans. 4 | ........ | .................. |
| 3. | 10.7 MC. | 30 MMF | 2nd I.F. Grid 6SG7 B | F. M. | Open | Discriminator Trans. 5 | ........ | .................. |
| 4. | 10.7 MC. | 30 MMF | 1st I.F. Grid 6SG7 A | F. M. | Open | 2nd I.F. 10.7 Trans. 4 | ........ | .................. |
| 5. | 10.7 MC. | 30 MMF | See Procedure | F. M. | Open | 1st I.F. 10.7 Trans. 2 & 3 | ........ | Signal Generator Ground Connection as Short as Possible |
| 6. | 5825 KC. | 30 MMF | 1st I.F. Grid 6SG7 A | S. W. | Open | 2nd A.M. Osc. Core 7 | 167.5 KC. Above | .................. |
| 7. | 5825 KC. | 30 MMF | *Link Coupling on 10.7 I.F. 2 | S. W. | Open | 5825 KC. I.F. Trans. 3 | 167.5 KC. Above | *Short Lead Between Transformers 2 & 3 |
| 8. | 5825 KC. | 30 MMF | 6AC7 Grid | S. W. | Open | 5825 KC. I.F. Trans. 2 | 167.5 KC. Above | .................. |
| 9. | 100 MC. | 78 ohm Dummy | F.M. Dipole Ant. Terms. | F. M. | Channel 261 | Osc. Core & Trim. F.M. Ant. Trims. Pri. & Sec. | 10.7 MC. Above | See Circuit Under the Title "Alignment Equipment" |
| 10. | 87.9 MC. | 78 ohm Dummy | F.M. Dipole Ant. Terms. | F. M. | Closed | F.M. Osc. Core | 10.7 MC. Above | .................. |
| 11. | 107.9 MC. | 78 ohm Dummy | F.M. Dipole Ant. Terms. | F. M. | Channel 300 | F.M. Osc. Trimmer | 10.7 MC. Above | .................. |
| 12 | Disconnect Generator Connect Field Strength Meter | | | F. M. | Channel 215 | Radiation Bal. Trimmer (Null Point) | ........ | See Paragraph on Field Strength Meter, Under "Alignment Equip." |
| 13. | 9.6 MC. | 30 MMF | One FM. Ant. Term. | S. W. | 9.6 MC. | S.W. Oscillator Series Padder | 5825 KC. Above | Disconnect Field Strength Meter Connect Signal Generator |
| 14. | 11.8 MC. | 30 MMF | One FM. Ant. Term. | S. W. | 11.8 MC. | S. W. Oscillator Core | 5825 KC. Above | .................. |
| 15. | 10.7 MC. | 30 MMF | One F.M. Ant. Term. | S. W. | 10.7 MC. | S. W. Ant. Pri. & Sec. Padder | ........ | .................. |
| 16. | 10.7 MC. | 30 MMF | One F.M. Ant. Term. | F. M. | 10.7 MC. | S. W. Primary (10.7 MC. Trap) | ........ | Adjust for Null Point |
| 17. | 535 KC. | 30 MMF | Hi. Side of Dummy Loop | B. C. | Closed | B. C. Oscillator Series Padder | 5825 KC. Above | .................. |
| 18. | 1620 KC. | 30 MMF | Hi. Side of Dummy Loop | B. C. | Open | B. C. Oscillator Core | 5825 KC. Above | .................. |
| 19. | 1400 KC. | 30 MMF | Hi. Side of Dummy Loop | B. C. | 1400 KC. | B. C. Antenna Trimmer | ........ | .................. |
| 20. | 600 KC. | 30 MMF | Hi. Side of Dummy Loop | B. C. | 600 KC. | B. C. Antenna Core | ........ | First Models Only. Omitted in Later Mod |
| 21. | 5825 KC. | 30 MMF | Hi. Side of Dummy Loop | B. C. | 1400 KC. | B. C. Wave Trap Trimmer | ........ | Adjust for Null Point |

CROSLEY DIV.
AVCOMFG. CORP.

## ALIGNMENT PROCEDURE

1. This receiver has been aligned at the factory for best performance, and no attempt should be made to re-align this receiver unless the proper test equipment is available.
2. Turn the tuning condenser to full mesh, against stop, and set the dial pointer to reference point which is Channel 200 on the dial.
3. Set tone control knob to the treble position, (extreme right).
4. When output meter is used, connect across voice coil: (3.2 ohms).
5. Feed an R. F. Signal modulated 30% at 400 cycles to the receiver as indicated on the alignment chart; connect signal generator ground terminal to the chassis of the receiver, except where noted.
6. When F. M. Signal generator is used, a 30% modulated signal is equal to 22.5 kilocycles deviation.
7. Turn volume control knob to maximum clockwise position and adjust signal generator output to produce a noticeable output meter reading, (approx. 500 mw.) Keep signal generator output as low as possible to prevent excessive AVC action in the receiver.
8. The low impedance "Signal Web" antenna should remain connected at all times.

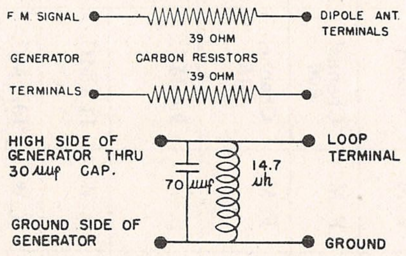
## ALIGNMENT EQUIPMENT

**FOR OUTPUT METER ALIGNMENT**

Signal Generator AM with 400 cycle modulated signal to cover 167.5 KC to 108 MC.
Suitable output meter.
Field strength meter.

**DUMMY ANTENNAS TO BE USED WITH GENERATOR OUTPUT:**

0.1 mfd. condenser
30 mmf. condenser
78 ohm dummy antenna (2) 39 ohm carbon resistors)



**DUMMY LOOP ANTENNA:**

14.7 uh inductance shunted by a 70 uuf condenser (to replace low impedance "Signal Web" when chassis is removed from cabinet.

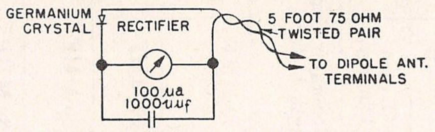
**SHUNTS:**

5000 ohm carbon resistor in series with a 0.1 mfd. condenser.
Hairpin shorting shunt composed of 2" of No. 14 bare tinned wire.

**FIELD STRENGTH METER:**

The Field Strength Meter may consist of a D. C. 100 microampere (full scale) meter shunted by a 1000 uf mica by-pass condenser; a crystal rectifier is connected in series with the meter and a five foot, 75 ohm twisted pair for leads. The open end of the twisted pair is connected to the dipole antenna terminals. Circuit for the field strength meter is given below:

NOTE: Connect condenser directly across meter terminals and crystal directly to one meter terminal, so leads are as short as possible.



## OUTPUT METER ALIGNMENT

Use this procedure in conjunction with alignment chart. Sequence numbers correspond to numbers on alignment chart. Refer to alignment chart first for connection of signal generator and control settings, then follow procedure

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**167.5 KC I. F. TRANSFORMER ALIGNMENT: (For maximum output)**

1. (a) Shunt primary of transformer No. 8 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from ground to link between transformers No. 5 and 8. Adjust secondary of 2nd I. F. Transformer No. 8 (above chassis).
   (b) Shunt secondary of transformer No. 8 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from diode plate (Pin No. 4) of the 6SQ7 to shielded lead junction on transformer and adjust primary of 2nd I. F. Transformer No. 8 (bottom of chasis).
2. (a) Connect signal generator to grid of 1st I. F. 6SG7 (A).
   (b) Shunt primary of transformer No. 4 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from plate of the 6SG7 (A) to the transformer side of the 2200 ohm resistor (106). Adjust secondary of 1st I. F. Transformer No. 4 (bottom of chasis).
   (c) Shunt secondary of transformer No. 4 with a 5000 ohm resistor in series with a 0.1 mfd. condenser from the grid of the 6SG7 (B) to transformer side of the 68,000 ohm resistor (109). Adjust primary of 1st I. F. Transformer No. 4 (top of chasis).

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**10.7 MC. DISCRIMINATOR TRANSFORMER ALIGNMENT:**

3. (a) Adjust discriminator transformer No. 5 secondary (bottom of chassis) padder for null point.
   (b) Tune signal generator for maximum output meter reading, approximately 75 to 100 KC. off of the 10.7 megacycle null point and note output meter reading. Retune signal generator to the opposite side of the 10.7 megacycle null point to maximum reading on the output meter reading. If the two readings are not equal, adjust discriminator primary padder until equal output meter readings and equal peak spacing are obtained on both sides of the 10.7 megacycle null point.

---

**10.7 MC. I. F. TRANSFORMER ALIGNMENT:**

4. (a) Set signal generator to peak on high side of 10.7 MC. and adjust 10.7 MC. primary (top) and secondary (bottom) of transformer No. 4 for maximum output and note output meter reading.
   (b) Set signal generator to peak on low side of 10.7 MC. and note output meter reading. If readings are unequal, readjust primary and secondary slightly until output meter readings and peak spacings are equal on both sides of the 10.7 MC. null point.
5. (a) Connect signal generator output to either lug of the F.M. ANTENNA Transformer Primary Trimmer (60). Connect signal generator ground to the receiver chassis at a point close to the trimmer to keep lead lengths to a minimum. Shielded cable of generator output should not be draped near under side of chassis.
   (b) Set signal generator to peak on high side of 10.7 MC. and adjust 10.7 MC. primary on transformer No. 2 (bottom of chassis), and 10.7 MC. secondary on transformer No. 3 (top of chassis) for maximum output, and note reading on output meter.
   (c) Set signal generator to peak on low side of 10.7 MC. and note output meter reading. If meter readings are not equal, readjust primary and secondary until equal readings are obtained on the peaks on both sides of 10.7 MC. Peaks should appear approximately 80 KC. on each side of 10.7 MC.

---

**5825 KC. I. F. TRANSFORMER ALIGNMENT:**

6. (a) Turn core adjustment screw on bottom of 2nd A. M. Oscillator Coil No. 7 until core is out of coil. DO NOT USE FORCE.
   (b) Turn core adjustment in until first peak (maximum output) is obtained.
7. (a) Connect signal generator output to link coupling (see chart).
   (b) Adjust 5825 KC. secondary trimmer and 5825 KC. secondary link adjustment on bottom of 1st I. F. Transformer No. 3 and retune 2nd A. M. Oscillator coil No. 7; adjust alternately for maximum output.
8. (a) Connect signal generator output to 6AC7 grid (see chart).
   (b) Adjust 5825 KC. primary trimmer on bottom and 5825 KC. primary link adjustment on top of 1st I. F. Transformer No. 2 for maximum output.

# CROSLEY DIV.
# AVCOMFG. CORP.

### FREQUENCY MODULATED BAND ALIGNMENT:

9. (a) Pre-set F. M. Oscillator iron core (131) located on the top of the chassis to midway position.
   (b) Pre-set F. M. radiation balance adjustment (57) on top of the chassis to approximately two turns from the closed position.
   (c) Set signal generator to 100 megacycles A. M. modulated at 400 cycles.
   (d) Set dial pointer to channel 261 (100 MC).
   (e) Adjust F. M. oscillator trimmer (54) (bottom of chassis) to maximum output (on sets without oscillator trimmer, adjust oscillator core) but keep signal generator output as low as possible.
   (f) Short circuit F. M. Antenna primary trimmer (60) with hairpin shorting shunt.
   (g) Adjust F. M. Antenna secondary trimmer (58) on bottom of chassis for maximum output.
   (h) Transfer shorting shunt to F. M. Antenna secondary trimmer (58), and adjust F. M. Antenna primary trimmer (60) for maximum output.
   (i) Remove shorting shunt.

NOTE: ON SETS WITHOUT OSCILLATOR TRIMMER CONDENSER, OMIT STEPS 10 AND 11.

10. (a) Set signal generator to 87.9 MC. amplitude modulated at 400 cycles.
    (b) If set does not tune to 87.9 MC. (Channel 200) adjust F. M. Oscillator core in slowly until 87.9 MC. signal is tuned in.
11. (a) Set signal generator to 107.9 MC. amplitude modulated at 400 cycles.
    (b) Set dial pointer to channel 300 and adjust F. M. Oscillator trimmer (54) for maximum output.
    (c) Repeat steps 10 and 11 until frequency shift stops.

NOTE: TOO MUCH COVERAGE ON F. M. BAND INDICATES CAPACITY OF OSCILLATOR TRIMMER CONDENSER SET TOO HIGH.

### F. M. RADIATION BALANCE ADJUSTMENT:

12. (a) Disconnect signal generator and connect Field Strength Meter to the dipole antenna terminals. (See paragraph on Field Strength Meter under title "Alignment Equipment".
    (b) Set dial pointer to channel 215.
    (c) Adjust F. M. Radiation Balance Trimmer (57) (on top of chassis) to null point. If this trimmer adjustment is changed more than a quarter turn repeat step 9 (f) to (i), and 12.

### SHORTWAVE ALIGNMENT:

13. (a) Set signal generator to 9.6 MC. Amplitude Modulated at 400 cycles.
    (b) Turn volume control to maximum.
    (c) Adjust shortwave oscillator series padder (55) on top of chassis for maximum output with dial pointer set at 9.6 MC.
14. (a) Set signal generator to 11.8 MC. Amplitude Modulated at 400 cycles.
    (b) Set dial pointer to 11.8 MC.
    (c) Adjust shortwave oscillator core on bottom of chassis for maximum output.
    Repeat steps 13 (a) and (c) and 14 (a), (b) and (c) until dial tracks at 9.6 and 11.8 MC.
15. (a) Set signal generator to 10.7 MC. Amplitude Modulated at 400 cycles.
    (b) Shunt shortwave Antenna Primary Padder (51) (lug connected to coil) to chassis with shorting clip.
    (c) Retune set to 10.7 MC. signal, increase signal generator output if necessary.
    (d) Adjust shortwave antenna secondary trimmer (59) for maximum output while rocking gang.
    (e) Remove shorting clip.
    (f) Shunt across shortwave antenna secondary trimmer (59) with shorting clip.
    (g) Retune radio to 10.7 MC. signal, increase signal generator output, if necessary.
    (h) Adjust SW. antenna primary padder (51) (top of chassis) for maximum output while rocking gang.
    (i) Remove shorting clip.

### WAVE TRAP ADJUSTMENT (10.7 MC.):

16. (a) Turn band switch to F. M. position.
    (b) Connect field strength meter from signal generator side of 30 mmf. cond. to chassis.
    (c) Increase or decrease signal generator output until field strength meter reads between 10 and 15 microvolts.
    (d) Adjust SW. Antenna primary padder (51) for lowest reading on Field Strength Meter. Make this adjustment slowly, otherwise the dip may be passed unnoticed when a highly damped meter is used.
    (e) Disconnect Field Strength Meter.

### BROADCAST BAND ALIGNMENT:

17. (a) Connect dummy loop (14.7 uh) to Signal Web terminal and ground terminal.
    (b) Connect Signal Generator in series with a 30 mmf. condenser to high side of dummy loop.
    (c) Preset Broadcast Antenna Wave Trap (85) on top of chassis to approximately two turns from the closed position.
    (d) Set signal generator to 535 KC. Amplitude Modulated.
    (e) Set dial pointer to 535 KC. (tuning condenser gang closed).
    (f) Adjust Broadcast Oscillator Series Padder (56), on top of chassis, for maximum output.
18. (a) Set signal generator to 1620 KC.
    (b) Set dial pointer to 1620 KC. (tuning condenser gang to minimum capacity, but not against stop).
    (c) Adjust Broadcast Oscillator core on the bottom of chassis for maximum output.
    (d) Repeat steps 17 (d) to 18 (c) until frequency shift stops.
19. (a) Set signal generator to 1400 KC.
    (b) Tune receiver to 1400 KC. maximum output.
    (c) Adjust Broadcast Antenna Trimmer on top of tuning condenser gang for maximum output.
20. (a) Set signal generator to 600 KC.
    (b) Tune receiver to 600 KC. maximum output.
    (c) Adjust Broadcast Antenna Core (132), on top of chassis, for maximum output while rocking gang.

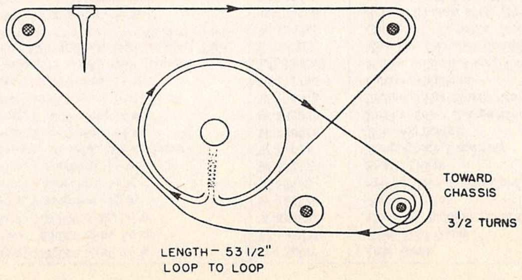
NOTE: B. C. ANTENNA CORE IN FIRST MODELS ONLY. OMIT STEP 20 WHEN ALIGNING LATER MODELS.

### 5825 KC. WAVE TRAP ADJUSTMENTS:

21. (a) Set signal generator to 5825 KC. Amplitude Modulated.
    (b) Set dial pointer to approximately 1400 KC. and retune signal generator to maximum output.
    (c) Adjust signal generator output to approximately midscale reading on output meter.
    (d) Adjust Broadcast Antenna Wave Trap Trimmer (85) for lowest reading on output meter.

NOTE: All air trimmers should be locked in position by applying a drop of household cement on the screw threads.

ARRANGEMENT OF DIAL DRIVE CORD
GANG IN CLOSED POSITION



# CROSLEY DIV.
# AV COMFG. CORP.

| Item No. | Part No. | Description |
|---|---|---|
| 1 | AC-136171 | Transformer Assy. (F. M. Antenna) |
| 2 | AC-136264 | Transformer, 10.7 MC. and 5.825 MC. I. F. (A) |
| 3 | AC-136081 | Transformer, 10.7 MC. and 5.825 MC. I. F. (B) |
| 4 | AC-136276 | Transformer, 10.7 MC and 167.5 KC. I.F. |
| 5 | AC-136260 | Transformer, 10.7 MC. Discriminator |
| 6 | AC-136509 | Coil Assy., 1st Oscillator (B.C. & S.W.) |
| 7 | AC-136390 | Coil Assy., 2nd Oscillator |
| 8 | AC-136261 | Transformer, 167.5 KC., Diode |
| 9 | AW-136511 | Coil, B.C., Antenna |
| 10 | AB-136444 | Coil Assy., S.W. Antenna |
| 11 | Part of Item #2 | Coil Assy. |
| 12 | Part of Item #4 | Coil Assy. |
| 13 | Part of Item #4 | Coil Assy. |
| 14 | Part of Item #5 | Coil Assy. |
| 15 | Part of Item #6 | Coil Assy. |
| 16 | Part of Item #6 | Coil Assy. |
| 17 | Part of Item #7 | Coil Assy. |
| 18 | Part of Item #8 | Coil Assy. |
| 19 | Part of Item #3 | Coil Assy. |
| 20 | Part of Item #3 | Coil Assy. |
| 21 | Part of Item #1 | Coil Assy. |
| 22 | Part of Item #1 | Coil Assy. |
| 23 | Part of Item #1 | Coil Assy. |
| 24 | W-136179 | Coil, F.M. Oscillator |
| 25 | 39001-17 | Condenser, .05 mfd., 600v., paper |
| 26 A | B-137028 | Condenser, 20 mfd., 400v. } Four |
| 26 B | | Condenser, 30 mfd., 350v. } Section |
| 26 C | | Condenser, 20 mfd., 300v. } Elect. |
| 26 D | | Condenser, 20 mfd., 25v. } Filter |
| 27 | B-135336 | Transformer, Power |
| 28 A | C-135946 | Condenser, Variable } Two |
| 28 B | | Condenser, Variable } Section |
| 29 | C-136161 | Switch, Band Change |
| 30 | B-135783 | Control, Volume (3 megohm, Tapped 720,000 ohm) |
| * | 39368-22 | Control (Volume) |
| * | 39370-2 | Shaft (Knurled Plug-in) |
| 31 A | B-135784 | Control, Tone } Assy. |
| 31 B | | Switch, Power } |
| 32 A | W-48858 | Bulb (Dial), Type 47, 6.3v., 15 amp. |
| 32 B | W-48858 | Bulb (Dial), Type 47, 6.3v., 15 amp. |
| 33 | C-132300-2 | Cable and Plug, Power- |
| 34 | 39001-7 | Condenser, .001 mfd., 600v., paper |
| 35 | 39001-13 | Condenser, .01 mfd., 600v., paper |
| 36 | 39001-11 | Condenser, .005 mfd., 600v., paper |
| 37 | 39001-11 | Condenser, .005 mfd., 600v., paper |
| 38 | 39001-11 | Condenser, .005 mfd., 600v., paper |
| 39 | 39001-11 | Condenser, .005 mfd., 600v., paper |
| 40 | 39001-11 | Condenser, .005 mfd., 600v., paper |
| 41 | 39001-11 | Condenser, .005 mfd., 600v., paper |
| 42 | 39001-11 | Condenser, .005 mfd., 600v., paper |
| 43 | 39001-11 | Condenser, .005 mfd., 600v., paper |
| 44 | 39001-11 | Condenser, .005 mfd., 600v., paper |
| 45 | 39001-11 | Condenser, .005 mfd., 600v., paper |
| 46 | 39001-13 | Condenser, .01 mfd., 600v., paper |
| 47 | 39001-13 | Condenser, .01 mfd., 600v., paper |
| 48 | 39001-17 | Condenser, .05 mfd., 600v., paper |
| 49 | 39001-17 | Condenser, .05 mfd., 600v., paper |
| 50 | 39001-76 | Condenser, .003 mfd., 600v., paper |
| 51 | C-137219-1 | Condenser, Trimmer (S. W. Ant. Prim.) |
| 52 | Part of Item #2 | Condenser, Trimmer (5.825 mc. Primary) |

| Item No. | Part No. | Description |
|---|---|---|
| 53 | Part of Item #3 | Condenser, Trimmer (5.825 mc. Secondary) |
| 54 | W-136964 | Condenser, Air Trimmer (F.M. Osc.) |
| 55 | W-136964 | Condenser, Air Trimmer (S. W. Osc. Series, Padder) |
| 56 | W-136964 | Condenser, Air Trimmer (B. C. Osc. Series, Padder) |
| 57 | W-136964 | Condenser, Air Trimmer (F.M. Radiation Balance |
| 58 | Part of Item #1 | Condenser, Trimmer (F.M. Ant. Secondary) |
| 59 | Part of Item#10 | Condenser, Trimmer (S.W. Ant. Secondary) |
| 60 | Part of Item #1 | Condenser, Trimmer (F.M. Ant. Primary) |
| 61 | Part of Item #2 | Condenser, 82 mmf., 300v., ceramic |
| 62 | Part of Item #3 | Condenser, 68 mmf., 300v., ceramic |
| 63 | Part of Item #4 | Condenser, 470 mmf., 300v., mica |
| 64 | Part of Item #4 | Condenser, 470 mmf., 300v., mica |
| 65 | Part of Item #8 | Condenser, 470 mmf., 300v., mica |
| 66 | Part of Item #2 | Condenser, 150 mmf., 500v., mica |
| 67 | Part of Item #3 | Condenser, 150 mmf., 500v., mica |
| 68 | Part of Item #5 | Condenser, 150 mmf., 500v., mica |
| 69 | Part of Item #5 | Condenser, 150 mmf., 500v., mica |
| 70 | Part of Item #5 | Condenser, 62 mmf., 500v., ceramic |
| 71 | B-226638-39 | Condenser, 120 mmf., 300v., ceramic |
| 72 | Part of Item #7 | Condenser, 120 mmf., 300v., ceramic |
| 73 | Part of Item #7 | Condenser, 120 mmf., 300v., ceramic |
| 74 | Part of Item #7 | Condenser, 4 mmf. (Transmission Line) |
| 75 | Part of Item #8 | Condenser, 1000 mmf., 500v., mica |
| 76 | GC-210685-182 | Condenser, 100 mmf., 500v., mica |
| 77 | Part of Item #8 | Condenser, 100 mmf., 500v., mica |
| 78 | W-136324 | Condenser, 50 mmf., 500v., ceramic |
| 79 | Part of Item #5 | Condenser, 12 mmf., 300v., ceramic |
| 80 | Part of Item #4 | Condenser, 33 mmf., 500v., ceramic |
| 81 | Part of Item #4 | Condenser, 33 mmf., 500v., ceramic |
| 82 | Part of Item #1 | Condenser, 30 mmf., 500v., mica |
| 83 | B-226638-49 | Condenser, 10 mmf., 300v., ceramic |
| 84 | B-226638-50 | Condenser, 27 mmf., 300v., ceramic |
| 85 | C-137219-3 | Condenser, Trimmer (B.C. Ant. Wave Trap) |
| 86 | B-226638-27 | Condenser, 82 mmf., 500v., ceramic |
| 87 | B-226638-51 | Condenser, 39 mmf., 300v., ceramic |
| 88 | B-226638-52 | Condenser, 91 mmf., 300v., ceramic |
| 89 | GC-210685-183 | Condenser, 50 mmf., 500v., mica |
| 90 | B-226638-35 | Condenser, 27 mmf., 500v., ceramic |
| 91 | Part of Item #3 | Condenser, 27 mmf., 500v., ceramic |
| 92 | Part of Item #1 | Resistor, 1,000 ohm, ½ w. |
| 93 | 39014-57 | Resistor, 470,000 ohm, ½ w. |
| 94 | 39014-57 | Resistor, 470,000 ohm, ½ w. |
| 95 | 39014-46 | Resistor, 56,000 ohm, ½ w. |
| 96 | 39014-58 | Resistor, 560,000 ohm, ½ w. |
| 97 | 39014-45 | Resistor, 47,000 ohm, ½ w. |
| 98 | 39014-50 | Resistor, 120,000 ohm, ½ w. |
| 99 | 39014-50 | Resistor, 120,000 ohm, ½ w. |
| 100 | 39015-17 | Resistor, 220 ohm, 1 w. |
| 101 | 39294-25 | Resistor, 100,000 ohm, ½ w. |
| 102 | 39294-25 | Resistor, 100,000 ohm, ½ w. |
| 103 | 39294-25 | Resistor, 100,000 ohm, ½ w. |
| 104 | 39294-27 | Resistor, 220,000 ohm, ½ w. |
| 105 | 39294-15 | Resistor, 2,200 ohm, ½ w. |
| 106 | 39294-15 | Resistor, 2,200 ohm, ½ w. |
| 107 | 39294-15 | Resistor, 2,200 ohm, ½ w. |

| Item No. | Part No. | Description |
|---|---|---|
| 108 | 39294-30 | Resistor, 680,000 ohm, ½ w. |
| 109 | 39294-24 | Resistor, 68,000 ohm, ½ w. |
| 110 | Part of Item #8 | Resistor, 68,000 ohm, ½ w. |
| 111 | 39294-31 | Resistor, 1 megohm, ½ w. |
| 112 | 39294-31 | Resistor, 1 megohm, ½ w. |
| 113 | Part of Item #1 | Resistor, 1 megohm, ½ w. |
| 114 | 39001-17 | Condenser, .05 mfd., 600v., paper |
| 115 | 39294-23 | Resistor, 47,000 ohm, ½ w. |
| 116 | 39014-42 | Resistor, 27,000 ohm, ½ w. |
| 117 | 39015-37 | Resistor, 10,000 ohm, 1 w. |
| 118 | 39014-41 | Resistor, 22,000 ohm, ½ w. |
| 119 | B-226638-59 | Condenser, 15 mmf., 500v., ceramic |
| 120 A | W-137021 | Resistor (Wirewound), 400ohm, 4w. } Two |
| 120 B | | Resistor (Wirewound), 700ohm, 4w. } Sect. |
| 121 | 39294-37 | Resistor, 10 megohm, ½ w. |
| 122 | C-135974 | Speaker & Transformer Assy. |
| 123 | AW-136911 | Condenser, 1.3 mmf. (Transmission Line) |
| 124 | 39019-3 | Terminal Board |
| 125 | W-137143 | Transmission Line, 75 ohm |
| 126 | AW-137220 | Loop Assy., Antenna |
| 128 | 39001-17 | Condenser, .05 mfd., 600v., paper |
| 129 | 39001-73 | Condenser, 250 mmf., 600 v., paper |
| 130 | B-226638-49 | Condenser, 10 mmf., 300v., ceramic |
| 131 | 39012-59 | Iron Core (F.M. Osc.) |
| 132 | 39012-60 | Iron Core (B.C. Ant.) |
| | W-136998 | Connector, Phone Pickup |
| 134 | W-137213 | Cable and Plug Assy., Phono. |
| 135 | B-138131-2 | Transformer (only), Output |
| | 39019-3 | Terminal Board |
| | W-134968-1 | Socket, Speaker |
| | 39232-5 | Socket, Tube (6AC7, 6SG7) |
| | W-136470 | Socket, Tube (7F8) |
| | 39232-7 | Socket, Tube (6H6) |
| | 39232-9 | Socket, Tube (6SQ7) |
| | 39232-3 | Socket, Tube (6V6GT/G) |
| | 39232-1 | Socket, Tube (5Y3GT/G) |
| | D-136565-12 | Socket, Dial Light |
| | W-211101 | Ring, Retaining (7F8 Socket) |
| | W-132366-2 | Nut, Locking (Iron Core) |
| | AC-136204 | Background, Dial |

| Part No. | Description |
|---|---|
| D-136252 | Dial Glass |
| W-136201 | Clip, Dial Glass |
| W-136853 | Cushion, Rubber (Dial Glass) |
| W-136176 | Pointer, Dial |
| W-51752 | Spring, Dial Drive Cord |
| W-136178 | Shaft, Drive |
| W-51071 | Ring, Shaft Retaining |
| W-134916 | Washer, Spring |
| W-136979 | Pulley, Idler (Large Stud) |
| W-135074 | Pulley, Idler (Small Stud) |
| W-131154-1 | Cotter, External |
| AB-136243 | Pulley & Hub Assy., Variable Condenser |
| C-136222 | Bracket, Variable Condenser Mtg. |
| W-134055 | Grommet, Variable Condenser Mtg. |
| 39172-200 | Screw, Chassis Mtg. (Front) |
| W-136111 | Mounting Rubber, Chassis (Front) |
| W-45580 | Mounting Rubber, Chassis (Rear) |
| W-137199 | Nut, Tee (Chassis Mtg.) |
| R-137010 | Cabinet (86CR) |
| R-137277 | Cabinet (86CS) |
| W-137201 | Pull, Drawer |
| W-137022 | Knob, 86CR (Band Switch, or Tone Control) |
| W-137350 | Knob, 86CS (Band Switch, or Tone Control) |
| W-135309 | Knob, 86CR (Dial Tuning, or Volume Control) |
| W-137349 | Knob, 86CS (Dial Tuning, or Volume Control) |
| D-134945-1 | Record Changer (Model "K") |
| AW-137338 | Shielded Wire & Plug Assy. (Phono.) |
| W-134956 | Nut, Tee (Record Changer Mtg.) |
| W-134966 | Nut, Spring Lock (Record Changer Mtg.) |
| AW-137232 | Screw and Washer Assy. (Record Changer Mtg.) |
| C-137173 | Album, 86CR (12" Record) |
| C-137295 | Album, 86CS (12" Record) |
| C-137236 | Album, 86CR (10" Record) |
| C-137294 | Album, 86CS (10" Record) |
| AB-134935 | Needle, Floating Jewel Assy. |

*These parts will replace the original equipment parts.

## CHANNEL NUMBERS TO MEGACYCLES

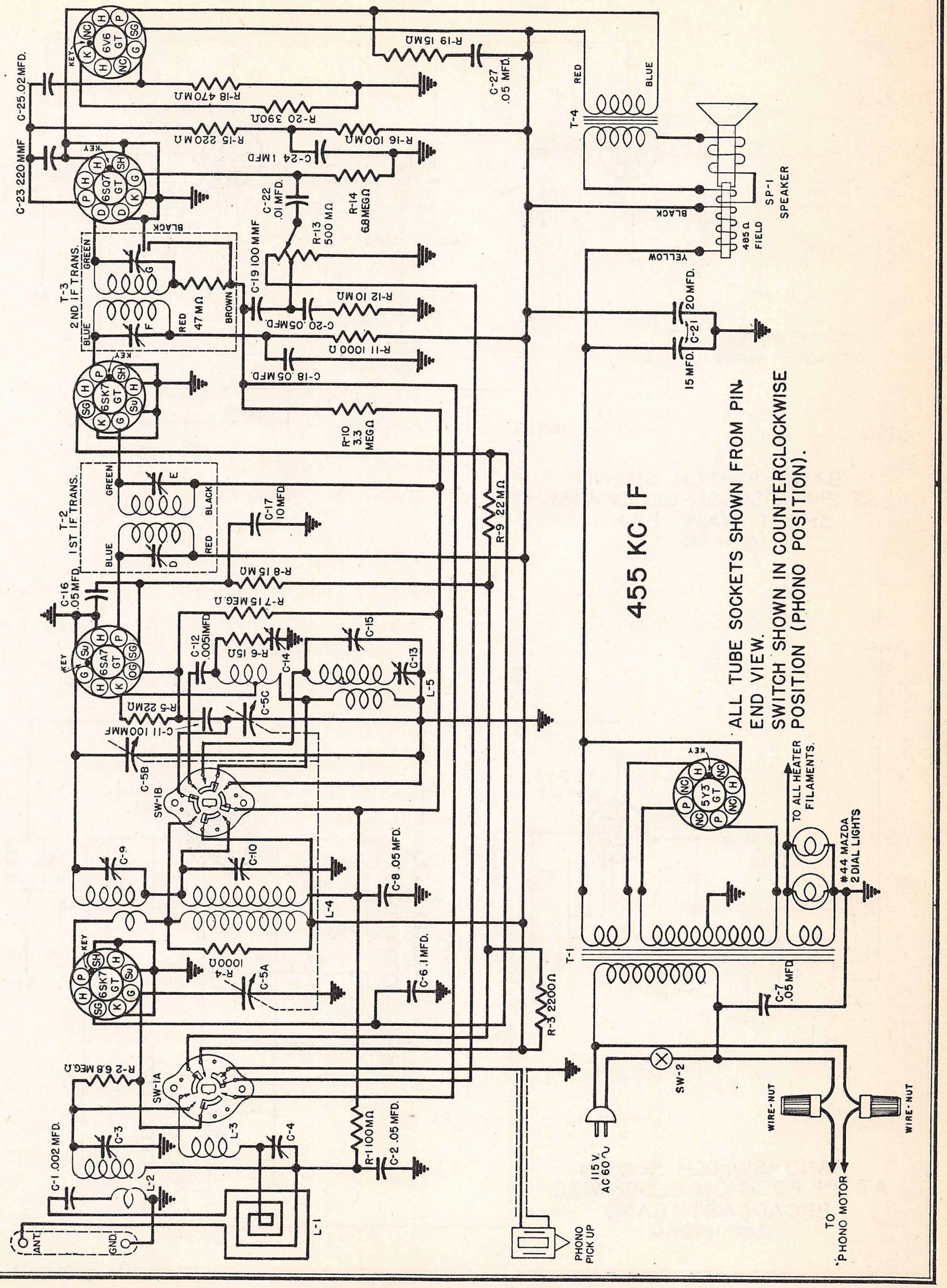
Cross index between channel calibrations on the dial and frequency in megacycles follow:

| Channel No. | Frequency in Megacycles | | |
|---|---|---|---|
| 200 | 87.9 | 255 | 98.9 |
| 205 | 88.9 | 260 | 99.9 |
| 210 | 89.9 | 265 | 100.9 |
| 215 | 90.9 | 270 | 101.9 |
| 220 | 91.9 | 275 | 102.9 |
| 225 | 92.9 | 280 | 103.9 |
| 230 | 93.9 | 285 | 104.9 |
| 235 | 94.9 | 290 | 105.9 |
| 240 | 95.9 | 295 | 106.0 |
| 245 | 96.9 | 300 | 107.9 |
| 250 | 97.9 | | |

To find the frequency in megacycles for CHANNEL NUMBERS between those given above, add .2 megacycle for every one added to the CHANNEL NUMBER; for example Channel 204 would be 88.7 megacycles and 251 would be 98.1 megacycles.

# INTERNATIONAL DETROLA CORP.

**MODEL 582**

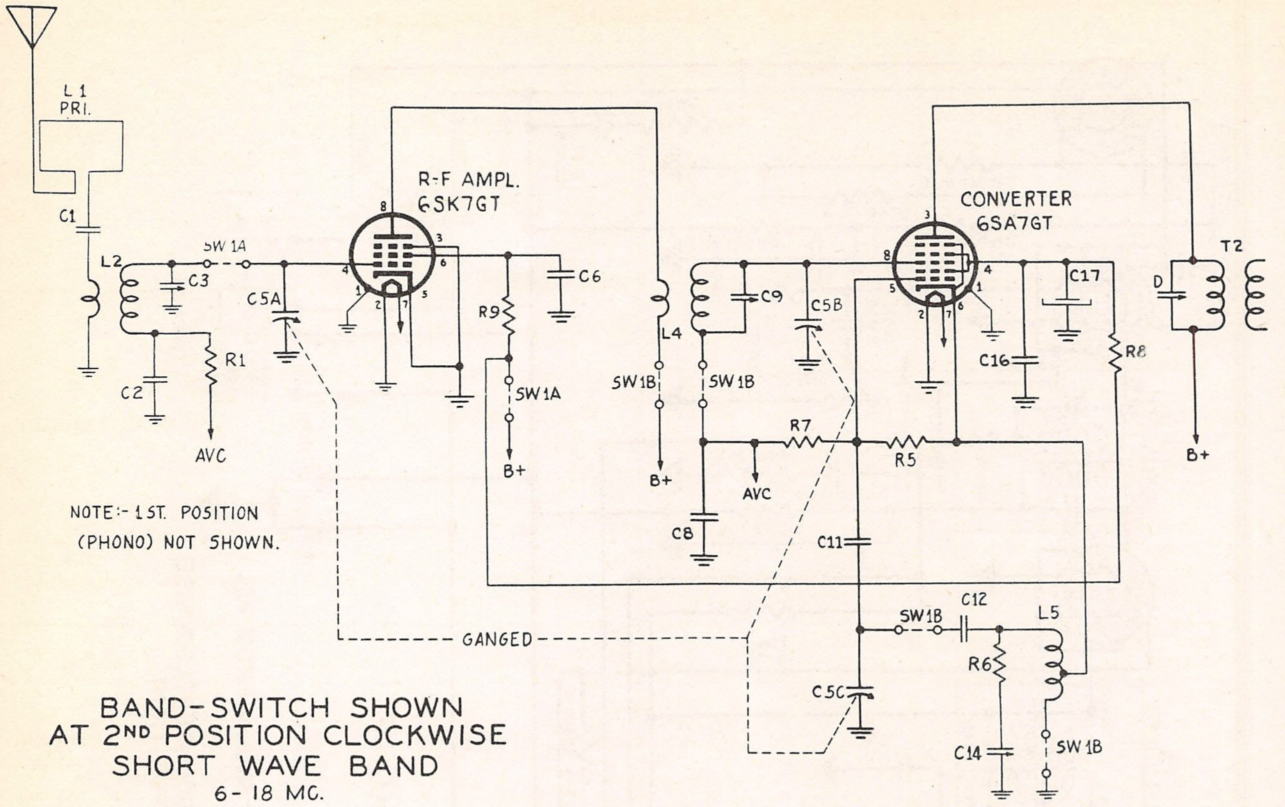

6V6 GT
6SQ7 GT
6SK7 GT
6SA7 GT
6SK7 GT
5Y3 GT
KEY
C-25 .02 MFD.
C-23 220 MMF
R-19 15MΩ
C-27 .05 MFD.
R-18 470MΩ
R-20 390Ω
R-15 220MΩ
R-16 100MΩ
C-24 .1MFD
C-22 .01 MFD.
R-14 6.8MEGΩ
R-13 500 MΩ
C-19 100 MMF
R-12 10MΩ
C-20 .05MFD.
R-11 1000 Ω
C-18 .05MFD.
R-10 3.3 MEGΩ
T-3 2ND IF TRANS.
GREEN
BLACK
BLUE
RED
BROWN
47 MΩ
T-4
RED
BLUE
SP-1 SPEAKER
485 Ω FIELD
YELLOW
20 MFD.
C-21
15 MFD
T-2 1ST IF TRANS.
C-17 .10 MFD.
R-9 22MΩ
R-8 15MΩ
C-16 .05 MFD.
R-7 15MEG.Ω
C-12 .0051MFD
R-6 15Ω
C-14
C-15
C-13
L-5
R-5 22MΩ
C-11 100MMF
C-5C
C-5B
SW-1B
C-9
C-10
C-8 .05 MFD.
L-4
R-4 1000Ω
C-5A
C-6 .1 MFD.
R-3 2200Ω
T-1
C-7 .05 MFD
TO ALL HEATER FILAMENTS.
#44 MAZDA 2 DIAL LIGHTS
R-2 6.8 MEG.Ω
SW-1A
SW-2
C-1 .002 MFD.
C-3
L-3
C-4
R-1 100MΩ
C-2 .05 MFD.
L-2
L-1
ANT
GND
PHONO PICK UP
115 V. AC 60 ∿
WIRE-NUT
WIRE-NUT
TO PHONO MOTOR

455 KC IF

ALL TUBE SOCKETS SHOWN FROM PIN END VIEW.
SWITCH SHOWN IN COUNTERCLOCKWISE POSITION (PHONO POSITION).

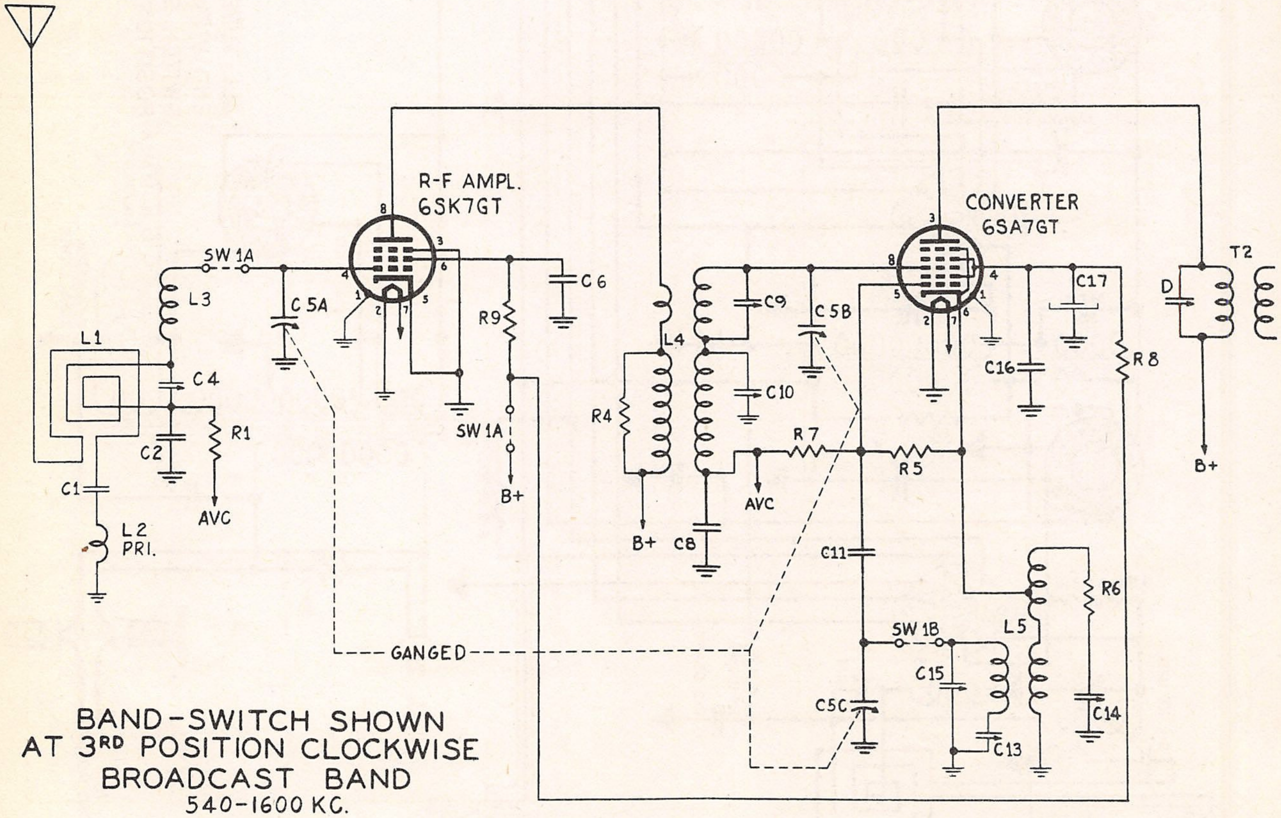
MODEL 582

## INTERNATIONAL DETROLA CORP.


L 1
PRI.
C1
L2
C3
SW 1A
C5A
R1
C2
AVC
R-F AMPL.
6SK7GT
8
3
6
4
1
2
7
5
R9
C6
SW 1A
B+
L4
SW 1B
B+
CONVERTER
6SA7GT
C9
C5B
SW 1B
R7
R5
AVC
C8
C11
C16
C17
R8
T2
D
B+
C12
SW 1B
L5
R6
C5C
C14
SW 1B
GANGED

NOTE:- 1ST. POSITION
(PHONO) NOT SHOWN.

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
6- 18 MC.


L3
SW 1A
C 5A
L1
C4
C2
R1
C1
L2
PRI.
AVC
R-F AMPL.
6SK7GT
8
3
6
4
1
2
7
5
R9
SW 1A
B+
C6
L4
R4
B+
C8
CONVERTER
6SA7GT
C9
C 5B
C10
R7
R5
AVC
C11
SW 1B
C15
C13
L5
C5C
R6
C14
C16
C17
R 8
T2
D
B+
GANGED

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
BROADCAST BAND
540-1600 KC.

MODEL 582

# INTERNATIONAL DETROLA CORP

MODEL 582
MODEL 7270

## Electrical and Mechanical Specifications

| | | | |
|---|---|---|---|
| Frequency Range | 540-1600 kc., 6-18 mc. | Power Output (Undistorted) | 1.8 watts |
| Intermediate Frequency | 455 kc. | Power Output (Maximum) | 3.75 watts |
| Power Supply | 105-125 volts, 60 cycle AC | Rated Power Input | 65 watts at 115 volts |
| Loudspeaker | 8-inch, Dynamic | Tuning Drive Ratio | 6 to 1 |
| V.C. Impedance | 3.5 ohms at 400 cycles | | |

## ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

A signal generator which will provide an accurately calibrated signal at the frequencies listed.

An output meter.

A non-metallic screwdriver.

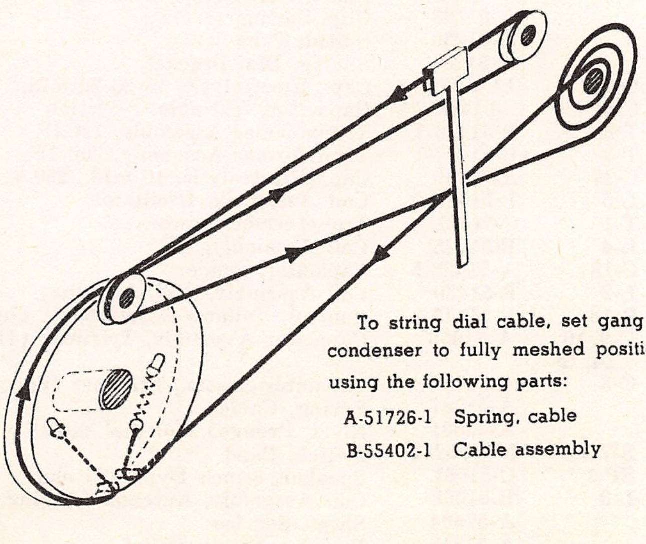
Dummy antenna: .1 mfd. — 400 ohm resistor — RMA loop.

NOTE: Intermediate Frequency and Oscillator Adjustments may be made with the loop disconnected provided a resistor of 10,000 to 50,000 ohms is substituted to close the RF grid circuit. The loop alignment must be done with the loop and chassis mounted in operating position in the cabinet. A single turn loosely coupled to the loop may be substituted for RMA loop.

| CONNECT TEST OSCILLATOR TO | DUMMY ANTENNA | INPUT SIGNAL FREQUENCY | BAND | SET DIAL AT | TRIMMERS | PURPOSE |
|---|---|---|---|---|---|---|
| 6SA7GT grid | .1 mfd. | 455 kc. | Broadcast | HF end | D E F G | Align IF |
| 6SK7GT RF grid | .1 mfd. | 18.3 mc. | Short wave | HF end | C-14 | Set limit of band |
| 6SK7GT RF grid | .1 mfd. | 16 mc. | Short wave | 16 mc. | C-9 | Align RF |
| Antenna post | 400 ohms | 16 mc. | Short wave | 16 mc. | C-3 | Align antenna |
| 6SK7GT RF grid | .1 mfd. | 1620 kc. | Broadcast | HF end | C-15 | Set limit of band |
| 6SK7GT RF grid | .1 mfd. | 1400 kc. | Broadcast | 1400 kc. | C-10 | Align RF |
| 6SK7GT RF grid | .1 mfd. | 600 kc. | Broadcast | 600 kc. | C-13 | Rock gang and adjust to maximum |
| RMA loop | Through loop | 1400 kc. | Broadcast | 1400 kc. | C-4 | Align antenna |

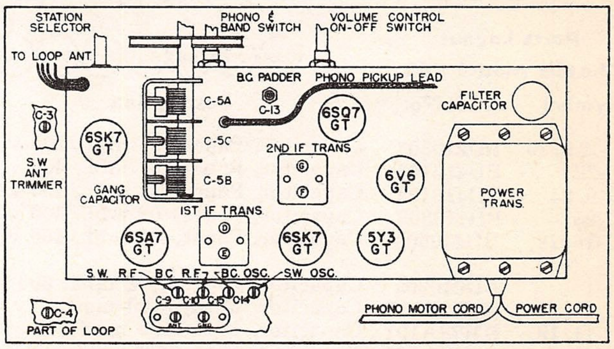
MODEL 7270

### DIAL AND POINTER DRIVE CABLE ARRANGEMENT

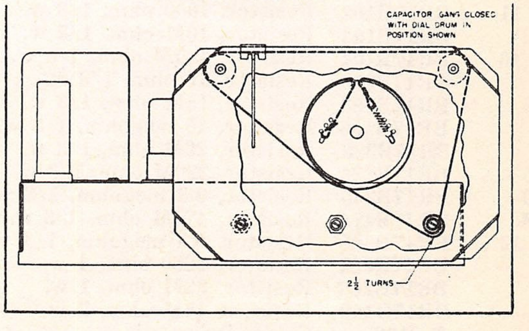


To string dial cable, set gang condenser to fully meshed position, using the following parts:

| | |
|---|---|
| A-51726-1 | Spring, cable |
| B-55402-1 | Cable assembly |


STATION SELECTOR
PHONO & BAND SWITCH
VOLUME CONTROL ON-OFF SWITCH
TO LOOP ANT
B.C. PADDER
PHONO PICKUP LEAD
C-5A
C-13
6SQ7 GT
FILTER CAPACITOR
C-3
6SK7 GT
C-5C
2ND IF TRANS
G
F
S.W ANT TRIMMER
GANG CAPACITOR
C-5B
6V6 GT
POWER TRANS.
IST IF TRANS.
D
E
6SA7 GT
6SK7 GT
5Y3 GT
S.W. R.F.
B.C R.F.
B.C. OSC.
SW OSC.
C-9
C-10
C-15
C-14
ANT
GND
C-4
PART OF LOOP
PHONO MOTOR CORD
POWER CORD

Tube Layout


CAPACITOR GANG CLOSED WITH DIAL DRUM IN POSITION SHOWN
2½ TURNS

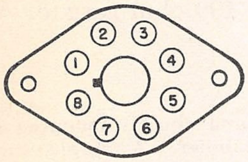
Dial Mechanism

# INTERNATIONAL DETROLA CORP.

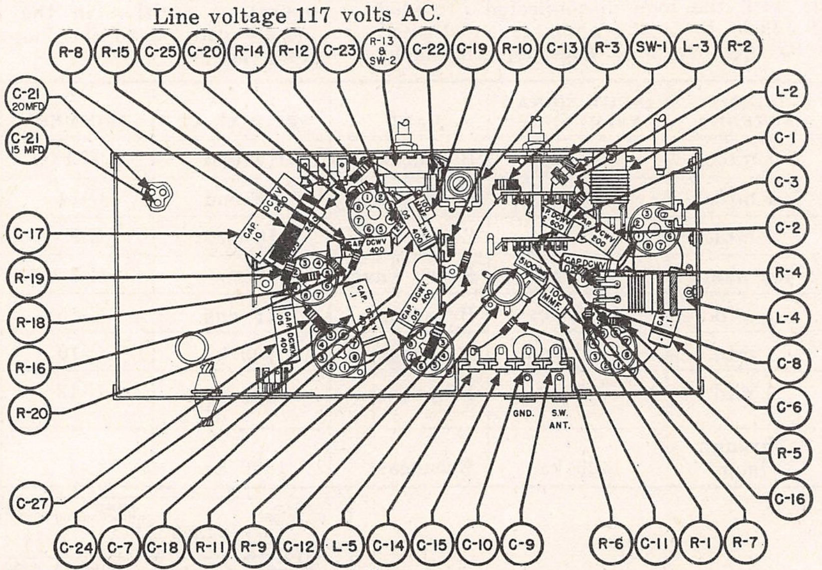
## SOCKET VOLTAGES

| TUBE | POSITION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 6SK7GT | RF Amplifier | 0 | 0 | 0 | 0 | 0 | 107 | 6AC | 255 |
| 6SA7GT | Converter | 0 | 6AC | 250 | 103 | 0 | 0 | 0 | 0 |
| 6SK7GT | IF Amplifier | 0 | 0 | 0 | 0 | 0 | 105 | 6AC | 237 |
| 6SQ7GT | Det.—AVC—1st Audio | 0 | 0 | 0 | 0 | 0 | 34 | 6AC | 0 |
| 6V6GT | Power Output | 0 | 0 | 235 | 250 | 0 | 0 | 6AC | 13 |
| 5Y3GT | Rectifier | 0 | 310 | 0 | 300 AC | 0 | 300 AC | 0 | 310 |

**NOTE:** The above glass tubes are interchangeable with their metal equivalent.



**NOTE:** Band switch in "Broadcast" position.
All voltages measured from chassis to socket contact indicated. DC voltages measured with a 1000 ohm-per-volt meter.
All voltages are positive DC unless otherwise marked.
Volume control full on. No signal.
Line voltage 117 volts AC.



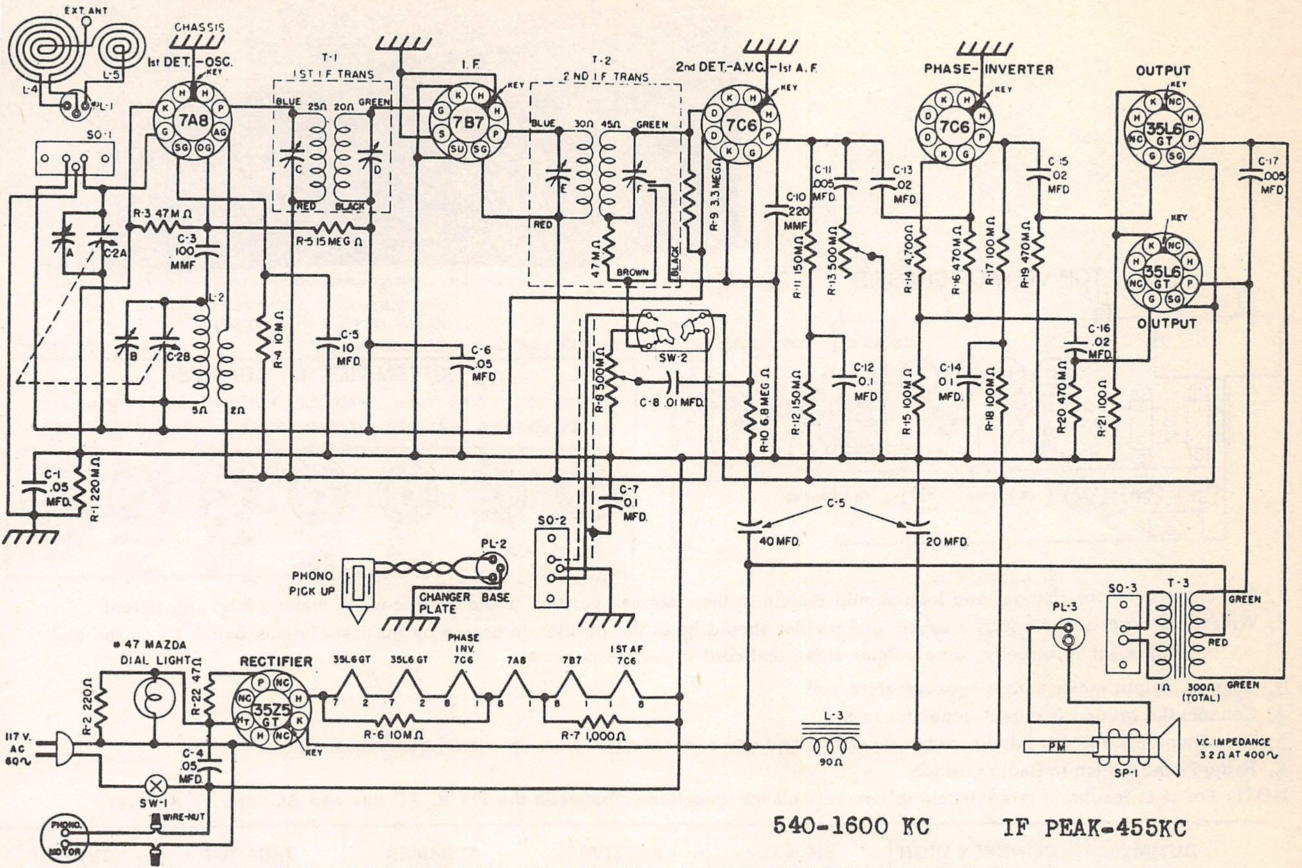
**Parts Layout**
**Chassis Model 582**

| Symbol | Part No. | Description |
|---|---|---|
| C-2, 8, 20 | BD210503 | Capacitor, Paper, .05 mfd., 200 v. |
| C-22 | BD410103 | Capacitor, Paper, .01 mfd., 400 v. |
| C-6, 24 | BD410104 | Capacitor, Paper, .1 mfd., 400 v. |
| C-25 | BD410203 | Capacitor, Paper, .02 mfd., 400 v. |
| C-16, 18, 29, 7 | BD410503 | Capacitor, Paper, .05 mfd., 400 v. |
| C-1 | BD610202 | Capacitor, Paper, .002 mfd., 600 v. |
| C-12 | BM58D512 | Capacitor, Mica, 5100 mmf. |
| C-11, 19 | BM78A101 | Capacitor, Mica, 100 mmf. |
| C-23 | BM78A221 | Capacitor, Mica, 200 mmf. |
| R-20 | BR16E391 | Resistor, 390 ohm, 1 w. |
| R-4, 11 | BR17B102 | Resistor, 1000 ohm, 1/3 w. |
| R-12 | BR17B103 | Resistor, 10M ohm, 1/3 w. |
| R-1, 16 | BR17B104 | Resistor, 100M ohm, 1/3 w. |
| R-6 | BR17B150 | Resistor, 15 ohm, 1/3 w. |
| R-19 | BR17B153 | Resistor, 15M ohm, 1/3 w. |
| R-7 | BR17B156 | Resistor, 15 megohm, 1/3 w. |
| R-5 | BR17B223 | Resistor, 22M ohm, 1/3 w. |
| R-15 | BR17B224 | Resistor, 220M ohm, 1/3 w. |
| R-10 | BR17B335 | Resistor, 3.3 megohm, 1/3 w. |
| R-18 | BR17B474 | Resistor, 470M ohm, 1/3 w. |
| R-2, 14 | BR17B685 | Resistor, 6.8 megohm, 1/3 w. |
| R-3 | BR17E222 | Resistor, 2200 ohm, 1 w. |
| R-9 | BR17E223 | Resistor, 22M ohm, 1 w. |
| R-8 | BR17G153 | Resistor, 15M ohm, 2 w. |
|  | A-2163 | Cable, Drive |
|  | A-9285 | Lamp, Pilot, Mazda No. 44 |

| Symbol | Part No. | Description |
|---|---|---|
|  | A-54847 | Cord, Power, 6 ft. |
|  | B-51162-7 | Shaft, Dial Drive |
|  | A-51163 | Clip, Spring |
|  | A-51260 | Shield, Tube |
|  | A-51331 | Spring, Dial Bracket |
| C-21 | A-51356 | Cap., Electrolytic, 15-20-20 mfd. |
| C-5 | C-51401-2 | Capacitor, Variable, 3-section |
| T-2 | B-51416-1 | Transformer Assembly, 1st IF |
| T-3 | B-51417-1 | Transformer Assembly, 2nd IF |
| C-17 | A-51419 | Cap., Electrolytic, 10 mfd., 250 v. |
| L-5 | B-51420 | Coil Assembly, Oscillator |
| T-1 | C-51421 | Transformer, Power |
| L-4 | B-51425 | Coil Assembly, RF |
| C-13 | A-51428-5 | Capacitor, Padder |
| L-2 | B-51430 | Coil Assembly, S.W. Antenna |
| R-13 | B-51445-3 | Control, Volume & Sw., 500M ohm |
| C-9, 10, 14, 15 | A-51656 | Capacitor Assembly, Trimmer (4) |
| C-3 | A-51657 | Capacitor Assem., Trimmer (Spec.) |
|  | A-51787 | Spring, Cable |
|  | A-51801 | Rivet, Pronged (for dial cable) |
| SW-1 | B-51952-1 | Switch, Band |
| SP-1 | C-51961 | Speaker, 8-inch Dyn., 485 ohm |
| L-3 | B-51968 | Coil Assembly, Antenna Loading |
|  | A-57464 | Sheet, Service |
|  | A-54848 | Bushing, Strain Relief |

# INTERNATIONAL DETROLA CORP.

## MODEL 7270


EXT. ANT
CHASSIS
1st DET.-OSC.
KEY
L-4
L-5
PL-1
SO-1
7A8
T-1
1ST I F TRANS
BLUE
25Ω
20Ω
GREEN
RED
BLACK
C
D
I. F.
7B7
T-2
2 ND I F TRANS
30Ω
45Ω
E
F
47 MΩ
BROWN
2nd DET.-A.V.C.-1st A. F.
7C6
PHASE-INVERTER
OUTPUT
35L6 GT
A
C2A
B
C-2B
R-3 47 MΩ
C-3 100 MMF
R-5 15 MEG Ω
L-2
5Ω
2Ω
R-4 10 MΩ
C-5 10 MFD.
C-6 .05 MFD
C-1 .05 MFD.
R-1 220 MΩ
R-8 500 MΩ
SW-2
C-8 .01 MFD.
C-7 0.1 MFD.
SO-2
PL-2
PHONO PICK UP
CHANGER BASE PLATE
R-9 3.3 MEG Ω
C-10 220 MMF
C-11 .005 MFD.
C-13 .02 MFD
R-11 150 MΩ
R-13 500 MΩ
R-10 6.8 MEG Ω
R-12 150 MΩ
C-12 0.1 MFD
R-14 4,700Ω
R-16 470 MΩ
R-17 100 MΩ
R-19 470 MΩ
C-15 .02 MFD
C-17 .005 MFD
R-15 100 MΩ
C-14 0.1 MFD.
R-18 100 MΩ
C-16 .02 MFD.
R-20 470 MΩ
R-21 100Ω
C-5
40 MFD.
20 MFD.
# 47 MAZDA DIAL LIGHT
R-2 220Ω
R-22 47Ω
RECTIFIER
35Z5 GT
35L6 GT
PHASE INV. 7C6
7A8
7B7
1ST AF 7C6
R-6 10 MΩ
R-7 1,000Ω
117 V. AC 60~
C-4 .05 MFD.
SW-1
WIRE-NUT
PHONO. MOTOR
L-3
90Ω
PL-3
SO-3
T-3
GREEN
RED
1Ω
300Ω (TOTAL)
PM
SP-1
V.C. IMPEDANCE 3.2Ω AT 400~

540-1600 KC IF PEAK-455KC

ALL SOCKETS AND PLUGS SHOWN FROM PIN END VIEW
ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW

| SYMBOL | PART NO. | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| | | **CAPACITORS** | |
| C-1 | BD410503 | Capacitor—.05 Mfd., 400 volt | $ .35 |
| C-2A, B | C-57243-1 | Capacitor—Variable gang | 4.50 |
| C-3 | BM74A101 | Capacitor—Mica 100 Mmfd. ± 20% | .35 |
| C-4 | BD410503 | Capacitor—.05 Mfd., 400 volt | .35 |
| **C-5** | **A-56154** | **Capacitor—Electrolytic 40-20-10 Mfd., 150 volt.** | **1.60** |
| C-6 | BD210503 | Capacitor—.05 Mfd., 200 volt | .30 |
| C-7 | BD410104 | Capacitor—0.1 Mfd., 400 volt | .40 |
| C-8 | BD410103 | Capacitor—.01 Mfd., 400 volt | .30 |
| C-10 | BM74A221 | Capacitor—Mica 220 Mmfd. ± 20% | .40 |
| C-11 | BD610502 | Capacitor—.005 Mfd., 600 volt | .30 |
| C-12 | BD410104 | Capacitor—0-1 Mfd., 400 volt | .40 |
| C-13 | BD410203 | Capacitor—.02 Mfd., 400 volt | .30 |
| C-14 | BD410104 | Capacitor—0.1 Mfd., 400 volt | .40 |
| C-15 | BD410203 | Capacitor—.02 Mfd., 400 volt | .30 |
| C-16 | BD410203 | Capacitor—.02 Mfd., 400 volt | .30 |
| C-17 | BD610502 | Capacitor—.005 Mfd., 600 volt | .30 |
| | | **RESISTORS** | |
| R-1 | BR17B224 | Resistor—Carbon, 220,000 Ohms, 1/3 watt | .15 |
| R-2 | BR17C221 | Resistor—Carbon, 220 Ohms, 1/2 watt | .15 |
| R-3 | BR17B473 | Resistor—Carbon, 47,000 Ohms, 1/3 watt | .15 |
| R-4 | BR17B103 | Resistor—Carbon, 10,000 Ohms, 1/3 watt | .15 |
| R-5 | BR17B156 | Resistor—Carbon, 15 Meg., 1/3 watt | .15 |
| R-6 | BR17E103 | Resistor—Carbon, 10,000 Ohms, 1 watt | .15 |
| R-7 | BR17B102 | Resistor—Carbon, 1,000 Ohms, 1/3 watt | .15 |
| **R-8** | **B-56142-1** | **Control—Dual Potentiometer, with switch 500,000 Ohms, (V. C.)** | **2.25** |
| R-9 | BR17B335 | Resistor—Carbon, 3.3 Meg., 1/3 watt | .15 |
| R-10 | BR17B685 | Resistor—Carbon, 6.8 Meg., 1/3 watt | .15 |
| R-11 | BR17B154 | Resistor—Carbon, 150,000 Ohms, 1/3 watt | .15 |
| R-12 | BR17B154 | Resistor—Carbon, 150,000 Ohms, 1/3 watt | .15 |
| **R-13** | **B-56142-1** | **Control—500,000 Ohms, (T. C.) part of R-8** | |
| R-14 | BR17B472 | Resistor—Carbon, 4,700 Ohms, 1/3 watt | .15 |
| R-15 | BR17B104 | Resistor—Carbon, 100,000 Ohms, 1/3 watt | .15 |
| R-16 | BR17B474 | Resistor—Carbon, 470,000 Ohms, 1/3 watt | .15 |
| R-17 | BR17B104 | Resistor—Carbon, 100,000 Ohms, 1/3 watt | .15 |
| R-18 | BR17B104 | Resistor—Carbon, 100,000 Ohms 1/3 watt | .15 |
| R-19 | BR17B474 | Resistor—Carbon, 470,000 Ohms, 1/3 watt | .15 |
| R-20 | BR17B474 | Resistor—Carbon, 470,000 Ohms, 1/3 watt | .15 |
| R-21 | BR16C101 | Resistor—Carbon, 100 Ohms, ± 10% 1/2 watt | .15 |
| R-22 | BR17G470 | Resistor—Carbon, 47 Ohms ± 20% 2 watt | .30 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

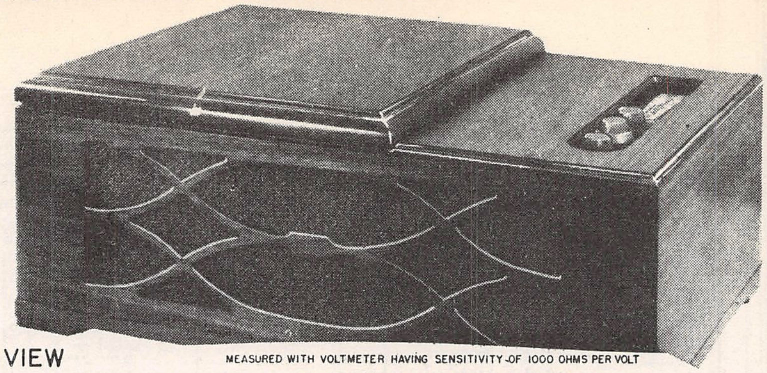
| SYMBOL | PART NO. | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| | | **COILS AND TRANSFORMERS** | |
| **L-4, 5** | **D-57259** | **Loop Antenna assembly** | **$1.00** |
| **L-2** | **B-56143** | **Coil—Oscillator assembly** | * |
| **L-3** | **B-51726-1** | **Filter Choke, 80 ma.** | **2.00** |
| **T-1** | **B-51010-3** | **Transformer—1st I.F.** | **2.00** |
| **T-2** | **B-51011-3** | **Transformer—2nd I.F.** | **2.50** |
| **T-3** | **B-57253-1** | **Transformer—Output** | **1.50** |
| | | **OTHER ELECTRICAL PARTS** | |
| SW-1 | | Switch—power part of R-8 and R-13 | |
| **SW-2** | **B-56156-1** | **Switch—Radio-Phono** | **1.00** |
| **SP-1** | **C-57272** | **Speaker—6" x 9" Permanent Magnet** | * |
| | **A-6158** | **Lamp—Dial Mazda No. 47** | .15 |
| | | **MISCELLANEOUS PARTS** | |
| | B-57275-1 | Background for dial | * |
| | A-54848 | Bushing—Strain relief (power cord) | .20 |
| | A-56155 | Bushing—Tuning control shaft | * |
| | E-57270-1 | Cabinet | * |
| | B-51330-1 | Channel rubber—mtg. for Dial scale | .04 |
| | B-55402-1 | Dial Cable assembly (includes clips at end of cable) | .25 |
| | **B-57269-1** | **Dial scale—plastic** | * |
| | B-51427-2 | Grommet—rubber; mtg., for variable gang | .05 |
| | **B-51124-1** | **Knob—Volume & switch, tuning or radio-phono** | **.15** |
| | **B-56138-1** | **Knob—Tone Control** | .15 |
| | BN751V02 | Palnut—No. 3/8-32; for mtg., controls | .02 |
| | BN770S02 | Palnut—No. 10-24; for mtg., record changer | .01 |
| | A-57271 | Plug—3 Prong—Phono pick-up connection | * |
| | B-55130-9 | Pointer | .15 |
| | **B-58069-1** | **Power Cord** | **.75** |
| | BP934G02 | Screw—No. 4 x 1/2"; for mtg., loop & back | .03 |
| | BP928N02 | Screw—No. 8 x 1 1/8"; for mtg., chassis | .03 |
| | BS016S09 | Screw—No. 10-24 x 1"; for mtg., record changer | .04 |
| | A-56136 | Shaft—tuning control | * |
| | A-54726 | Socket—octal base | .20 |
| | A-54900 | Socket—loctal base | .25 |
| | A-57273 | Socket—3 Prong; Phono pick-up & loop antenna | .20 |
| | A-57258 | Socket—2 Prong; speaker connection | .20 |
| | A-6182-5 | Socket—dial lamp (with leads) | .15 |
| | A-51331 | Spring—Mtg., for channel rubbers | .10 |
| | A-51787 | Spring—dial cable tension | .07 |
| | A-50147 | Spring—conical; for mtg., record changer | .10 |
| | BF13NT05 | Washer—flat; for mtg., record changer | .02 |
| | B-50156-1 | Washer—rubber; for mtg., record changer | .04 |
| | A-54492 | Washer—"C"; tuning shaft | .02 |
| | A-1089 | Washer—cup; variable gang mtg. | .05 |
| | B-50964-3 | Wirenut—phono motor power connection | .03 |

*PRICE AVAILABLE UPON REQUEST

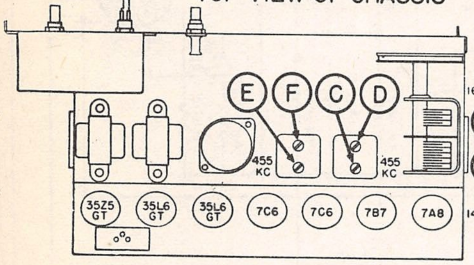
For Dial Data, see P.16-3

**MODEL 7270**

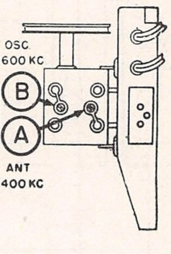
# INTERNATIONAL DETROLA CORP.



TOP VIEW OF CHASSIS


E
F
C
D
455 KC
455 KC
35Z5 GT
35L6 GT
35L6 GT
7C6
7C6
7B7
7A8

SIDE VIEW


OSC 1600 KC
B
A
ANT 1400 KC

MEASURED WITH VOLTMETER HAVING SENSITIVITY OF 1000 OHMS PER VOLT

TONE CONTROL IN CLOCKWISE POSITION

VOLUME ON FULL WITH NO SIGNAL

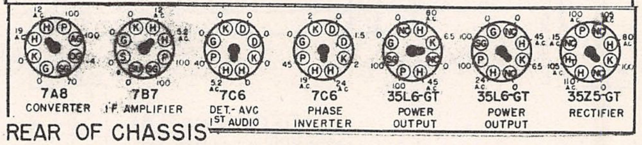
RADIO-PHONO SWITCH IN RADIO POSITION

DIAL TUNED TO 540 KC.

## BOTTOM VIEW OF CHASSIS

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.

ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.


7A8 CONVERTER
7B7 I.F. AMPLIFIER
7C6 DET.-AVC 1ST AUDIO
7C6 PHASE INVERTER
35L6-GT POWER OUTPUT
35L6-GT POWER OUTPUT
35Z5-GT RECTIFIER

REAR OF CHASSIS

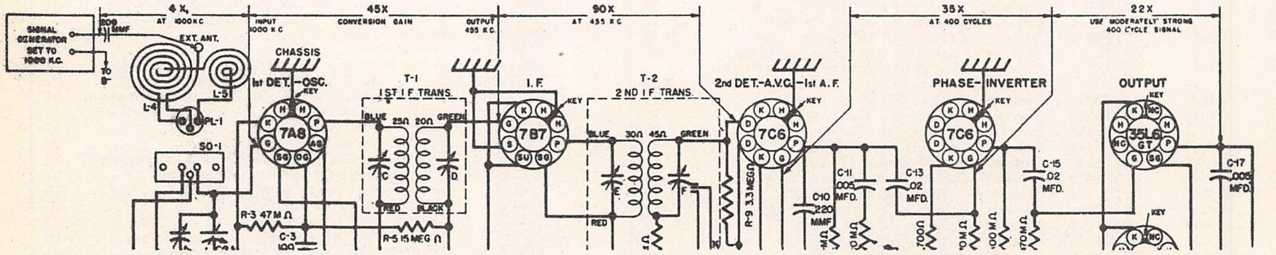
1. The chassis, record changer and loop should remain in their normal position in the cabinet when making loop adjustment.
2. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, slide pointer along dial cord to correct position.
3. Connect output meter across speaker voice coil.
4. Connect the ground of signal generator to B–.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Radio-Phono switch in Radio position.

**NOTE:** For best results, it is advisable to use an isolation transformer between the 117 V. AC line and AC input to receiver.

| DUMMY ANT. | CONNECT HIGH SIDE OF SIGNAL GENERATOR TO | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER LETTER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|
| 0.1 Mfd. Condenser | 7A8 Grid | **455 KC** | Any point where it does not affect the signal | F-E<br>D-C | 2nd IF<br>1st IF | Adjust for maximum output. Then repeat adjustment. |
| 0.1 Mfd. Condenser | 7A8 Grid | **1620 KC** | Gang condenser completely out of mesh. | B | Oscillator | Adjust for maximum output. |
| RMA Loop | | **1400 KC** | Tuned to 1400 kc Generator signal | A | Loop Antenna | Adjust for maximum output. |

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

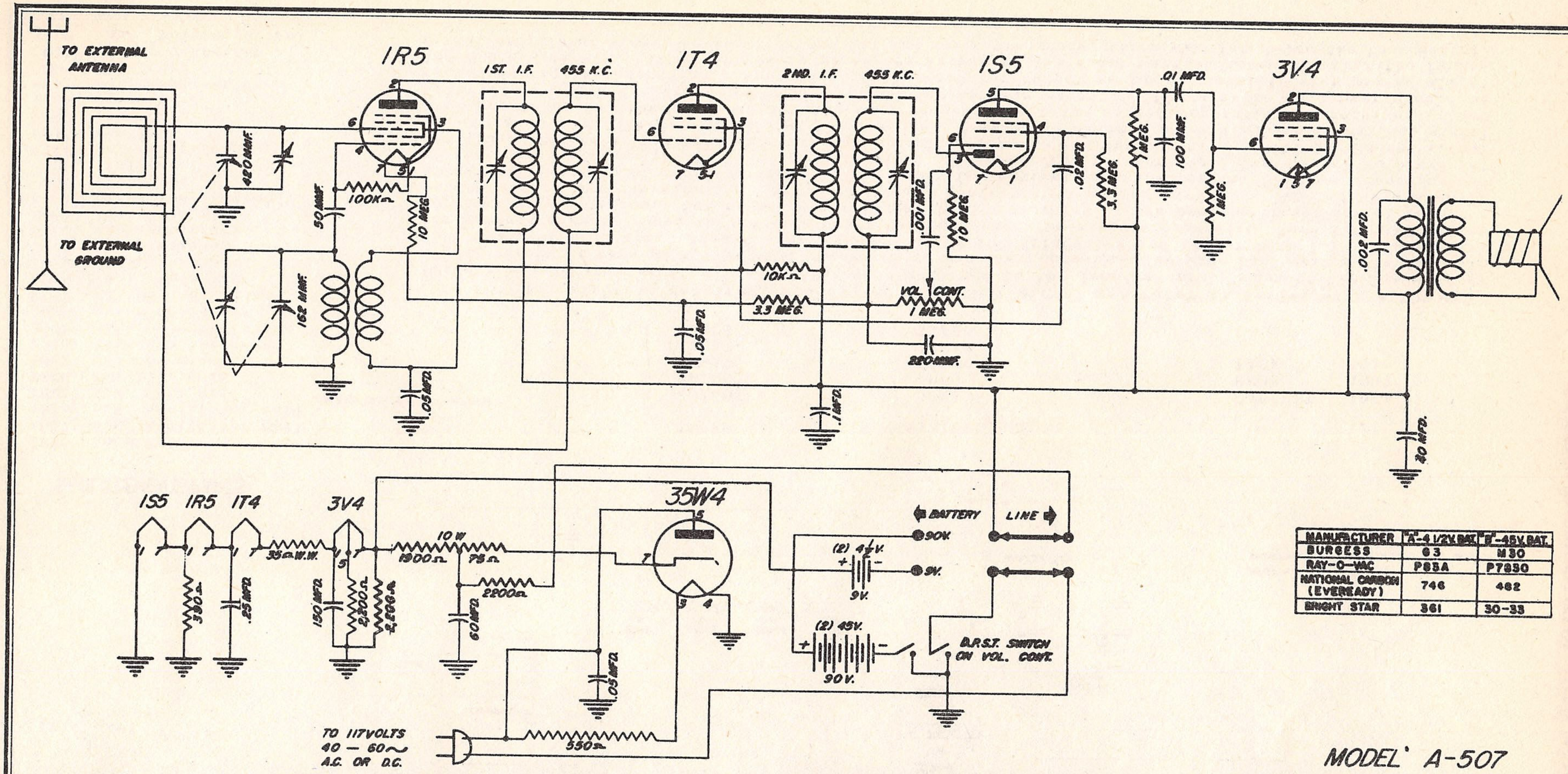
1. For all gain measurements connect signal generator as shown. Use 1000 KC signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. Be sure radio is carefully tuned to generator signal. (Use weak signal for sharp tuning.)
3. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.


SIGNAL GENERATOR SET TO 1000 K.C.
TO B-
4 X, AT 1000KC
INPUT 1000 KC
45X CONVERSION GAIN
OUTPUT 455 KC
90X AT 455 KC
35X AT 400 CYCLES
22X USE MODERATELY STRONG 400 CYCLE SIGNAL
EXT. ANT.
CHASSIS
1st DET.-OSC.
7A8
L-4
L-5
PL-1
SO-1
T-1 1ST I.F. TRANS.
BLUE
GREEN
RED
BLACK
I.F.
7B7
T-2 2ND I.F. TRANS.
2nd DET.-A.V.C.-1st A.F.
7C6
R-9 3.3 MEG
C-10 220 MMF
C-11 .005 MFD.
C-13 .02 MFD.
PHASE-INVERTER
7C6
C-15 .02 MFD.
OUTPUT
35L6 GT
C-17 .005 MFD.
R-3 47M Ω
R-5 15 MEG Ω
C-3
KEY

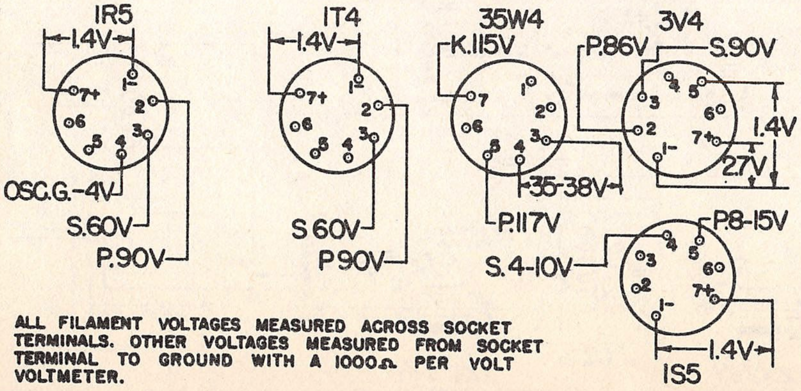
Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

## DEWALD RADIO MFG. CORP.

**MODEL A-507**

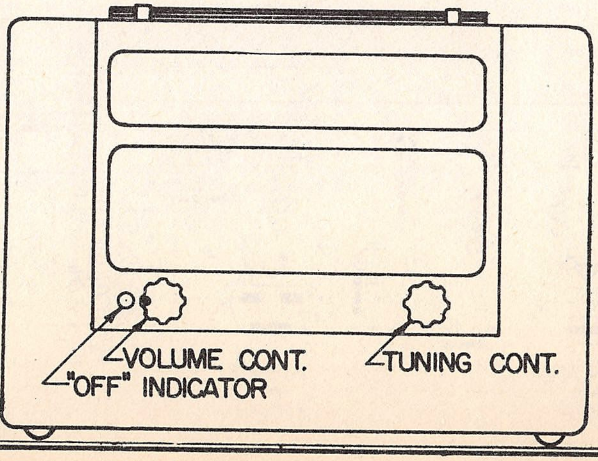

TO EXTERNAL ANTENNA
TO EXTERNAL GROUND
IR5
420 MMF.
162 MMF.
50 MMF.
100K Ω
10 MEG.
.05 MFD.
1ST. I.F.
455 K.C.
IT4
.05 MFD.
2ND. I.F.
455 K.C.
10K Ω
3.3 MEG.
.1 MFD.
IS5
.001 MFD.
10 MEG.
VOL. CONT. 1 MEG.
220 MMF.
.02 MFD.
3.3 MEG.
.01 MFD.
100 MMF.
1 MEG.
3V4
.002 MFD.
20 MFD.
IS5
IR5
IT4
3V4
330 Ω
.25 MFD.
35 Ω W.W.
150 MFD.
2,200 Ω
2,200 Ω
10 W.
1900 Ω
75 Ω
2200 Ω
60 MFD.
35W4
.05 MFD.
550 Ω
TO 117 VOLTS 40 — 60~ A.C. OR D.C.
BATTERY
LINE
90K
9V.
(2) 4½V.
9V.
(2) 45V.
90V.
D.P.S.T. SWITCH ON VOL. CONT.

| MANUFACTURER | "A"-4 1/2V. BAT. | "B"-45V. BAT. |
|---|---|---|
| BURGESS | G3 | M30 |
| RAY-O-VAC | P83A | P7830 |
| NATIONAL CARBON (EVEREADY) | 746 | 482 |
| BRIGHT STAR | 361 | 30-33 |


IR5
1.4V
OSC.G.-4V
S.60V
P.90V
IT4
1.4V
S 60V
P 90V
35W4
K.115V
35-38V
P.117V
3V4
P.86V
S.90V
1.4V
27V
P.8-15V
S.4-10V
1.4V
IS5

ALL FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS. OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000Ω PER VOLT VOLTMETER.

BOTTOM VIEW OF CHASSIS


VOLUME CONT.
"OFF" INDICATOR
TUNING CONT.

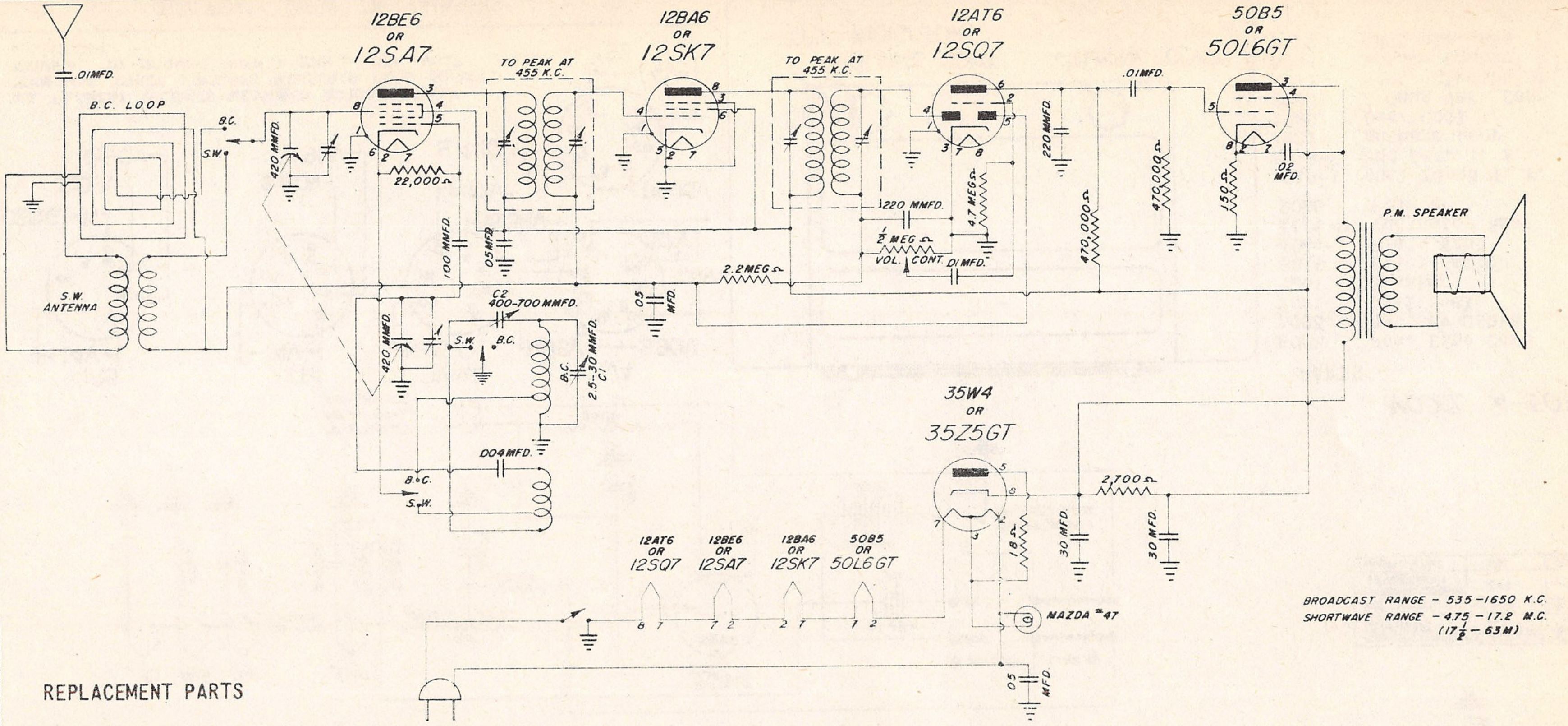
MODEL' A-507

PARTS

| | |
|---|---|
| 5002 | Res. Line Cord |
| 5003 | Battery Cable |
| 9001 | Dial Scale |
| 7001 | Speaker |
| 8019 | Slide Switch |
| 4044-1 | Plain Knob |
| 4044-2 | Indicator Knob |
| 9025 | Pointer |
| 1019-1 | Dual Tuned I. F. |
| 1019-2 | 2nd Det. I. F. |
| 1021 | Antenna Loop |
| 1020 | Osc. Coil |
| 2003 | 2 Gang Var. Cond. |
| 2013 | Comb. Electrolytic |
| 3006 | Volume Control |
| 3007 | 1975 ohm. Res. |

MODEL A-509

# DEWALD RADIO MFG. CORP.


12BE6
OR
12SA7
12BA6
OR
12SK7
12AT6
OR
12SQ7
50B5
OR
50L6GT
.01MFD.
B.C. LOOP
S.W. ANTENNA
B.C.
S.W.
420 MMFD.
22,000Ω
TO PEAK AT 455 K.C.
100 MMFD.
.05MFD.
TO PEAK AT 455 K.C.
220 MMFD.
4.7 MEGΩ
1/2 MEG Ω
VOL. CONT.
.01 MFD.
220 MMFD.
470,000Ω
470,000Ω
.01MFD.
150Ω
.02 MFD.
P.M. SPEAKER
2.2MEGΩ
.05 MFD.
C2
400-700 MMFD.
420 MMFD.
S.W.
B.C.
B.C.
C1
2.5-30 MMFD.
.004MFD.
B.&C.
S.W.
35W4
OR
35Z5GT
2,700Ω
18Ω
30 MFD.
30 MFD.
MAZDA #47
.05 MFD.
12AT6 OR 12SQ7
12BE6 OR 12SA7
12BA6 OR 12SK7
50B5 OR 50L6GT
TO 105-125V
40-60~
UNLESS OTHERWISE SPECIFIED

BROADCAST RANGE - 535-1650 K.C.
SHORTWAVE RANGE - 4.75-17.2 M.C. ($17\frac{1}{2}$ - 63 M)

## REPLACEMENT PARTS

| | |
|---|---|
| 1016 | loop ant. |
| 1017 | B.C. oscillator coil |
| 1018 | S.W. oscillator coil |
| 1009 | S.W. ant. coil |
| 1000 | 1st I.F. coil |
| 1002 | 2nd detector I.F. |
| 2014 | variable condenser |
| 2002 | comb. electrolytic |
| 2000 | paper condenser |
| 2012 | ceramic condenser |
| 3000 | 1/4 W. resistor |
| 3003 | 1/2 W. resistor |
| 3004 | 2 W. resistor |
| 6003 | dial scale |
| 9001 | dial back plate |
| 8001 | pilot lamp assembly |
| #47 | pilot lamp |
| #20 | dial cord |
| 9762 | drive spring |
| 9818 | bushing |
| 9000 | shaft |
| 7000 | speaker |
| 8017 | wave band switch |
| 5000 | line cord |
| 2011 | padder condenser |
| 3002 | comb. volume control |

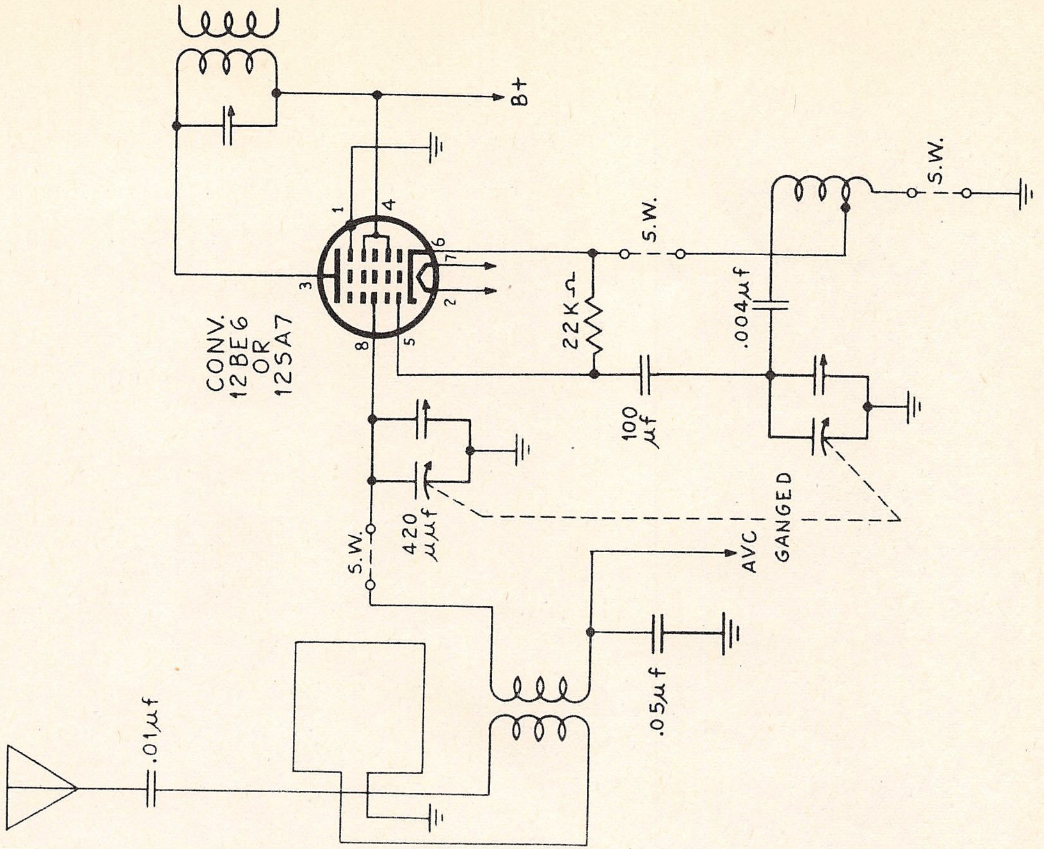
| | TUBES | IF MINIATURE USE |
|---|---|---|
| 1 | 35Z5GT | 35W4 |
| 1 | 50L6GT | 50B5 |
| 1 | 12SA7 | 12BE6 |
| 1 | 12SK7 | 12BA6 |
| 1 | 12SQ7 | 12AT6 |

| | |
|---|---|
| CABINET | 4004 |
| KNOB | 4037 |
| BACK | 4018 |

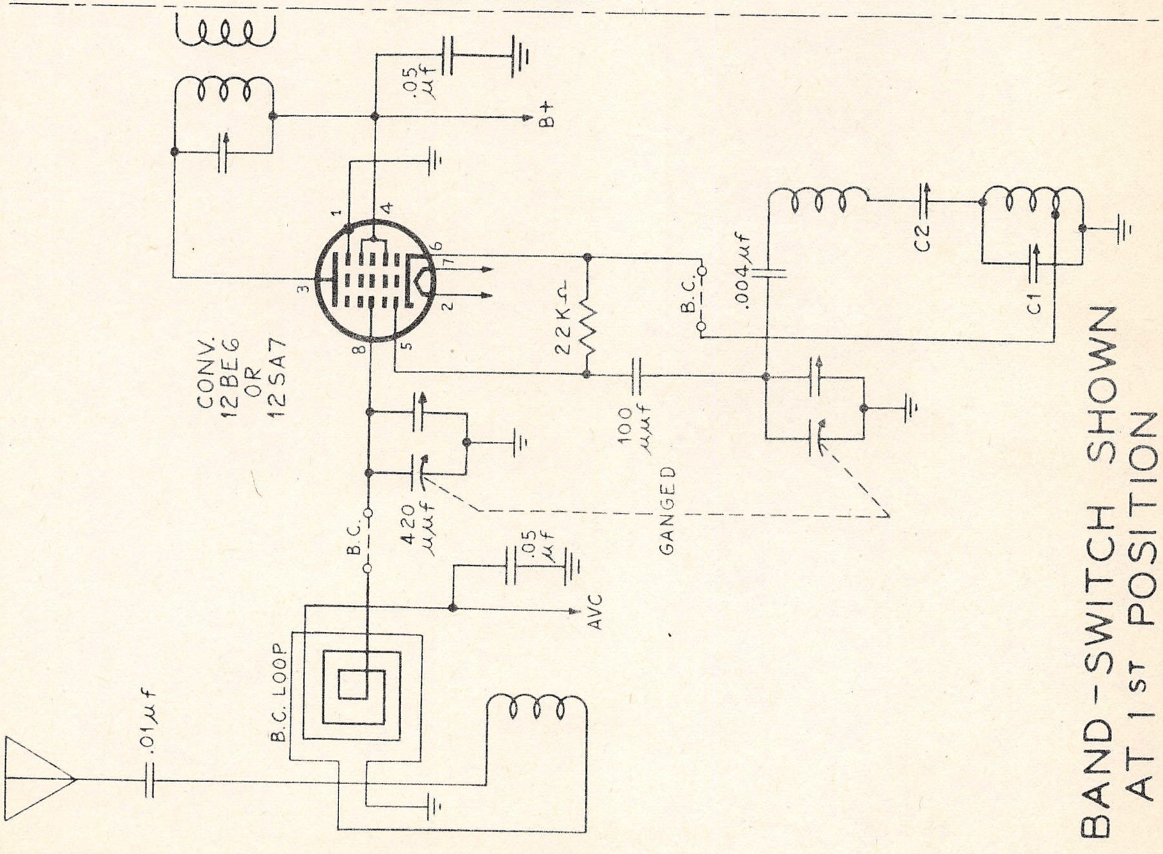
To calibrate receiver connect the output of signal generator in series with a 200 MMFD fixed condenser to the flexible antenna lead attached to the loop antenna. Connect the low side of signal generator through a 1/10 mfd. condenser to receiver chassis. The wave band switch should be in the broadcast position. Adjust signal generator to 455 Kilocycles and adjust both I.F. transformers for maximum signal. Open the receiver variable condenser for minimum capacity. Turn the band switch to short wave position. Set signal generator at 17.2 Megacycles. Peak oscillator section of receiver condenser for maximum signal. Next set signal generator at 16 Megacycles. Tune in this signal. Adjust R.F. section of receiver variable condenser for maximum signal strength. The low frequency end of the dial is automatically adjusted by a fixed padder condenser. Next turn band switch to broadcast position. Rotate drive shaft until variable condenser is in minimum capacity position. Adjust signal generator to 1650 Kilocycles. Adjust the broadcast oscillator trimmer screw (C-1) until maximum signal from generator is heard. To adjust the low frequency, set the signal generator and receiver to 600 Kilocycles. Peak the broadcast padder (C-2) for maximum output. The variable condenser should be rocked during the operation. Keep the signal generator output as low as possible when making all of these measurements. It is extremely necessary in making the short wave adjustments, that the fundamental oscillator signal be tuned in and not the image frequency, which will fall below the fundamental.

## DEWALD RADIO MFG. CORP.

**MODEL A-509**


B+
S.W.
S.W.
1
4
6
7
3
2
8
5
CONV. 12BE6 OR 12SA7
22K Ω
.004 µf
100 µf
420 µµf
S.W.
AVC
GANGED
.05 µf
.01 µf

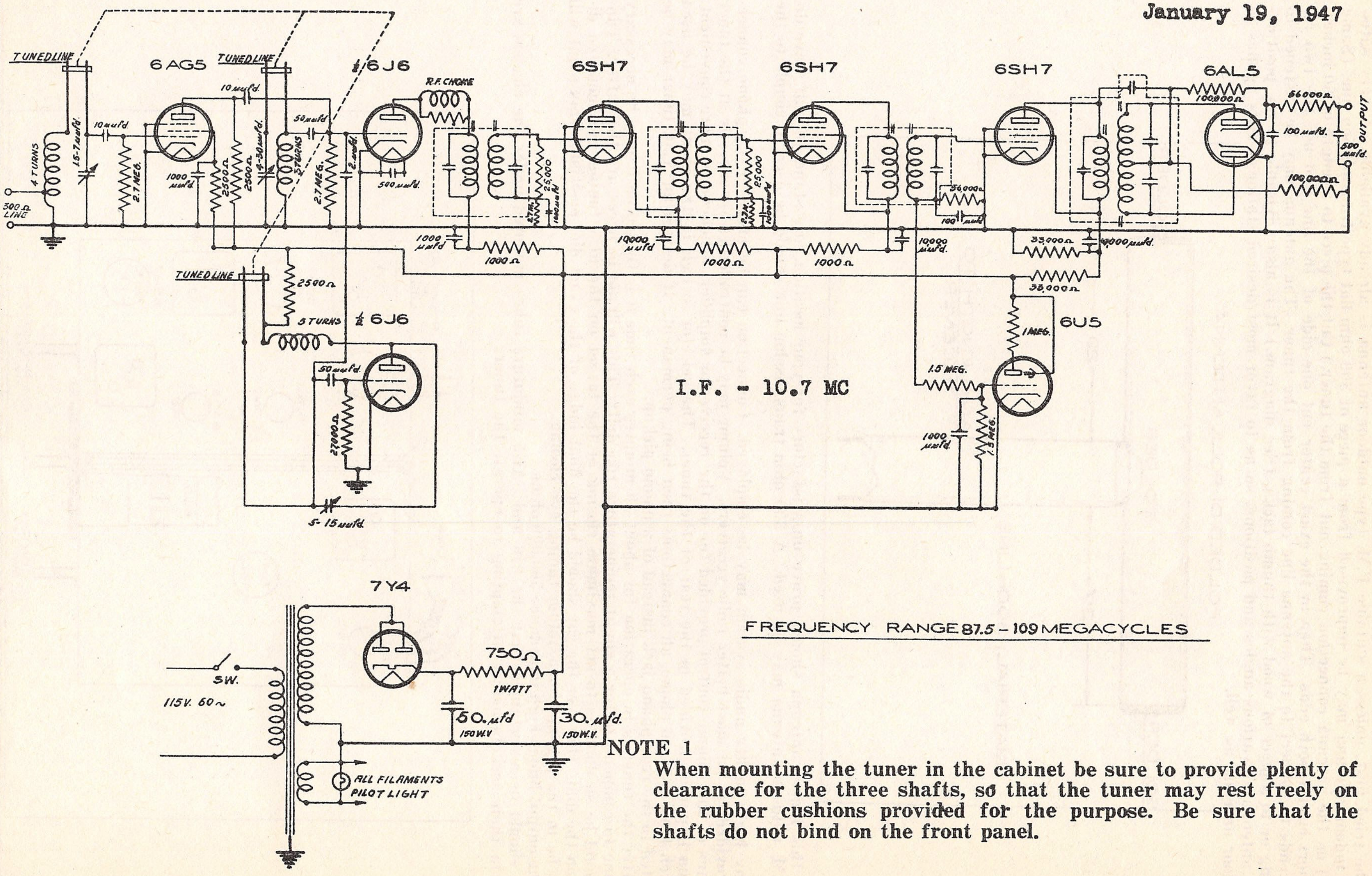
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE SHORT WAVE BAND 4.75-17.2 MC.


.05 µf
B+
1
4
6
7
3
2
8
5
CONV. 12BE6 OR 12SA7
22K Ω
B.C.
.004 µf
C2
C1
100 µµf
420 µµf
GANGED
B.C.
.05 µf
AVC
B.C. LOOP
.01 µf

BAND-SWITCH SHOWN AT 1ST POSITION BROADCAST BAND 535-1650 KC.

# EDWARD'S FM RADIO CORP.

January 19, 1947


TUNEDLINE
6AG5
TUNEDLINE
½ 6J6
R.F. CHOKE
6SH7
6SH7
6SH7
6AL5
4 TURNS
300 Ω LINE
1.5-7 μμfd.
10 μμfd
2.7 MEG.
10 μμfd.
1000 μμfd
2500 Ω
2500 Ω
4-30 μμfd.
5 TURNS
50 μμfd
2.7 MEG.
2. μμfd.
500 μμfd.
25,000
2.7 M.
1000 μμfd
1000 μμfd
1000 Ω
10000 μμfd
1000 Ω
1000 Ω
25,000
2.7 M.
1000 μμfd
56,000 Ω
100 μμfd
10000 μμfd.
33,000 Ω
10000 μμfd.
33,000 Ω
100,000 Ω
56000 Ω
100 μμfd.
500 μμfd.
OUTPUT
100,000 Ω
TUNEDLINE
2500 Ω
5 TURNS
½ 6J6
50 μμfd.
27000 Ω
5- 15 μμfd.
6U5
1 MEG.
1.5 MEG.
1000 μμfd.
1.5 MEG.
I.F. - 10.7 MC
7Y4
SW.
115V. 60~
750 Ω
1 WATT
50. μfd 150 W.V
30. μfd. 150 W.V
ALL FILAMENTS
PILOT LIGHT
FREQUENCY RANGE 87.5 - 109 MEGACYCLES

NOTE 1

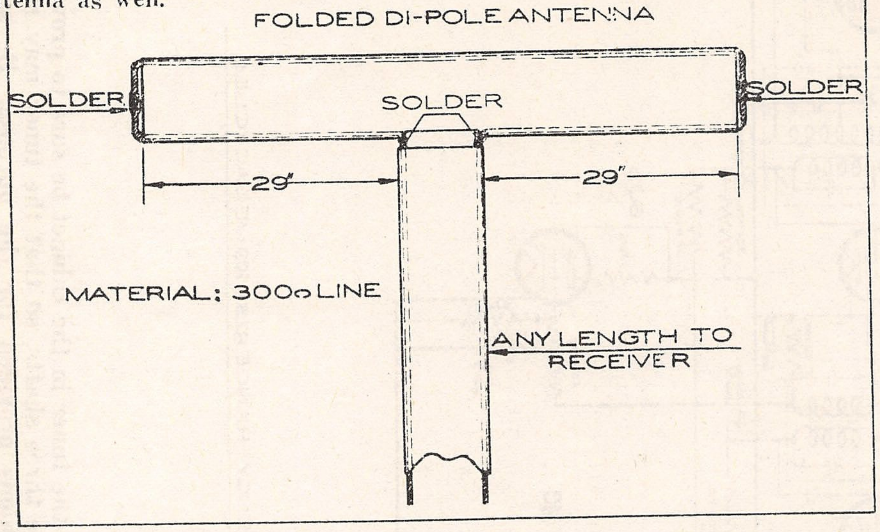
When mounting the tuner in the cabinet be sure to provide plenty of clearance for the three shafts, so that the tuner may rest freely on the rubber cushions provided for the purpose. Be sure that the shafts do not bind on the front panel.

NOTE 2

The tuning lines are lubricated at the factory for best contact and smoother dial operation. Normally this lubricant will not have to be replaced. However, should it be desired to lubricate the rods, use a dab of General Cement Co. "Lube-Rex on each rod.

## EDWARD'S FM RADIO CORP.

In most metropolitan locations an indoor antenna may be all that is necessary. This by all means should be tried first, unless a suitable F.M. type outdoor antenna is already available. A very satisfactory indoor antenna may be improvised from a piece of 300 ohm flat type transmission line. (Same material as the antenna connection coming out from the tuner.) Cut the piece to a length of 60 inches. Then short circuit both ends. Then in the exact center cut one side of the line and use the two resulting ends to connect to the antenna line coming from the tuner. The antenna may be fastened to a molding or to a piece of wood with thumb tacks. (See diagram.) It is also advisable to try positioning the antenna at various angles and positions, so as to favor most desired stations. This applies to an outdoor antenna as well.



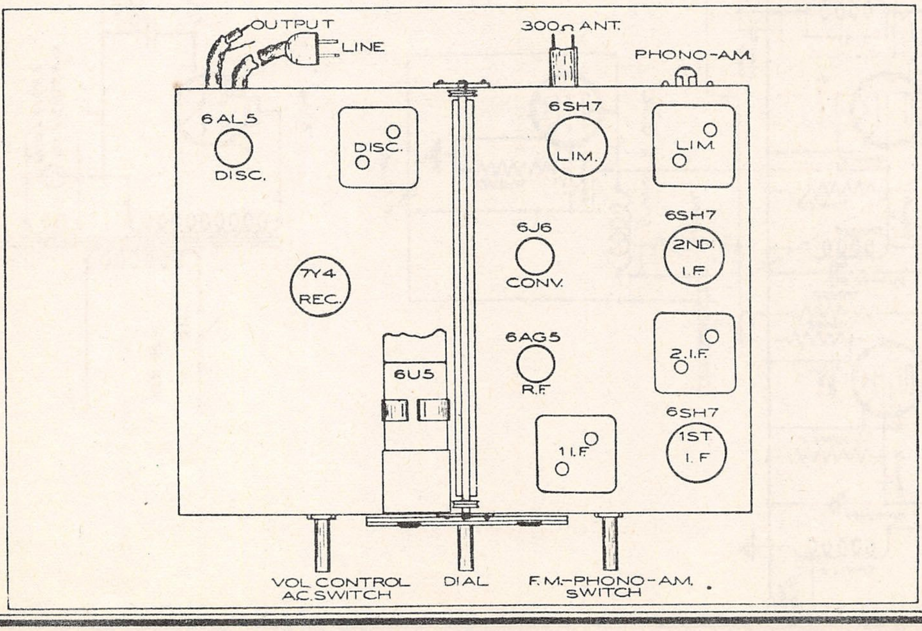
If this indoor antenna should prove unsatisfactory for your location, any standard half wave dipole F.M. outdoor antenna may be used. A 300 ohm transmission line should be used to couple to the tuner.

Any high quality audio system may be employed. Connection can be made to the phono connection provided for on most better radio receivers. Volume may be controlled either directly at the tuner by means of the volume control provided for on the receiver or amplifier, whichever is more convenient. A phono imput is provided in the rear of the tuner. The selector switch in the front may be used to switch from F.M. to phono, all connections then being permanent. If desired an A.M. tuner may be connected to the rear phono jack instead of a phono pickup.

After the tuner is in operation for about 10 minutes each time it is turned on it may be necessary to retune to compensate for a slight temperature rise drift. This will not be necessary thereafter. Tuning should be so done as to get maximum closing of the target on the 6U5 tuning eye mounted directly on the dial. However the ear should be the final judge of the exact dial position. This point will always be in the region of maximum tuning eye closing.

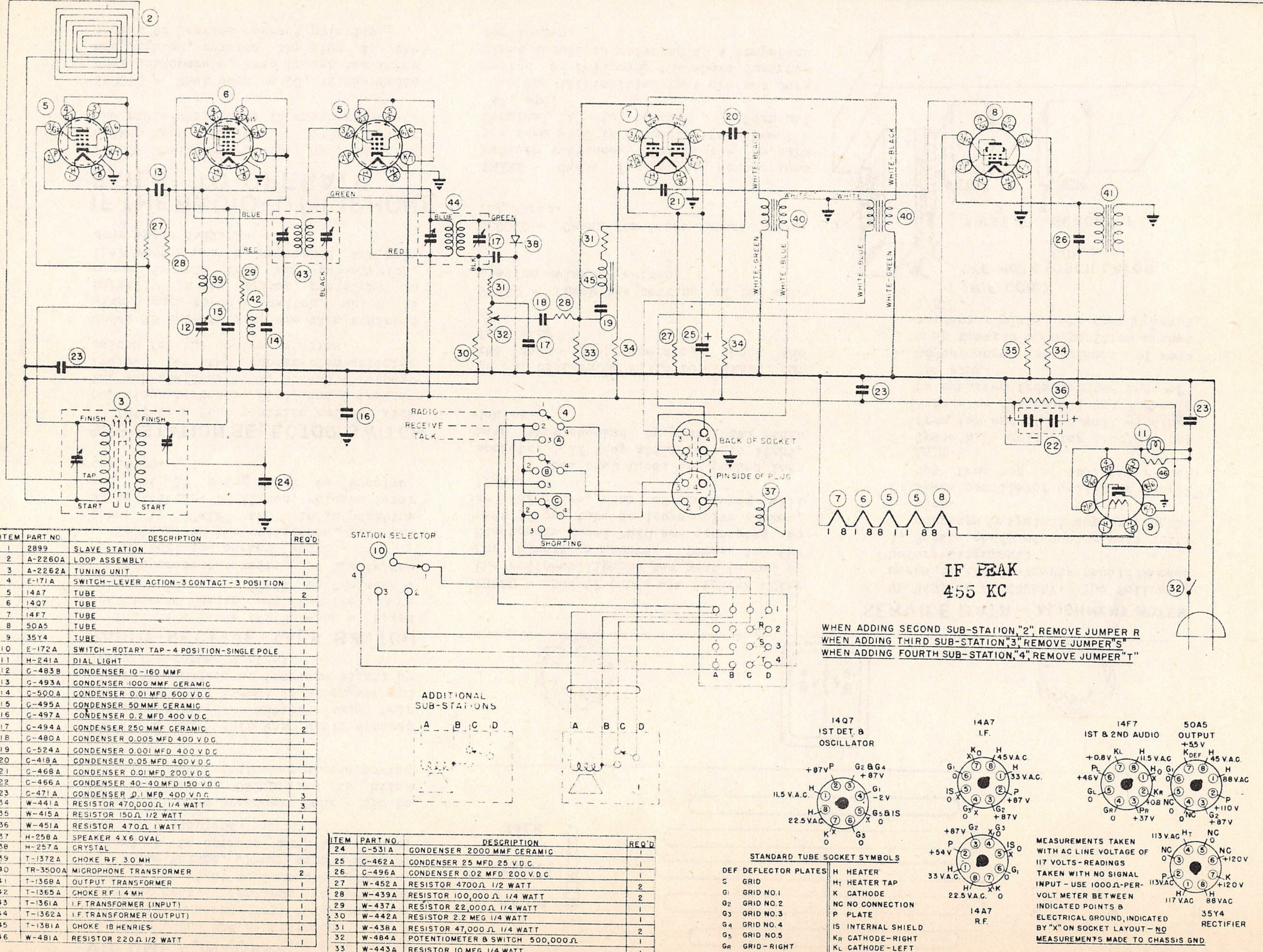
The output line is high impedance 500,000 ohms.

It should be ascertained that the 6J6 and 6AG5 miniature tubes mounted under the chassis are firmly in their sockets before attempting to operate the tuner.



# ELECTRONIC LABORATORIES, INC.

Radio Utiliphone,
MODEL 76RU,
Chassis 2865


RADIO
RECEIVE
TALK
BACK OF SOCKET
PIN SIDE OF PLUG
SHORTING
STATION SELECTOR
ADDITIONAL SUB-STATIONS
A B C D
FINISH
START
TAP
BLUE
RED
GREEN
BLACK
BLK
WHITE-BLACK
WHITE-GREEN
WHITE-BLUE
WHITE
1 8 1 88 1 1 88 1
14Q7 1ST DET. & OSCILLATOR
14A7 I.F.
14F7 1ST & 2ND AUDIO
50A5 OUTPUT
14A7 R.F.
35Y4 RECTIFIER

IF PEAK
455 KC

WHEN ADDING SECOND SUB-STATION "2", REMOVE JUMPER R
WHEN ADDING THIRD SUB-STATION "3", REMOVE JUMPER "S"
WHEN ADDING FOURTH SUB-STATION "4", REMOVE JUMPER "T"

| ITEM | PART NO. | DESCRIPTION | REQ'D |
|---|---|---|---|
| 1 | 2899 | SLAVE STATION | 1 |
| 2 | A-2260A | LOOP ASSEMBLY | 1 |
| 3 | A-2262A | TUNING UNIT | 1 |
| 4 | E-171A | SWITCH-LEVER ACTION-3 CONTACT-3 POSITION | 1 |
| 5 | 14A7 | TUBE | 2 |
| 6 | 14Q7 | TUBE | 1 |
| 7 | 14F7 | TUBE | 1 |
| 8 | 50A5 | TUBE | 1 |
| 9 | 35Y4 | TUBE | 1 |
| 10 | E-172A | SWITCH-ROTARY TAP-4 POSITION-SINGLE POLE | 1 |
| 11 | H-241A | DIAL LIGHT | 1 |
| 12 | C-483B | CONDENSER 10-160 MMF | 1 |
| 13 | C-493A | CONDENSER 1000 MMF CERAMIC | 1 |
| 14 | C-500A | CONDENSER 0.01 MFD 600 V.D.C. | 1 |
| 15 | C-495A | CONDENSER 50 MMF CERAMIC | 1 |
| 16 | C-497A | CONDENSER 0.2 MFD 400 V.D.C. | 1 |
| 17 | C-494A | CONDENSER 250 MMF CERAMIC | 2 |
| 18 | C-480A | CONDENSER 0.005 MFD 400 V.D.C. | 1 |
| 19 | C-524A | CONDENSER 0.001 MFD 400 V.D.C. | 1 |
| 20 | C-418A | CONDENSER 0.05 MFD 400 V.D.C. | 1 |
| 21 | C-468A | CONDENSER 0.01 MFD 200 V.D.C. | 1 |
| 22 | C-466A | CONDENSER 40-40 MFD 150 V.D.C. | 1 |
| 23 | C-471A | CONDENSER 0.1 MFD 400 V.D.C. | 3 |
| 34 | W-441A | RESISTOR 470,000Ω 1/4 WATT | 3 |
| 35 | W-415A | RESISTOR 150Ω 1/2 WATT | 1 |
| 36 | W-451A | RESISTOR 470Ω 1 WATT | 1 |
| 37 | H-258A | SPEAKER 4X6 OVAL | 1 |
| 38 | H-257A | CRYSTAL | 1 |
| 39 | T-1372A | CHOKE R.F. 3.0 MH | 1 |
| 40 | TR-3500A | MICROPHONE TRANSFORMER | 2 |
| 41 | T-1368A | OUTPUT TRANSFORMER | 1 |
| 42 | T-1365A | CHOKE R.F. 1.4 MH | 1 |
| 43 | T-1361A | I.F. TRANSFORMER (INPUT) | 1 |
| 44 | T-1362A | I.F. TRANSFORMER (OUTPUT) | 1 |
| 45 | T-1381A | CHOKE 18 HENRIES | 1 |
| 46 | W-481A | RESISTOR 220Ω 1/2 WATT | 1 |

| ITEM | PART NO. | DESCRIPTION | REQ'D |
|---|---|---|---|
| 24 | C-531A | CONDENSER 2000 MMF CERAMIC | 1 |
| 25 | C-462A | CONDENSER 25 MFD 25 V.D.C. | 1 |
| 26 | C-496A | CONDENSER 0.02 MFD 200 V.D.C. | 1 |
| 27 | W-452A | RESISTOR 4700Ω 1/2 WATT | 2 |
| 28 | W-439A | RESISTOR 100,000Ω 1/4 WATT | 2 |
| 29 | W-437A | RESISTOR 22,000Ω 1/4 WATT | 1 |
| 30 | W-442A | RESISTOR 2.2 MEG 1/4 WATT | 1 |
| 31 | W-438A | RESISTOR 47,000Ω 1/4 WATT | 2 |
| 32 | W-484A | POTENTIOMETER & SWITCH 500,000Ω | 1 |
| 33 | W-443A | RESISTOR 10 MEG 1/4 WATT | 1 |

STANDARD TUBE SOCKET SYMBOLS

| | | | |
|---|---|---|---|
| DEF | DEFLECTOR PLATES | H | HEATER |
| G | GRID | $H_T$ | HEATER TAP |
| $G_1$ | GRID NO.1 | K | CATHODE |
| $G_2$ | GRID NO.2 | NC | NO CONNECTION |
| $G_3$ | GRID NO.3 | P | PLATE |
| $G_4$ | GRID NO.4 | IS | INTERNAL SHIELD |
| $G_5$ | GRID NO.5 | $K_R$ | CATHODE-RIGHT |
| $G_R$ | GRID-RIGHT | $K_L$ | CATHODE-LEFT |
| $G_L$ | GRID-LEFT | $P_R$ | PLATE-RIGHT |
| | | $P_L$ | PLATE-LEFT |

MEASUREMENTS TAKEN WITH AC LINE VOLTAGE OF 117 VOLTS-READINGS TAKEN WITH NO SIGNAL INPUT-USE 1000Ω-PER-VOLT METER BETWEEN INDICATED POINTS & ELECTRICAL GROUND, INDICATED BY "X" ON SOCKET LAYOUT-NO MEASUREMENTS MADE TO CHASSIS GND.

Radio Utiliphone,
MODEL 76RU,
Chassis 2865

# ELECTRONIC LABORATORIES, INC.

**VOLUME, ON-OFF** Turn knob to the right to turn Radio-Utiliphone on. A click will be heard - wait 30 seconds for tubes to heat. Continue to turn the knob to the right to increase volume.

The Volume, ON-OFF switch must be turned on to operate both the radio, and the utiliphone.

**DIAL** Standard Broadcast Bank - 540 to 1620 Kilocycles. Calibrated in kilocycles. Shadow indicator behind moving dial.

**TUNING** Radio Turn knob until desired station is heard. Rotate slowly back and forth until signal is strongest and clearest. Reduce or increase signal by using the volume control.

## RADIO-RECEIVE-TALK SWITCH

This is a lever switch with a fixed position at "Radio" and "Receive", and a spring return from "Talk" to "Receive".

To operate the radio, set the switch to the position marked "Radio".

To talk on the utiliphone, push the lever to "Talk" and hold in position while talking. To listen, release lever and let it swing back to "Receive" position.

## SUB-STATION SELECTOR SWITCH

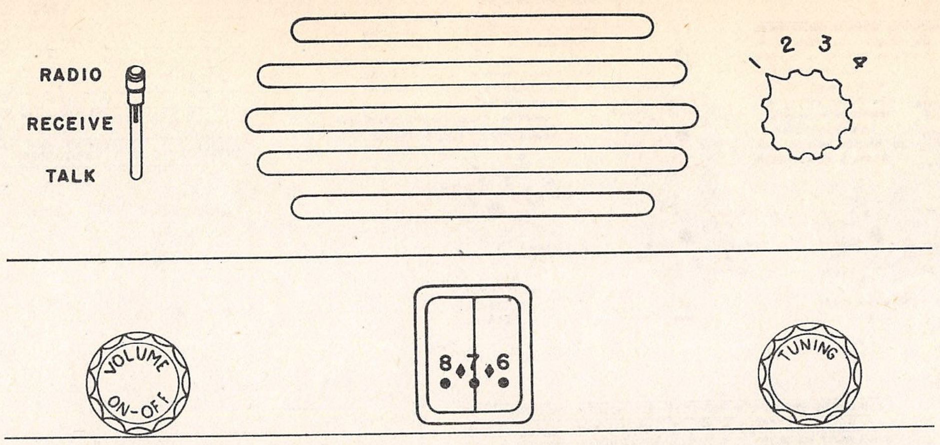
This is a four position switch with positions marked 1, 2, 3, and 4 indicating sub-stations 1, 2, 3, and 4 respectively. Set the sub-station selector switch for the desired station.

Model 7S Sub-Stations are each equipped with a push-to-talk switch, which is normally in the listen position. In order to talk from any sub-station, this switch must be depressed and held down while talking.

## IF THE RADIO-UTILIPHONE FAILS TO OPERATE

FIRST- Check power supply by connecting a lamp to the outlet, or by connecting the radio-utiliphone in another socket.

SECOND - When used on DC, if the radio does not operate, even though the tubes are lighted, reverse the plug in the socket to provide correct polarity.



THIRD - See if tubes are lighted after the radio-utiliphone has been turned on for almost a minute. Tubes in the Electronic Model 76RU are connected so that if one tube is loose in its socket, or defective, none of the tubes will light.

See that tubes are pushed into sockets. If they still fail to light, have them checked by your local radio dealer.

IF THE UTILIPHONE FAILS TO OPERATE, but the radio does operate, check the following:

FIRST - Check the setting of the sub-station selector switch.

SECOND - Check for loose interconnecting wires.

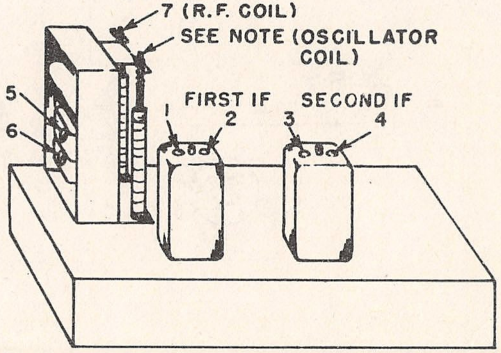
THIRD - Check for correct connections between stations. Example: - Be sure the same wire is connected from Row 1 - Terminal "A" to Station 1 - Terminal "A", etc.

Any difficulties that are not corrected by following the above instructions should be referred to a competent serviceman.

## SERVICE DATA—ALIGNMENT NOTES

A. MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F. coil winding. (Note:-The distance 1 and 2 should be measured from mounted end of the slug.)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".



## ELECTRONIC LABORATORIES, INC.

Radio Utiliphone,
MODEL 76RU,
Chassis 2865

B. I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F. adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.5 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap (under chassis) by turning clockwise to the minimum signal.

C. R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.5 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F. input to keep signal output voltage below 0.5 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R.F. coil slug by rotation in the Tinnerman nut to maximum output.

NOTE: Alternately adjust R.F. trimmer and R. F. slug until maximum output is reached at both 1400 KC and 700 KC as instructed in paragraphs C4 and C5.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

## SPECIFICATIONS

Power consumption............. 35 Watts
(At 117 volts AC Supply)
Power Output- 1.1 Watts 10% Distortion
1.6 Watts Max.
Selectivity----49 KC Broad at
1000 times Signal
Intermediate Frequency......... 455 KC
Speaker....................... 4"x6" Oval
Tuning Frequency Range..540 to 1620 KC
Sensitivity (For .05 Watt output-external Antenna) 15 microvolts average

## ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

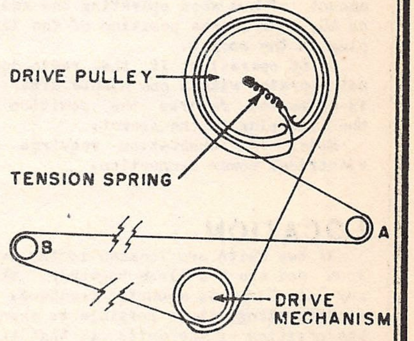
Output Indicating Meter; Non-Metallic Screwdriver.

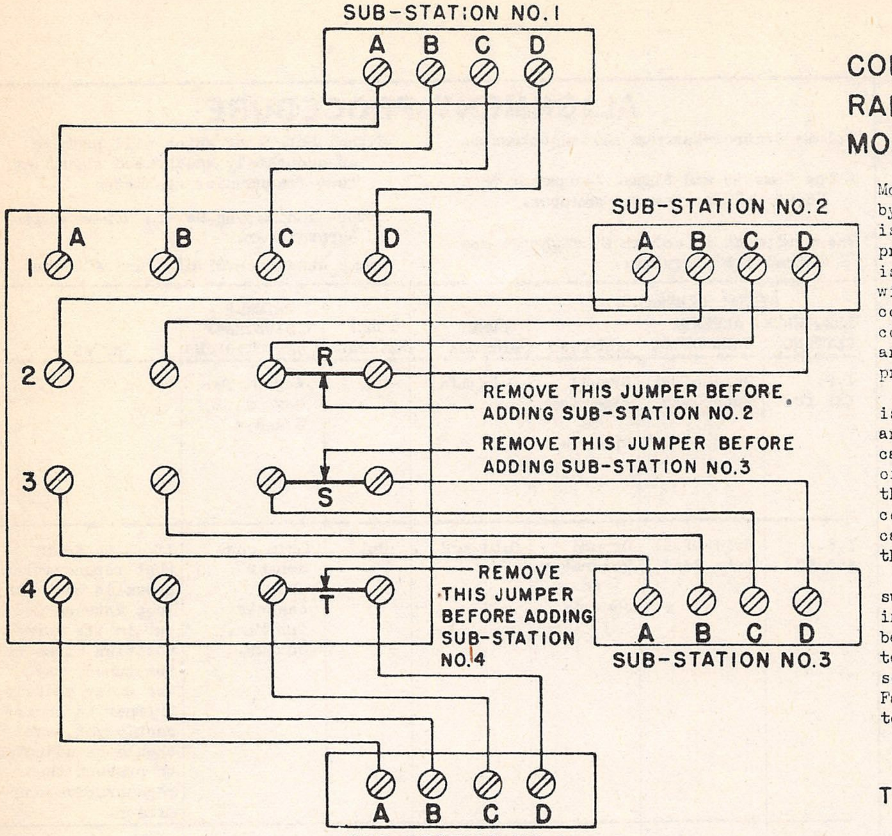
Dummy Antennas-.01 mf., and 400 ohms.

| SIGNAL GENERATOR | | | | | | |
|---|---|---|---|---|---|---|
| FREQUENCY SETTING | ANTENNA CONNECTION | COUPLING | DUMMY ANTENNA | TUNER SETTING | TRIMMER ADJUSTMENT (SEE DIAGRAM) | NOTES |
| I.F. 455 KC | Grid of RF tube 14A7 | Ground generator to chassis | 0.01 mfd | Out | Adjust for Max. 1, 2, 3 and 4 | |
| I.F. 455 KC | Grid of RF tube 14A7 | Ground generator to chassis | 0.01 mfd | Out | Trim condenser under chassis for Min. output. | If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition. |
| 1620 KC | Inductive Coupling to Loop | Loop coupling with leads brought out | 400 ohms in series with Antenna & Gnd.leads | Out | Adjust Osc. #5 for Max. Signal | |
| 1400 KC | Inductive Coupling to Loop | Loop coupling with leads brought out | 400 ohms in series with Antenna & Gnd.leads | Dial set for 1400KC | Adjust RF trimmer #6 for Max. Signal | |
| 700 KC | Inductive Coupling to Loop | Loop Coupling with leads brought out | 400 ohms in series with Antenna & Gnd.leads | Dial set for 700KC | Adjust RF tuning core #7 for Max. Signal (care should be taken not to disturb carriage position of tuner) | Alternately adjust R.F. trimmer and R.F. slug until maximum output is reached at both 1400 KC and 700 KC as instructed above. |

## DRIVE CORD REPLACEMENT

Turn the tuner to the fully open position. Use a new cord 41" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string.
Attach dial pointer to cord.




SUB-STATION NO.1
A
B
C
D
SUB-STATION NO.2
A
B
C
D
1
2
3
4
R
REMOVE THIS JUMPER BEFORE ADDING SUB-STATION NO.2
REMOVE THIS JUMPER BEFORE ADDING SUB-STATION NO.3
S
T
REMOVE THIS JUMPER BEFORE ADDING SUB-STATION NO.4
SUB-STATION NO.3
SUB-STATION NO.4

## INSTALLATION CONNECTION, MODEL 76RU RADIO-UTILIPHONE AND MODEL 7S SUB-STATIONS

Model 76RU Radio-Utiliphone and Model 7S Sub-Stations are interconnected by using the four-conductor wire furnished. (Additional lengths, up to approximately 500 feet may be used. This is available in 50 foot lengths.) The wire supplied with the equipment is color coded for convenience in making connections. Connections on each unit are made to screws on the terminal boards provided. (See connection diagram.)

The terminal board on the Sub-Station is located on the back of the cabinet, and on the radio-utiliphone, it is located on the back of the chassis inside of the cabinet. Remove four screws in the corners of the back cover. The back cover may then be pulled away from the cabinet far enough to permit access to the terminal board.

Wires must be clean and free of insulation before making connections. To insure a good connection, the wire should be wrapped completely around the screw terminal. Screw should then be tightened so that wires are held securely in place. Faulty connections of any kind may interfere with operation.

## TO CONNECT TWO OR MORE SUB-STATIONS

The Model 76RU Radio-Utiliphone is supplied, by the manufacturer, set up to operate one sub-station. If more than one sub-station is to be installed, be sure to read all instructions before starting to connect the stations.

Terminal board on the 76RU, is marked 1, 2, 3, 4, and A, B, C, D. The numbers 1, 2, 3, and 4 indicate stations, the letters A, B, C and D indicate the four terminals which are to be used for connections to the sub-stations.

Stations must be connected in sequence as marked. IF ONLY ONE STATION IS TO BE USED, IT MUST BE CONNECTED TO THE SET OF TERMINALS MARKED "1".

THE SAME WIRE MUST BE CONNECTED BETWEEN TERMINALS HAVING THE SAME MARKINGS:-

Terminal 1A (on Model 76RU) to Terminal A on No. 1 Sub-Station
Terminal 1B (on Model 76RU) to Terminal B on No. 1 Sub-Station
Terminal 1C (on Model 76RU) to Terminal C on No. 1 Sub-Station
Terminal 1D (on Model 76RU) to Terminal D on No. 1 Sub-Station

Be certain that jumpers R, S, and T are in place per diagram.

## LINE VOLTAGE

Model 76RU Radio Utiliphone operates only on a power supply of 105-125 volts AC, 50 to 60 cycles, or 105-125 volts DC. If in doubt about your line voltage, check with your local power company before connecting the Radio-Utiliphone.

If there seems to be an excessive amount of hum when operating the radio on AC, reverse the position of the line plug in the socket.

On DC operation, if the radio does not operate within one minute after it is connected, reverse the position of the line plug in the socket.

Model 7S Sub-Station requires no electrical power connection.

## LOCATION

If two units are located in the same room and are too close together, they may "sing" due to acoustic feedback. By experimenting, it is possible to change the position of the units to that this feedback is eliminated.

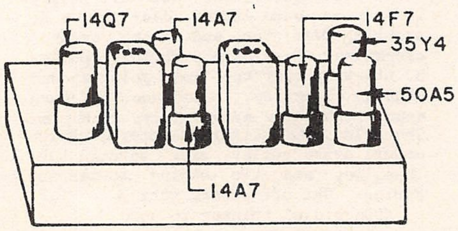
## TUBES AND DIAL LAMP

The type and position of tubes are shown in illustration.

All tubes and the dial lamp MUST be in the socket to operate the radio-utiliphone.

CAUTION - If a dial lamp burns out, it should be replaced at once. A hole in the bottom of the cabinet provides access to the dial lamp so that it may be replaced without removing chassis from the cabinet.

Use only a #47 dial lamp.



## TO CONNECT ONE SUB-STATION

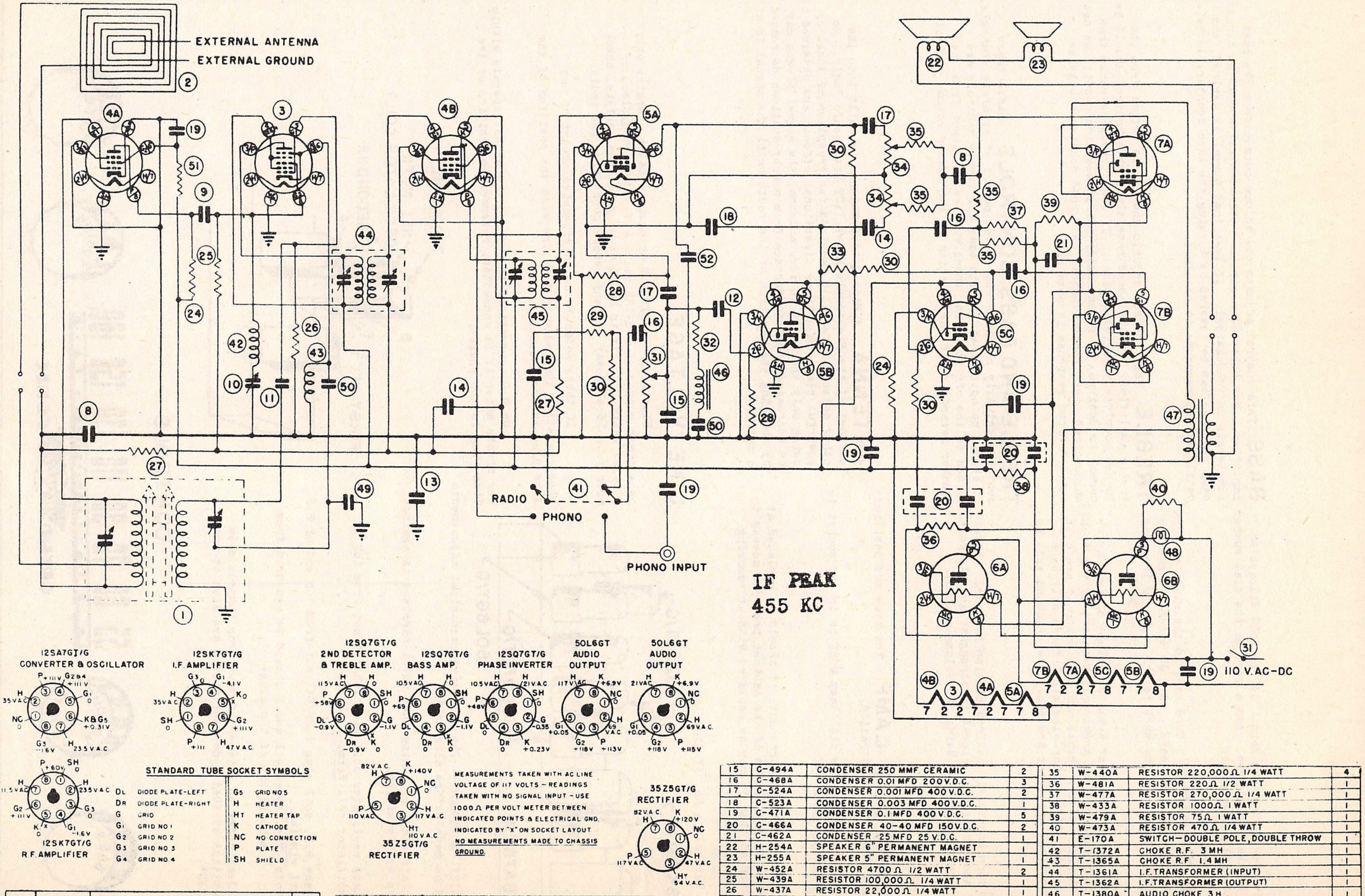
Sub-Stations must always be connected in sequence as marked on the terminal board. If two sub-stations are used, they must be connected to the terminals marked "1" and "2". Before connecting station No. 2, remove jumper "R" (refer to connection diagram). Then connect wires between terminals #2A, #2B, #2C, and #2D and Terminals A, B, D, and D of No. 2 sub-station. IF ONE STATION IS LATER REMOVED, THE REMAINING STATION MUST THEN BE CONNECTED TO THE TERMINALS MARKED "1", AND JUMPER "R" MUST BE REPLACED.

Three sub-stations must be connected to terminals #1, #2 and #3. Before connecting station #3, remove jumper "S" (refer to conrection diagram). Then connect wires between terminals #3A, #3B, #3C and #4D, and terminals A, B, C, and D of No. 3 sub-station. If the third station is later removed, the two remaining stations must be connected to terminals marked "1" and "2", and jumper "S" must be replaced.

Before connecting station No. 4, remove jumper "T" (refer to connection diagram). Then connect wires between terminals #4A, #4B, #4C, and #4D, and terminals A, B, C, and D of No. 4 sub-station. If fourth station is later removed, the three remaining stations must be connected to terminals #1, #2 and #3, and jumper "T" must be replaced.

# ELECTRONIC LABORATORIES, INC.

## MODEL 710T, Orthosonic, Chassis 2875


EXTERNAL ANTENNA
EXTERNAL GROUND
RADIO
PHONO
PHONO INPUT
110 V. AC-DC
7 2 2 7 2 7 7 8
7 2 2 7 8 7 7 8
12SA7GT/G CONVERTER & OSCILLATOR
12SK7GT/G I.F. AMPLIFIER
12SQ7GT/G 2ND DETECTOR & TREBLE AMP.
12SQ7GT/G BASS AMP
12SQ7GT/G PHASE INVERTER
50L6GT AUDIO OUTPUT
50L6GT AUDIO OUTPUT
35Z5GT/G RECTIFIER
12SK7GT/G R.F. AMPLIFIER
35Z5GT/G RECTIFIER

IF PEAK 455 KC

STANDARD TUBE SOCKET SYMBOLS

| | | | |
|---|---|---|---|
| DL | DIODE PLATE-LEFT | G5 | GRID NO 5 |
| DR | DIODE PLATE-RIGHT | H | HEATER |
| G | GRID | HT | HEATER TAP |
| G1 | GRID NO 1 | K | CATHODE |
| G2 | GRID NO 2 | NC | NO CONNECTION |
| G3 | GRID NO 3 | P | PLATE |
| G4 | GRID NO 4 | SH | SHIELD |

MEASUREMENTS TAKEN WITH AC LINE VOLTAGE OF 117 VOLTS – READINGS TAKEN WITH NO SIGNAL INPUT – USE 1000Ω PER VOLT METER BETWEEN INDICATED POINTS & ELECTRICAL GND. INDICATED BY "X" ON SOCKET LAYOUT. NO MEASUREMENTS MADE TO CHASSIS GROUND.

LIST OF PARTS

| ITEM | PART NO. | DESCRIPTION | REQ'D |
|---|---|---|---|
| 1 | A-2220A | TUNER ASSEMBLY | 1 |
| 2 | A-2221A | LOOP & BACK COVER ASSEMBLY | 1 |
| 3 | 12SA7GT/G | TUBE | 1 |
| 4 | 12SK7GT/G | TUBE | 2 |
| 5 | 12SQ7GT/G | TUBE | 3 |
| 6 | 35Z5GT/G | TUBE | 2 |
| 7 | 50L6GT | TUBE | 2 |
| 8 | C-460A | CONDENSER 0.1 MFD 200 V.D.C. | 2 |
| 9 | C-493A | CONDENSER 1000 MMF. CERAMIC | 1 |
| 10 | C-483B | CONDENSER 10-160 MMF | 1 |
| 11 | C-495A | CONDENSER 50 MMF CERAMIC | 1 |
| 12 | C-418A | CONDENSER 0.05 MFD 400 V.D.C. | 1 |
| 13 | C-497A | CONDENSER 0.2 MFD 400 V.D.C. | 1 |
| 14 | C-467A | CONDENSER 0.05 MFD 200 V.D.C | 2 |
| 15 | C-494A | CONDENSER 250 MMF CERAMIC | 2 |
| 16 | C-468A | CONDENSER 0.01 MFD 200 V.D.C. | 3 |
| 17 | C-524A | CONDENSER 0.001 MFD 400 V.D.C. | 2 |
| 18 | C-523A | CONDENSER 0.003 MFD 400 V.D.C. | 1 |
| 19 | C-471A | CONDENSER 0.1 MFD 400 V.D.C. | 5 |
| 20 | C-466A | CONDENSER 40-40 MFD 150 V.D.C. | 2 |
| 21 | C-462A | CONDENSER 25 MFD 25 V.D.C. | 1 |
| 22 | H-254A | SPEAKER 6" PERMANENT MAGNET | 1 |
| 23 | H-255A | SPEAKER 5" PERMANENT MAGNET | 1 |
| 24 | W-452A | RESISTOR 4700Ω 1/2 WATT | 2 |
| 25 | W-439A | RESISTOR 100,000Ω 1/4 WATT | 1 |
| 26 | W-437A | RESISTOR 22,000Ω 1/4 WATT | 1 |
| 27 | W-442A | RESISTOR 2.2 MEG 1/4 WATT | 2 |
| 28 | W-480A | RESISTOR 4.7 MEG 1/4 WATT | 2 |
| 29 | W-438A | RESISTOR 47,000Ω 1/4 WATT | 1 |
| 30 | W-441A | RESISTOR 470,000Ω 1/4 WATT | 4 |
| 31 | W-489A | POTENTIOMETER & SWITCH 500,000Ω | 1 |
| 32 | W-478A | RESISTOR 33,000Ω 1/4 WATT | 1 |
| 33 | W-468A | RESISTOR 330,000Ω 1/4 WATT | 1 |
| 34 | W-476A | POTENTIOMETER 1 MEG | 2 |
| 35 | W-440A | RESISTOR 220,000Ω 1/4 WATT | 4 |
| 36 | W-481A | RESISTOR 220Ω 1/2 WATT | 1 |
| 37 | W-477A | RESISTOR 270,000Ω 1/4 WATT | 1 |
| 38 | W-433A | RESISTOR 1000Ω 1 WATT | 1 |
| 39 | W-479A | RESISTOR 75Ω 1 WATT | 1 |
| 40 | W-473A | RESISTOR 470Ω 1/4 WATT | 1 |
| 41 | E-170A | SWITCH–DOUBLE POLE, DOUBLE THROW | 1 |
| 42 | T-1372A | CHOKE R.F. 3 MH | 1 |
| 43 | T-1365A | CHOKE R.F. 1.4 MH | 1 |
| 44 | T-1361A | I.F. TRANSFORMER (INPUT) | 1 |
| 45 | T-1362A | I.F. TRANSFORMER (OUTPUT) | 1 |
| 46 | T-1380A | AUDIO CHOKE 3 H | 1 |
| 47 | T-1379A | OUTPUT TRANSFORMER | 1 |
| 48 | H-241A | PILOT LAMP | 1 |
| 49 | C-531A | CONDENSER 2000 MMF CERAMIC | 1 |
| 50 | C-500A | CONDENSER 10,000 MMF 400 V D.C. | 2 |
| 51 | W-490A | RESISTOR 15,000Ω 1/4 WATT | 1 |
| 52 | C-492A | CONDENSER 100 MMF 50 V.D.C. | 1 |

# ELECTRONIC LABORATORIES, INC.

**DIAL** Standard Broadcast Band. 540 to 1620 Kilocycles. Calibrated in channel numbers. Add a zero to the dial number to obtain the kilocycle number.

**VOLUME, ON-OFF** Turn knob to the right to turn radio on. A click will be heard - wait 30 seconds for tubes to heat. Continue to turn the knob to the right to increase the volume.

This control acts as a master volume control after treble and bass response has previously been set by the treble and bass controls. If the treble and bass controls are both turned completely off (counter-clockwise) there will be no volume to the final amplifier and therefore no sound will be heard.

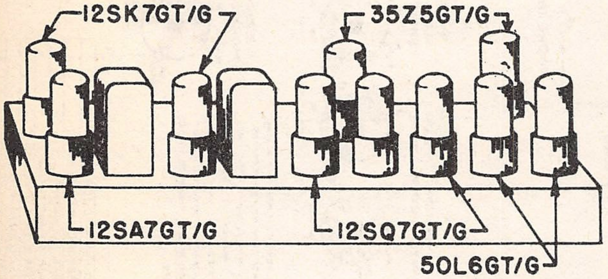
**TUNING** Turn knob until desired station is heard. Rotate slowly back and forth until signal is strongest and clearest. Reduce or increase signal by using the volume control.

**TUBES AND DIAL LAMP** The type and position of tubes are shown in illustration.

All tubes and the dial lamp MUST be in the socket to operate the radio.

CAUTION - If a dial lamp burns out, it should be replaced at once. A hole in the bottom of the cabinet provides access to the dial lamp so that it may be replaced without removing chassis from the cabinet.

Use only a No. 47 dial lamp



MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F. coil winding.
   (Note:-The distance 1 and 2 should be measured from mounted end of the slug)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".

**BASS** This control adjusts the volume output from the bass amplifier. For balanced reception, this control should be turned completely on (clockwise). If less than normal is desired, the bass response can be lowered by turning the knob counter-clockwise until desired response is obtained.

**TREBLE** This control adjusts the volume output from the treble amplifier. For balanced reception, this control should be turned completely on (clockwise). If less treble response than normal is desired, or if unusually noisy reception conditions are encountered, this control should be turned counter-clockwise until desired response is obtained.

**TREBLE AND BASS CONTROLS** Since these controls actually regulate the volume output of separate channels, it should be noted that if both bass and treble controls are turned to the off position, there will be no output from the speaker regardless of the position of the master volume control.

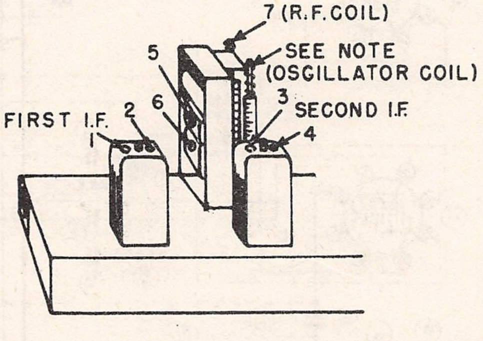
**ANTENNA** A High Q Loop Antenna is built into the cabinet of the Electronic Model 710T Orthosonic Radio. No other antenna is usually required for reception of local or powerful stations. Since directional effects are obtained by using only the built-in loop antenna, the signal pickup may be increased and interference from nearby stations decreased, by changing the position of the radio until the signal is at a maximum.

## LINE VOLTAGE

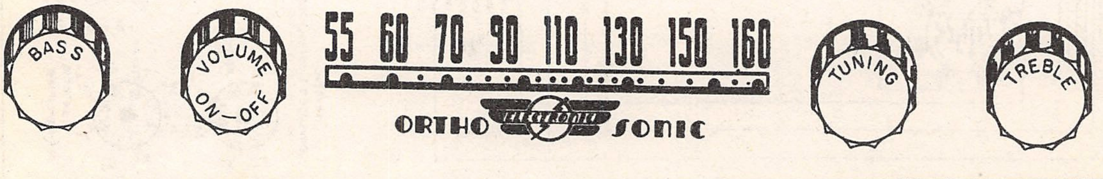
Electronic Model 710T Orthosonic Radio operates only on a power supply of 105-125 volts A.C. 50 to 60 cycles, or 105-125 volts D.C. If in doubt about your line voltage, check with your local power company before connecting the radio.

If there seems to be an excessive amount of hum when operating the radio on A.C., reverse the position of the line plug in the socket.

On D.C. operation, if the radio does not operate within one minute after it is connected, reverse the position of the line plug in the socket.



## CONTROLS



MODEL 710T

# ELECTRONIC LABORATORIES, INC.

### I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F. adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.7 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap by turning clockwise to the minimum signal.

### R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.7 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F. input to keep signal output voltage below 0.7 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R.F. coil slug by rotation in the Tinnerman nut to maximum output.

NOTE: Alternately adjust R.F. trimmer and R.F. slug until maximum output is reached at both 1400 kc. and 700 kc. as instructed in paragraphs C4 and C5.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

## SPECIFICATIONS

Power consumption............ 60 Watts
(At 117 volts AC Supply)
Power Output- 3.5 Watts Max.
2.5 Watts 10% Distortion
Selectivity----45 KC Broad at
1000 times Signal
Intermediate Frequency.........455 KC
Speakers................4½" PM Dynamic
6" PM Dynamic
Tuning Frequency Range..540 to 1620 KC
Sensitivity (For .05 Watt output-external Antenna) 10 microvolts average

## ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

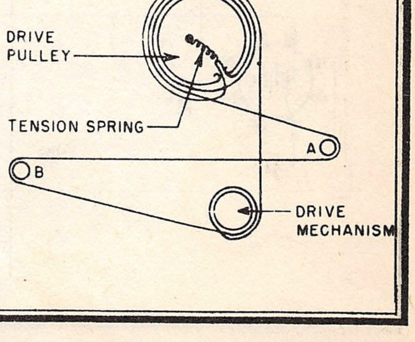
Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas-.01 mf., and 400 ohms.

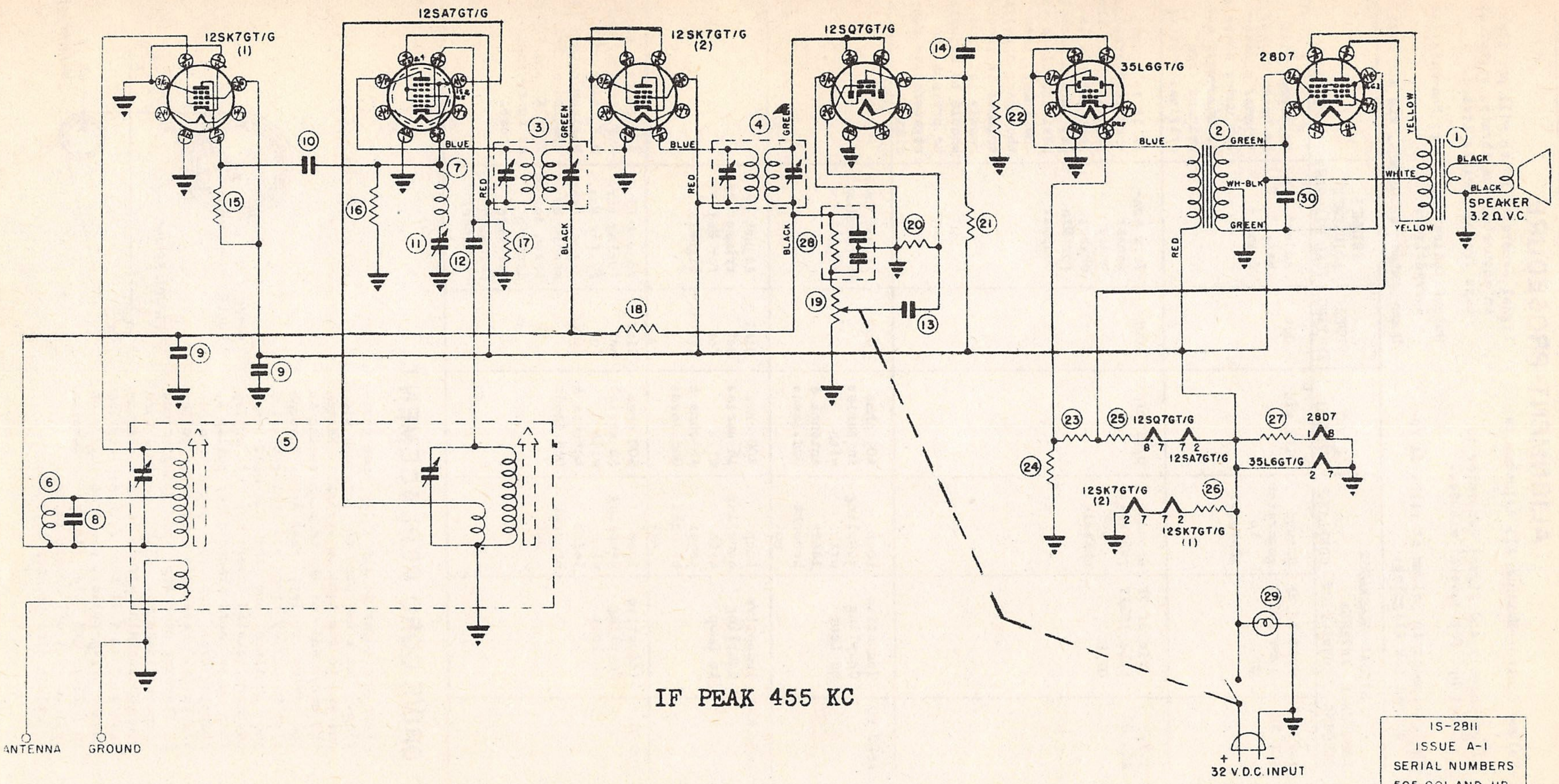
| FREQUENCY SETTING | SIGNAL GENERATOR ANTENNA CONNECTION | COUPLING | DUMMY ANTENNA | TUNER SETTING | TRIMMER ADJUSTMENT (SEE DIAGRAM) | NOTES |
|---|---|---|---|---|---|---|
| I.F. 455 KC | Grid of RF tube 12SK7 GTG | Ground generator to chassis | 0.01 mfd | Out | Adjust for Max. 1, 2, 3 and 4 | No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting |
| I.F. 455 KC | Grid of RF tube 12SK7 GT/G | Ground generator to chassis | 0.01 mfd | Out | Trim condenser under chassis for Min. output. | If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition. |
| 1620 KC | Inductive Coupling to Loop | Loop coupling with leads brought out | 400 ohms in series with Antenna & Gnd.leads | Out | Adjust Osc. #5 for Max. signal | |
| 1400 KC | Inductive Coupling to Loop | Loop coupling with leads brought out | 400 ohms in series with Antenna & Gnd.leads | Dial set for 1400KC | Adjust RF trimmer #6 for Max. Signal. | |
| 700 KC | Inductive Coupling to Loop | Loop Coupling with leads brought out | 400 ohms in series with Antenna & Gnd.leads | Dial set for 700KC | Adjust RF tuning core #7 for Max. Signal (care should be taken not to disturb carriage position of tuner) | Alternately adjust R.F. trimmer and R.F. slug until Maximum output is reached at both 1400 KC and 700 KC as instructed above. |

## DRIVE CORD REPLACEMENT

Turn the tuner to the fully open position. Use a new cord 50" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string.
Attach dial pointer to cord.



# ELECTRONIC LABORATORIES, INC.


12SK7GT/G (1)
12SA7GT/G
12SK7GT/G (2)
12SQ7GT/G
35L6GT/G
28D7
SPEAKER 3.2Ω V.C.
BLACK
BLACK
WHITE
YELLOW
YELLOW
GREEN
WH-BLK
GREEN
RED
BLUE
BLUE
BLUE
GREEN
GREEN
RED
RED
BLACK
BLACK
12SQ7GT/G 8 7 7 2
12SA7GT/G
28D7 1 8
35L6GT/G 2 7
12SK7GT/G (2) 2 7
12SK7GT/G (1) 7 2
32 V.D.C. INPUT
+
−
ANTENNA
GROUND
①
②
③
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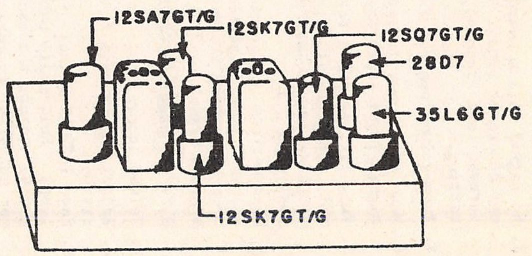
IF PEAK 455 KC

IS-2811
ISSUE A-1
SERIAL NUMBERS
505,001 AND UP

LIST OF PARTS

| ITEM | PART NO. | DESCRIPTION | REQ'D |
|---|---|---|---|
| 1 | T-1385A | OUTPUT TRANSFORMER | 1 |
| 2 | T-1386A | DRIVER TRANSFORMER | 1 |
| 3 | T-1361A | I.F. TRANSFORMER | 1 |
| 4 | T-1362A | I.F. TRANSFORMER | 1 |
| 5 | ISSUE-A<br>A-2309A | TUNER ASSEMBLY | 1 |
| 6 | T-1387A | CHOKE 304 MICROHENRIES | 1 |
| 7 | T-1372 A | CHOKE 3 MILLIHENRIES | 1 |
| 8 | C-541A | CONDENSER 12 MMF CERAMIC | 1 |
| 9 | C-460A | CONDENSER 0.1 MFD 200 V.D.C. | 2 |
| 10 | C-493A | CONDENSER 1000 MMF-CERAMIC | 1 |
| 11 | C-483B | CONDENSER 10-160 MMF | 1 |
| 12 | C-495A | CONDENSER 50 MMF-CERAMIC | 1 |
| 13 | C-480A | CONDENSER 0.005 MFD 400 V.D.C. | 1 |
| 14 | C-468A | CONDENSER 0.01 MFD 200 V.D.C. | 1 |
| 15 | W-452A | RESISTOR 4700Ω 1/2 WATT | 1 |
| 16 | W-442A | RESISTOR 2.2 MEGΩ 1/4 WATT | 1 |
| 17 | W-437A | RESISTOR 22,000 Ω 1/4 WATT | 1 |
| 18 | W-417A | RESISTOR 1 MEGΩ 1/2 WATT | 1 |
| 19 | W-444A | POTENTIOMETER & SWITCH 500,000Ω | 1 |
| 20 | W-443A | RESISTOR 10 MEGΩ 1/4 WATT | 1 |
| 21 | W-440A | RESISTOR 220,000Ω 1/4 WATT | 1 |
| 22 | W-441A | RESISTOR 470,000Ω 1/4 WATT | 1 |
| 23 | W-78B | RESISTOR 5.1Ω 1/2 WATT | 1 |
| 24 | W-494A | RESISTOR 15Ω 2 WATT | 1 |
| 25 | W-175A | RESISTOR 22 Ω 1 WATT | 1 |
| 26 | W-493A | RESISTOR 47Ω 1 WATT | 1 |
| 27 | W-150A | RESISTOR 10Ω 2 WATT | 1 |
| 28 | A-2297A | DIODE FILTER UNIT | 1 |
| 29 | H-266A | DIAL LIGHT-36 VOLT | 1 |
| 30 | C-524A | CONDENSER 0.001 MFD 400 V.D.C | 1 |

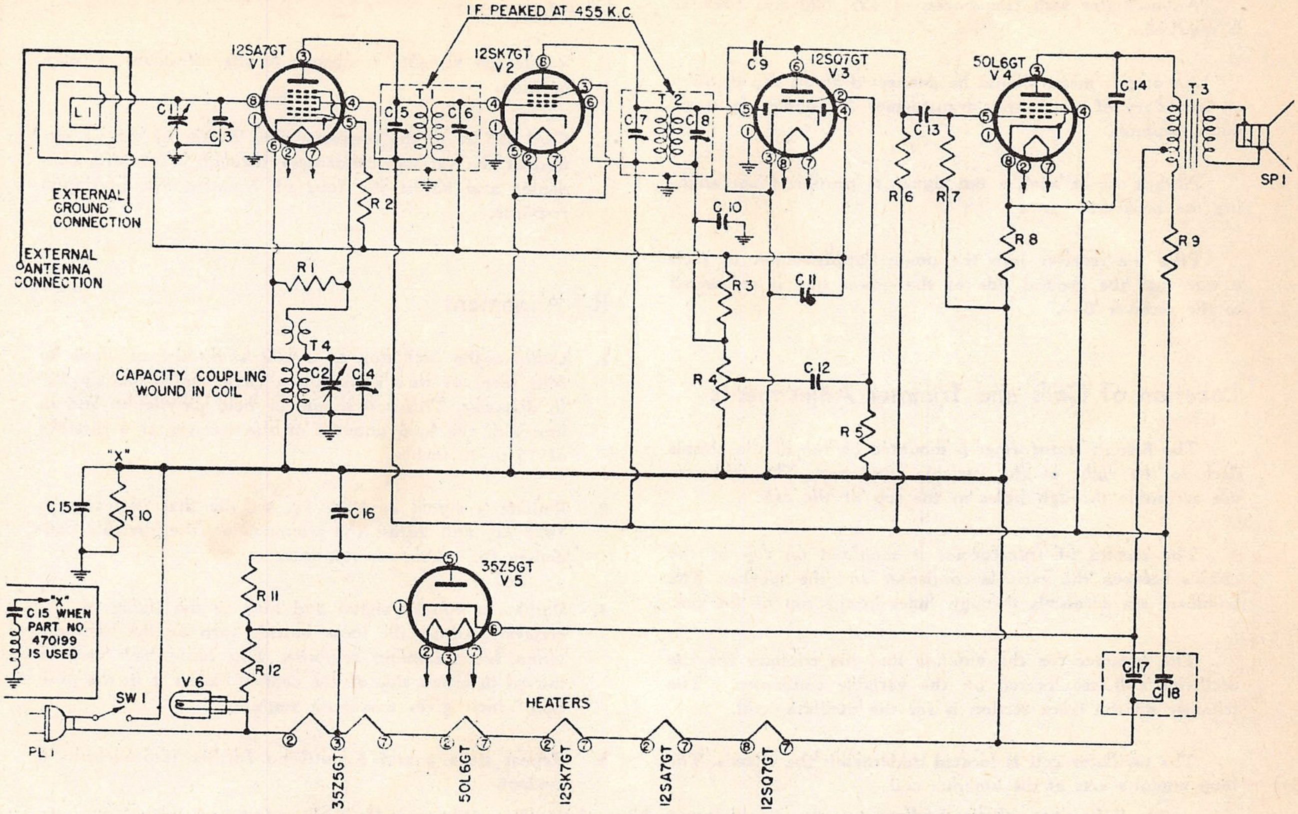

12SA7GT/G
12SK7GT/G
12SQ7GT/G
28D7
35L6GT/G
12SK7GT/G

# EMERSON RADIO & PHONO. CORP.

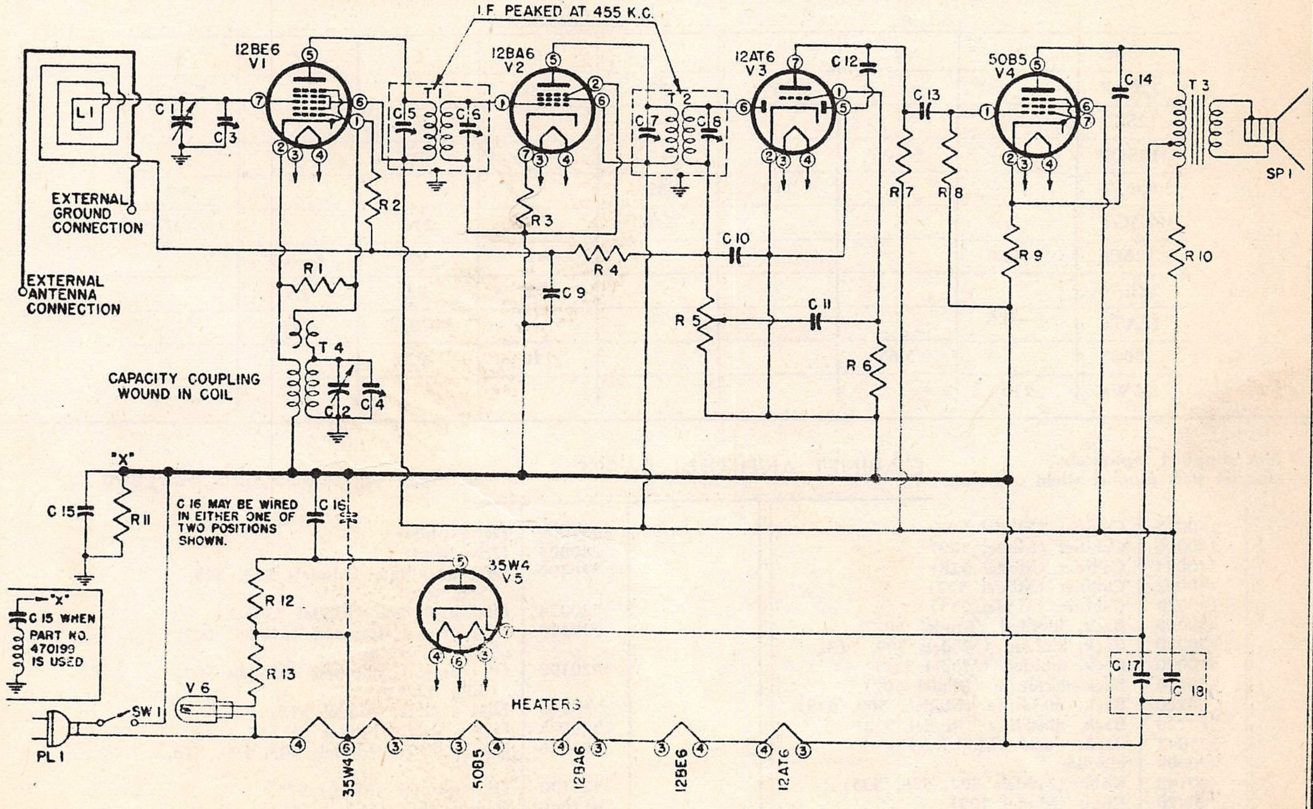
**MODELS 503,510,510A,520,539**
**Chassis 120000,120029,120030,**
**120032,120035,120044**

**TYPE:** Single-band superheterodyne.

**FREQUENCY RANGE:** 540-1620 kc.


I.F. PEAKED AT 455 K.C.
12SA7GT V1
12SK7GT V2
12SQ7GT V3
50L6GT V4
35Z5GT V5
V6
L1
C1
C3
T1
C5
C6
T2
C7
C8
C9
C10
C11
C12
C13
C14
T3
SP1
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
T4
C2
C4
C15
C16
C17
C18
EXTERNAL GROUND CONNECTION
EXTERNAL ANTENNA CONNECTION
CAPACITY COUPLING WOUND IN COIL
"X"
C15 WHEN PART NO. 470199 IS USED
SW1
PL1
HEATERS
35Z5GT
50L6GT
12SK7GT
12SA7GT
12SQ7GT

Schematic Circuit Diagram of Chassis Models 120000, 120029, 120030, 120044


I.F. PEAKED AT 455 K.C.
12BE6 V1
12BA6 V2
12AT6 V3
50B5 V4
35W4 V5
V6
L1
C1
C3
T1
C5
C6
T2
C7
C8
C9
C10
C11
C12
C13
C14
T3
SP1
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
T4
C2
C4
C15
C16
C17
C18
EXTERNAL GROUND CONNECTION
EXTERNAL ANTENNA CONNECTION
CAPACITY COUPLING WOUND IN COIL
"X"
C16 MAY BE WIRED IN EITHER ONE OF TWO POSITIONS SHOWN.
C15 WHEN PART NO. 470199 IS USED
SW1
PL1
HEATERS
35W4
50B5
12BA6
12BE6
12AT6

Schematic Circuit Diagram of Chassis Models 120032, 120035

MODELS 503,510,510A,520,539
MODELS 507,509,518,522,535
MODELS 525,552
MODELS 543,544

## EMERSON RADIO & PHONO. CORP.

ALL MODELS

An oscillator with frequencies of 455, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—.

### Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the variable condenser. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis between the variable condenser and the speaker. The trimmers are accessible through holes in the top of the can.

The trimmer for the antenna and the trimmer for the oscillator coil are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil is located underneath the chassis. The loop antenna acts as the antenna coil.

### I-f Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the converter grid (stator of the r-f section of the variable condenser) through a 0.1 mfd. condenser and adjust the four i-f trimmers for maximum response.

### R-f Alignment

1. Connect the oscillator to a coil composed of three to four turns of wire wound in a circle approximately 12" in diameter. This coil should be held parallel to and in line with the loop antenna of the receiver at a distance of 15 to 20 inches.
2. Radiate a signal at 1425 kc, set the dial indicator to 1425 kc, and adjust the trimmers on the variable condenser for maximum response.
3. Radiate a 600 kc signal and tune in the signal on the receiver. Adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
4. Repeat steps 2 and 3 until no further improvement is evident.

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

| | PIN NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TUBE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 12SA7 | | | 89 | 89 | *—10 | | | *—1.6 |
| 12SK7 | | | | *—1.6 | | 89 | | 89 |
| 12SQ7 | | *—0.7 | | *—1.6 | —0.5 | 37.5 | | |
| 50L6GT | | | 110 | 89 | | | | 6.2 |
| 35Z5GT | | | | 116 | | 116 | | 117 |
| 12BE6 | *—8.0 | | | | 92 | 92 | *—1.3 | |
| 12BA6 | | | | | 92 | 92 | 1.7 | |
| 12AT6 | *—0.6 | | | | | *—0.45 | *44 | |
| 50B5 | | 5.65 | | | 110 | 92 | | |
| 35W4 | 115 | | | | | | 115 | |

* Not supplied separately.
† Specify part number when ordering.

### CABINET AND DIAL PARTS

MODEL--507,509,518,522,535

| | |
|---|---|
| 140015 | Cabinet (Model 507) |
| 140016 | Cabinet (Model 509) |
| 140034 | Cabinet (Model 518) |
| 140007 | Cabinet (Model 522) |
| 140070 | Cabinet (Model 535) |
| 450060 | Back, molded (Model 507) |
| 450080 | Back, molded (Models 509, 518) |
| 450050 | Back, molded (Model 522) |
| 560110 | Back masonite (Model 507) |
| 560220 | Back, masonite (Models 509, 518) |
| 560120 | Back, masonite (Model 522) |
| 575047 | Back, wood (Model 535) |
| 450000 | Handle |
| 460140 | Knob (Models 507, 518, 535) |
| 460470 | Knob (Model 509) |
| 460150 | Knob (Model 522) |
| 531009 | Drive pulley |
| 280003 | Drive shaft |
| 520499 | Dial backplate (Models 507, 509, 518, 522) |
| 520024 | Dial backplate (Model 535) |
| 520350 | Dial crystal, stamped (Models 507, 509, 522), or |
| 520190 | Dial crystal, stamped (Models 507, 509, 522) |
| 520440 | Dial crystal (Model 518) |
| 520025 | Dial crystal (Model 535) |
| 525080 | Dial pointer (Models 507, 509, 518, 522) |
| 525130 | Dial pointer (Model 535 |
| 411040 | Pointer hub (Model 535) |

MODELS 503,510,510A,520,539

# EMERSON RADIO & PHONO. CORP.

## CHASSIS 120000, 120029, 120030, 120044

| Schematic Symbol | †Part No. | DESCRIPTION |
|---|---|---|
| C1, C2 | 900170 | Two-gang variable condenser (chassis 120000) |
| C1, C2 | 900319 | Two-gang variable condenser (chassis 120030 and 120044) |
| C1, C2 | 900290 | Two-gang variable condenser chassis 120029) |
| *C3, C4 | | Trimmers, part of variable condenser |
| *C5, C6, C7, C8 | | Trimmers, part of i-f transformers |
| C9 | 920170 | 0.001 mfd., 600 volt condenser |
| C10 | 910000 | 0.00022 mfd. mica condenser |
| C11 | 920040 | 0.1 mfd., 200 volt condenser |
| C12 | 920010 | 0.002 mfd., 600 volt condenser |
| C13, C14 | 920020 | 0.02 mfd., 400 volt condenser |
| C15 | 920050 | 0.2 mfd., 200 volt condenser, or |
| C15 | 470199 | 0.2 mfd., 200 volt assembly (used only with midget i-f transformers 720525 and 720529) |
| C16 | 920030 | 0.05 mfd., 400 volt condenser |
| C17, C18 | 925009 | 50-50 mfd., 150 volt dual electrolytic condenser |
| L1 | 700000 | Loop antenna, or |
| L1 | 700200 | Loop antenna, or |
| L1 | 700210 | Loop antenna |
| *PL1 | | Plug, part of line cord |
| R1 | 310810 | 22,000 ohms, ¼ watt resistor |
| R2, R5 | 397000 | 15 meg., ½ watt resistor |
| R3 | 321330 | 3.3 meg., ¼ watt resistor |
| R4 | 390010 | 0.5 meg. volume control |
| R6, R7 | 321130 | 470,000 ohms, ¼ watt resistor |
| R8 | 340290 | 150 ohms, ½ watt resistor |
| R9 | 370490 | 1,000 ohms, 1 watt resistor |
| R10 | 321050 | 220,000 ohms, ¼ watt resistor |
| R11 | 340050 | 15 ohms, ½ watt resistor |
| R12 | 340010 | 10 ohms, ½ watt resistor |
| SP1 | 180000 | P.M. speaker |
| *SW1 | | Line switch on volume control |
| T1 | 720000 | First i-f transformer, or |
| T1 | 720525 | First i-f transformer, midget |
| T2 | 720100 | Second i-f transformer, or |
| T2 | 720529 | Second i-f transformer, midget |
| T3 | 734000 | Output transformer |
| T4 | 716010 | Oscillator coil |
| | 583010 | Line cord |

## CHASSIS 120032, 120035

| Schematic Symbol | †Part No. | DESCRIPTION |
|---|---|---|
| C1, C2 | 900319 | Two-gang variable condenser |
| *C3, C4 | | Trimmers, part of variable condenser |
| *C5, C6, C7, C8 | | Trimmers, part of i-f transformers |
| C9 | 920040 | 0.1 mfd., 200 volt condenser |
| C10 | 910000 | 0.00022 mfd. mica condenser |
| C11 | 920010 | 0.002 mfd., 600 volt condenser |
| C12 | 920170 | 0.001 mfd., 600 volt condenser |
| C13, C14 | 920020 | 0.02 mfd., 400 volt condenser |
| C15 | 920050 | 0.2 mfd., 200 volt condenser, or |
| C15 | 470199 | 0.2 mfd., 200 volt assembly (used only with midget i-f transformers 720525 and 720529) |
| C16 | 920030 | 0.05 mfd., 400 volt condenser |
| C17, C18 | 925009 | 50-50 mfd., 150 volt dual electrolytic condenser |
| L1 | 700000 | Loop antenna, or |
| L1 | 700210 | Loop antenna |
| *PL1 | | Plug, part of line cord |
| R1 | 310810 | 22,000 ohms, ¼ watt resistor |
| R2, R6 | 397000 | 15 meg., ½ watt resistor |
| R3 | 340310 | 180 ohms, ½ watt resistor |
| R4 | 321290 | 2.2 meg., ¼ watt resistor |
| R5 | 390010 | 0.5 meg. volume control |
| R7, R8 | 321130 | 470,000 ohms, ¼ watt resistor |
| R9 | 340290 | 150 ohms, ½ watt resistor |
| R10 | 370490 | 1,000 ohms, 1 watt resistor |
| R11 | 321050 | 220,000 ohms, ¼ watt resistor |
| R12 | 340050 | 15 ohms, ½ watt resistor |
| R13 | 340010 | 10 ohms, ½ watt resistor |
| SP1 | 180000 | P.M. speaker |
| *SW1 | | Line switch on volume control |
| T1 | 720000 | First i-f transformer, or |
| T1 | 720525 | First i-f transformer, midget |
| T2 | 720100 | Second i-f transformer, or |
| T2 | 720529 | Second i-f transformer, midget |
| T3 | 734000 | Output transformer |
| T4 | 716010 | Oscillator coil |
| | 583010 | Line cord |

## CABINET AND DIAL PARTS

* Not supplied separately.
† Specify part numbers when ordering

| | |
|---|---|
| 807000 | Pilot light |
| 280103 | Drive shaft |
| 520019 | Dial backplate, 320° dial numbers (Chassis 120000) |
| 520500 | Dial backplate, 180° dial numbers (Chassis 120029) |
| 412600 | Dial backplate, plain (Chassis 120035, 120030) |
| 410004 | Dial backplate, plain (Chassis 120032, 120044) |
| 520513 | Dial face, paper (Chassis 120032, 120044) |
| 525010 | Pointer (Chassis 120000, 120029) |
| 525090 | Pointer (Chassis 120030, 120032, 120035, 120044) |
| 520080 | Dial crystal (Chassis 120000, 120029, 120032, 120044) |
| 520470 | Dial crystal, printed (Chassis 120030, 120035) |
| 460140 | Knob (Model 503) |
| 460470 | Knob (Models 510, 539) |
| 460150 | Knob (Model 520) |
| 450230 | Ivory plastic front, square holes, (Model 520) |
| 450250 | Ivory plastic front, round holes, (Model 520) |
| 450330 | Black plastic front, square holes, (Model 510) |
| 450350 | Black plastic front, round holes, (Model 510) |
| 140001 | Cabinet (Model 503) |
| 140000 | Cabinet (Model 520) |
| 140005 | Cabinet (Model 510, 510A) |
| 140069 | Cabinet (Model 539) |

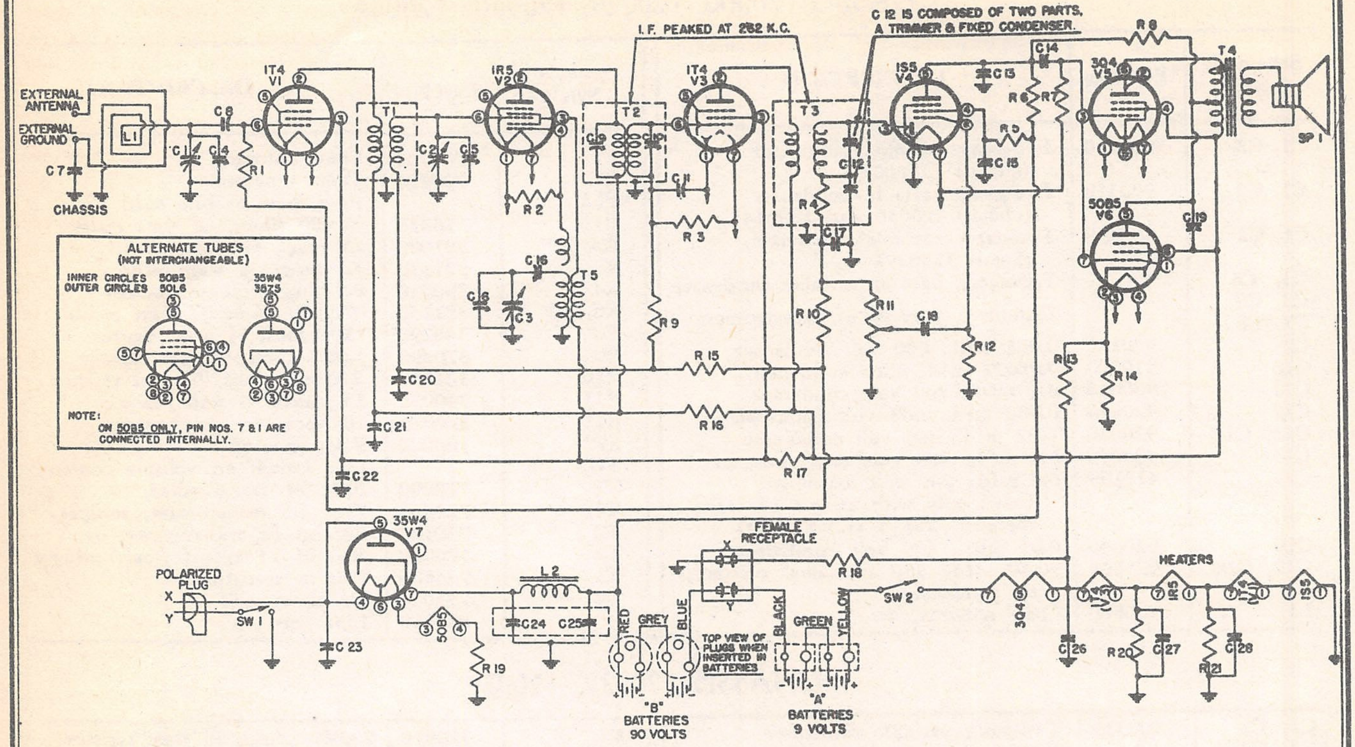
The color coding of the i-f transformer leads is as follows:

Grid—green
Grid return—black
Plate—blue
B+—red

Chassis 120000, 1200029, 120030, 120044 use metal or glass tubes. Chassis 120032 and 120035 use miniature tubes. Model 510A only uses chassis 120035.

**MODEL 505**
**Chassis 120020**

# EMERSON RADIO & PHONO. CORP.


C 12 IS COMPOSED OF TWO PARTS, A TRIMMER & FIXED CONDENSER.
I.F. PEAKED AT 262 K.C.
EXTERNAL ANTENNA
EXTERNAL GROUND
CHASSIS
L1
C1 C4 C7 C8
1T4 V1
R1
T1
C2 C5
1R5 V2
R2
C16 C6 C3
T5
T2
C9 C10 C11
1T4 V3
R3
R9
T3
C12
R4
C17
1S5 V4
C13 C14 C15
R5 R6 R7 R8
R10 R11 C18 R12
R15 R16 R17
C20 C21 C22
3Q4 V5
T4
SP 1
50B5 V6
C19
R13 R14
ALTERNATE TUBES (NOT INTERCHANGEABLE)
INNER CIRCLES 50B5 35W4
OUTER CIRCLES 50L6 35Z5
NOTE: ON 50B5 ONLY, PIN NOS. 7 & 1 ARE CONNECTED INTERNALLY.
35W4 V7
POLARIZED PLUG
X
Y
SW 1
C 23
L2
C24 C25
50B5
R19
FEMALE RECEPTACLE
RED GREY BLUE
BLACK GREEN YELLOW
TOP VIEW OF PLUGS WHEN INSERTED IN BATTERIES
"B" BATTERIES 90 VOLTS
"A" BATTERIES 9 VOLTS
R18
SW 2
HEATERS
3Q4 1T4 1R5 1T4 1S5
C26 R20 C27 R21 C28

Schematic Circuit Diagram Model 505, Chassis 120020

## Chassis 120020

| | | |
|---|---|---|
| C1, C2, C3 | 900080 | Three-gang variable condenser |
| *C4, C5, C6 | | Trimmers, part of variable condenser |
| C7, C18 | 920010 | 0.002 mfd., 600 volt condenser |
| C8, C11 | 920060 | 0.05 mfd., 200 volt condenser |
| *C9, C10 | | Trimmers, part of first i-f transformer |
| *C12 | | Trimmer and fixed condenser, part of second i-f transformer |
| C13 | 910050 | 0.0004 mfd. mica condenser |
| C14, C21 | 920020 | 0.02 mfd., 400 volt condenser |
| C15, C19 | 920090 | 0.01 mfd., 400 volt condenser |
| C16 | 900110 | Padding condenser |
| C17 | 910010 | 0.00011 mfd. mica condenser |
| C20, C22, C28 | 920100 | 0.02 mfd., 200 volt condenser |
| C23 | 920030 | 0.05 mfd., 400 volt condenser |
| C24, C25 | 925050 | 20-40 mfd., 150 volt dual electrolytic condenser |
| C26 | 925090 | 100 mfd., 25 volt electrolytic condenser |
| C27 | 920110 | 0.25 mfd., 100 volt condenser |
| L1 | 700090 | Loop antenna |
| L2 | 737010 | Filter choke |
| R1, R3, R5, R9, R15 | 311330 | 3.3 meg., ¼ watt resistor |
| R2 | 310970 | 100,000 ohms, ¼ watt resistor |
| *R4 | | 47,000 ohms, ¼ watt resistor part of second i-f transformer |
| R6, R7 | 321130 | 470,000 ohms, ¼ watt resistor |
| R8 | 311250 | 1.5 meg., ¼ watt resistor |
| R10 | 321290 | 2.2 meg., ¼ watt resisotr |
| R11 | 390020 | 0.5 meg. volume control |
| R12 | 321450 | 10 meg., ¼ watt resistor |
| R13 | 310130 | 33 ohms, ¼ watt resistor |
| R14 | 310730 | 10,000 ohms, ¼ watt resistor |
| R16 | 340630 | 3,900 ohms, ½ watt resistor |
| R17 | 340770 | 15,000 ohms, ½ watt resistor |
| R18 | 340510 | 1,200 ohms, ½ watt resistor |
| R19 | 394110 | 213 ohms, 6 watt resistor |
| R20 | 310570 | 2,200 ohms, ¼ watt resistor |
| R21 | 310450 | 680 ohms, ¼ watt resistor |
| SP1 | 180006 | P.M. speaker |
| *SW1 | | Line switch on volume control |
| *SW2 | | Battery switch on volume control |
| T1 | 713000 | R.F. coil |
| T2 | 720170 | First i-f transformer |
| T3 | 720410 | Second i-f transformer |
| T4 | 734140 | Output transformer |
| T5 | 716030 | Oscillator coil |

The cabinet is designed to house the complete set of batteries. The battery complement should be as follows:

| Battery Type | Number Required | Eveready Part No. | Rayovac Part No. | Burgess Part No. |
|---|---|---|---|---|
| 4½ volt "A" | 2 | 746<br>(plug-in type) | P83A or EM-83<br>(plug-in type) | 3G<br>(plug-in type) |
| 45 volt "B" | 2 | 482 Minimax<br>(plug-in type) | — | — |

**MODELS 505,523**
**Chassis 120020,120041**

An oscillator with frequencies of 262, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

Plug the receiver into the power supply in such a way that the ground side of the power line is connected to the receiver B—.

## Location of Coils and Trimmer Adjustments

The oscillator coil (T5) is located beneath the chassis. The trimmer for the oscillator (C6) is on the middle section of the variable condenser.

The interstage coil (T1) is the shielded coil located under the chassis. Its trimmer (C5) is on the front section of the variable condenser.

The trimmer for the loop antenna (C4) is on the last section of the variable condenser (the section nearest the loop).

The i-f transformers are mounted on top of the chassis. The first i-f transformer (T2) is mounted next to the loop. The second i-f transformer (T3) is mounted next to the dial.

The series padder, C10 for chassis 120002 and C16 for chassis 120020 and 120041, is located on the chassis near the 1T4 tube.

## I-f Alignment

Rotate the variable condenser to the minimum capacity position. Feed 262 kc to the converter grid and adjust the three i-f trimmers for maximum response. The signal should be fed through a 0.1 mfd. condenser.

## Interstage Alignment

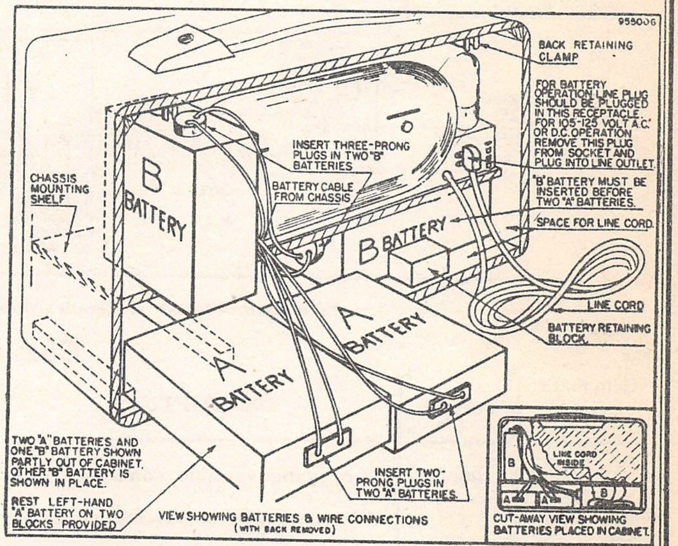
1. Set the dial indicator to 1425 kc, feed 1425 kc to the r-f grid, and adjust the oscillator and interstage trimmers for maximum response.
2. Set the dial indicator to 600 kc, feed 600 kc to the r-f grid, and adjust the oscillator padding trimmer by rocking in the signal for maximum response.
3. Repeat steps 1 and 2 until no further improvement is possible.

## Loop Alignment

Connect the test oscillator to a coil composed of three or four turns of wire wound in a loop approximately 12" in diameter. This coil should be held parallel to and in line with the receiver's loop at a distance of 15 to 20 inches.

1. Radiate a signal at 1425 kc, tune in the signal on the receiver, and adjust the loop trimmer for maximum response.
2. Radiate signal at 600 kc, tune in the signal on the receiver, and adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
3. Repeat steps 1 and 2 until no further improvement is possible.

## Battery Installation


955006
BACK RETAINING CLAMP
FOR BATTERY OPERATION LINE PLUG SHOULD BE PLUGGED IN THIS RECEPTACLE. FOR 105-125 VOLT A.C. OR D.C. OPERATION REMOVE THIS PLUG FROM SOCKET AND PLUG INTO LINE OUTLET.
INSERT THREE-PRONG PLUGS IN TWO "B" BATTERIES
BATTERY CABLE FROM CHASSIS
CHASSIS MOUNTING SHELF
B BATTERY
"B" BATTERY MUST BE INSERTED BEFORE TWO "A" BATTERIES.
SPACE FOR LINE CORD.
B BATTERY
LINE CORD
BATTERY RETAINING BLOCK.
A BATTERY
A BATTERY
TWO "A" BATTERIES AND ONE "B" BATTERY SHOWN PARTLY OUT OF CABINET. OTHER "B" BATTERY IS SHOWN IN PLACE.
REST LEFT-HAND "A" BATTERY ON TWO BLOCKS PROVIDED
INSERT TWO-PRONG PLUGS IN TWO "A" BATTERIES.
LINE CORD INSIDE
B
A
A
B

VIEW SHOWING BATTERIES & WIRE CONNECTIONS (WITH BACK REMOVED)

CUT-AWAY VIEW SHOWING BATTERIES PLACED IN CABINET.

## External Antenna

For loop antennas that do not have external antenna connection, wind one turn of insulated wire around or across the loop. Connect one end to an outside aerial. Connect the other end of a good ground or to chassis through a 0.002 mfd. condenser.

The color coding of the i-f transformer leads is as follows:

| | |
|---|---|
| Grid—green | Plate—blue |
| Grid return—black | B+—red |

## CABINET AND DIAL PARTS

| | | | | | |
|---|---|---|---|---|---|
| | 525090 | Pointer | | 520200 | Escutcheon (Model 523) |
| | 410929 | Pointer hub | | 140002 | Cabinet (Model 505) |
| | 531009 | Drive pulley | | 140053 | Cabinet (Model 523) |
| | 280133 | Drive shaft | | 460470 | Knob, black |
| | 520039 | Dial backplate (Model 505) | | 460140 | Knob, brown |
| | 520505 | Dial backplate (Model 523) | | 450001 | Handle, or |
| | 460040 | Dial crystal (Model 505) | | 450280 | Handle |
| | 520080 | Dial crystal (Model 523) | | | |

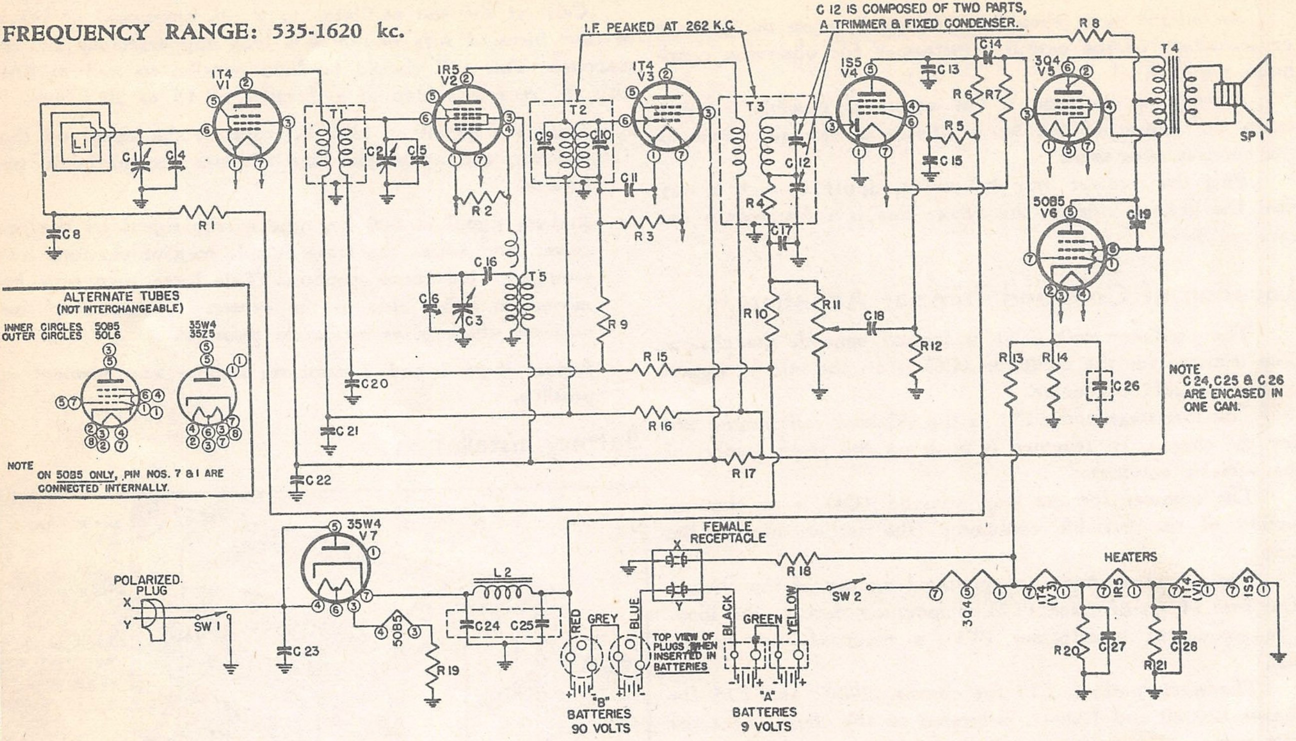
* Not supplied separately.
† Specify part numbers when ordering. When in doubt of chassis or model also include complete serial number.

**MODELS 505,523**
**Chassis 120041**

## EMERSON RADIO & PHONO. CORP.

**TYPE:** Three-way (battery, a.c-d.c.) portable superheterodyne.

**FREQUENCY RANGE:** 535-1620 kc.


C 12 IS COMPOSED OF TWO PARTS, A TRIMMER & FIXED CONDENSER.
I.F. PEAKED AT 262 K.C.
1T4 V1
1R5 V2
1T4 V3
1S5 V4
3Q4 V5
50B5 V6
35W4 V7
L1
C1
C4
C2
C5
C3
C6
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
C26
C27
C28
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
T1
T2
T3
T4
T5
L2
SP1
SW1
SW2
NOTE C24,C25 & C26 ARE ENCASED IN ONE CAN.
ALTERNATE TUBES (NOT INTERCHANGEABLE)
INNER CIRCLES 50B5 OUTER CIRCLES 50L6
35W4 35Z5
NOTE ON 50B5 ONLY, PIN NOS. 7 & 1 ARE CONNECTED INTERNALLY.
POLARIZED PLUG
X
Y
FEMALE RECEPTACLE
RED
GREY
BLUE
BLACK
GREEN
YELLOW
TOP VIEW OF PLUGS WHEN INSERTED IN BATTERIES
"B" BATTERIES 90 VOLTS
"A" BATTERIES 9 VOLTS
HEATERS

Schematic Circuit Diagram Models 505-523, Chassis 120041

## Chassis 120041

| Schematic Symbol | †Part No. | DESCRIPTION |
|---|---|---|
| C1, C2, C3 | 900080 | Three-gang variable condenser |
| *C4, C5, C6 | | Trimmers, part of variable condenser |
| C8, C14, C20, C21, C22, C28 | 920020 | 0.02 mfd., 400 volt condenser |
| *C9, C10 | | Trimmers, part of first i-f transformer |
| C11 | 920060 | 0.05 mfd., 200 volt condenser |
| *C12 | | Trimmer and fixed condenser, part of second i-f transformer |
| C13 | 910050 | 0.0004 mfd. mica condenser |
| C15, C19 | 920090 | 0.01 mfd., 400 volt condenser |
| C16 | 900110 | Padding condenser |
| C17 | 910010 | 0.00011 mfd. mica condenser |
| C18 | 920010 | 0.002 mfd., 600 volt condenser |
| C23 | 920030 | 0.05 mfd., 400 volt condenser |
| C24, C25, C26 | 925210 | Electrolytic condenser: C24, C25—20-40 mfd., 150V.; C26—100 mfd., 25 V. |
| C27 | 920110 | 0.25 mfd., 100 volt condenser |
| L1 | 700233 | Loop antenna |
| L2 | 737067 | Filter choke |
| R1, R3, R5, R9, R15 | 311330 | 3.3 meg., ¼ watt resistor |
| R2 | 310970 | 100,000 ohms, ¼ watt resistor |
| *R4 | | 47,000 ohms, ¼ watt resistor, part of second i-f transformer |
| R6, R7 | 321130 | 470,000 ohms, ¼ watt resistor |
| R8 | 311250 | 1.5 meg., ¼ watt resistor |
| R10 | 321290 | 2.2 meg., ¼ watt resistor |
| R11 | 390020 | 0.5 meg. volume control |
| R12 | 321450 | 10 meg., ¼ watt resistor |
| R13 | 310130 | 33 ohms., ¼ watt resistor |
| R14 | 310730 | 10,000 ohms, ¼ watt resistor |
| R16 | 340630 | 3,900 ohms, ½ watt resistor |
| R17 | 340770 | 15,000 ohms, ½ watt resistor |
| R18 | 340510 | 1,200 ohms, ½ watt resistor |
| R19 | 394110 | 213 ohms, 6 watt resistor, or |
| R19 | 394170 | 213 ohms, 10 watt resistor |
| R20 | 310570 | 2,200 ohms, ¼ watt resistor |
| R21 | 310450 | 680 ohms, ¼ watt resistor |
| SP1 | 180012 | P.M. speaker |
| *SW1 | | Line switch on volume control |
| *SW2 | | Battery switch on volume control |
| T1 | 713012 | R.F. coil |
| T2 | 720500 | First i-f transformer, or |
| T2 | 720510 | First i-f transformer |
| T3 | 720490 | Second i-f transformer, or |
| T3 | 720520 | Second i-f transformer |
| T4 | 734150 | Output transformer |
| T5 | 716030 | Oscillator coil |

Model 505 uses chassis 120002, 120020, 120041. Model 523 uses chassis 120041.

IMPORTANT—Where excessive tube burn-out is encountered, the 50B5 tube should be replaced *only* with a new Emerson tube bearing the designation 274 on the tube base.

**POWER CONSUMPTION:** 30 watts (line operation).

**CURRENT DRAIN:**

"A" Battery—0.053 amp.

"B" Battery—0.013 amp.

MODEL--505,523

The following voltage readings are d-c measurements taken with a line voltage of 117 volts, 60 cycles from B— (chassis) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. The readings with the volume control set at minimum and the variable condenser closed. All voltages are d.c. positive unless indicated otherwise. Voltages for 3Q4 are given for battery operation only. Readings for 50L6 and 35Z5 can be determined from 50B5 and 35W4 by referring to schematic diagram for proper pin connections.

### Chassis 120002

| TUBE TYPE | PIN NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1T4 | 1.2 | 88 | 56 | | 1.2 | *0.3 | 2.4 | |
| 1R5 | 2.4 | 88 | 56 | -8 | 2.4 | *1.5 | 3.7 | |
| 1T4 | 3.7 | 98 | 56 | | 3.7 | *2.3 | 4.9 | |
| 1S5 | | | *-0.3 | *19 | *50 | *-0.2 | 1.2 | |
| 3Q4 | 4.9 | 92 | *1.1 | 98 | 4.9 | 92 | 4.9 | |
| 117N7 | | | 92 | *1.1 | 98 | 6.25 | | 125 |

### Chassis 120020

| TUBE TYPE | PIN NUMBER | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1T4 | 1.32 | 90 | 50 | | 1.32 | *-0.2 | 2.55 |
| 1R5 | 2.55 | 90 | 50 | *-7.0 | 2.55 | | 3.85 |
| 1T4 | 3.85 | 98 | 50 | | 3.85 | *1.9 | 5.25 |
| 1S5 | | | *-0.35 | *24 | *46 | *-0.1 | 1.32 |
| 3Q4 | 6.1 | 88 | *1.2 | 90 | 7.6 | 88 | 9.0 |
| 50B5 | 1.2 | 6.6 | 83AC | 33AC | 90 | 98 | *1.2 |
| 35W4 | 1.32 | | 83AC | 117AC | 117AC | 108AC | 129 |

### Chassis 120041

| TUBE TYPE | PIN NUMBER | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1T4 | 1.32 | 90 | 50 | | 1.32 | *-0.2 | 2.55 |
| 1R5 | 2.55 | 90 | 50 | *-7.0 | 2.55 | | 3.85 |
| 1T4 | 3.85 | 98 | 50 | | 3.85 | *1.9 | 5.25 |
| 1S5 | | | *-0.35 | *24.0 | 46.0 | *-0.1 | 132 |
| 3Q4 | 6.1 | 88 | *1.2 | 90 | 7.6 | 88 | 9.0 |
| 50B5 | 1.2 | 6.6 | 33AC | 83AC | 90 | 98.0 | 1.2 |
| 35W4 | | | 83AC | 117AC | 117AC | 108AC | 129 |

MODEL-- 525,552

## VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Take readings with the volume control set at minimum and the variable condenser closed.

| TUBE | PIN NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 12SA7 | | | 89 | 89 | *-10 | | | *-1.6 |
| 12SK7 | | | | *-1.6 | | 89 | | 89 |
| 12SQ7 | | *-0.7 | | *-1.6 | -0.5 | 37.5 | | |
| 50L6GT | | | 110 | 89 | | | | 6.2 |
| 35Z5GT | | | | 116 | | 116 | | 117 |

## CABINET AND DIAL PARTS

| | | | | |
|---|---|---|---|---|
| | 807000 | Dial light | 520080 | Crystal |
| | 507217 | Dial light socket | 520200 | Escutcheon |
| | 531059 | Drive pulley | 140052 | Cabinet (Model 525) |
| | 280103 | Drive shaft | 140102 | Cabinet (Model 552) |
| | 520500 | Dial backplate | 460470 | Knob |
| | 525010 | Dial pointer | 430300 | Knob, with indicator dot |

† Specify part numbers when ordering.
* Not supplied separately.

**POWER CONSUMPTION:**

30 watts for the receiver.
20 watts for the phono motor.

The color coding of the i-f transformer leads is as follows:

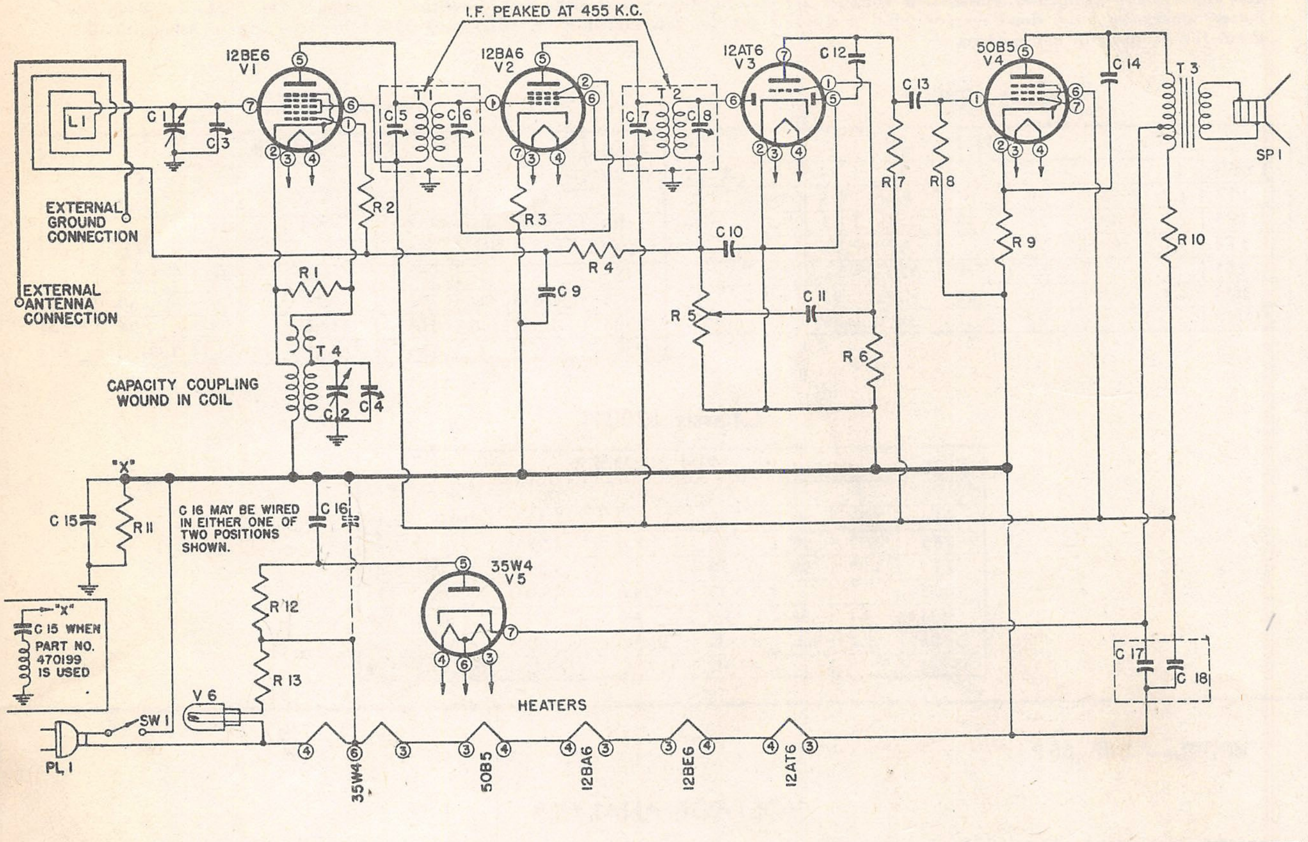
| | |
|---|---|
| Grid return—black | Plate—blue |
| Grid—green | B+—red |

**MODELS 507,509,518,522,535**
**Chassis 120004,120045**

## EMERSON RADIO & PHONO. CORP.

**TYPE:** Single-band superheterodyne.

**FREQUENCY RANGE:** 540-1620 kc.


I.F. PEAKED AT 455 K.C.
12BE6 V1
12BA6 V2
12AT6 V3
50B5 V4
L1
C1
C3
C5
C6
T1
C7
C8
T2
C12
C13
C14
T3
SP1
R2
R3
R4
C10
R7
R8
R9
R10
EXTERNAL GROUND CONNECTION
EXTERNAL ANTENNA CONNECTION
R1
C9
R5
C11
R6
T4
CAPACITY COUPLING WOUND IN COIL
C2
C4
"X"
C15
R11
C 16 MAY BE WIRED IN EITHER ONE OF TWO POSITIONS SHOWN.
C16
35W4 V5
R12
R13
"X"
C15 WHEN PART NO. 470199 IS USED
V6
SW1
PL1
HEATERS
C17
C18
35W4
50B5
12BA6
12BE6
12AT6

Schematic Circuit Diagram for Chassis 120004 and 120045

## CHASSIS 120004 AND 120045

| | | |
|---|---|---|
| C1, C2 | 900160 | Two-gang variable condenser |
| *C3, C4 | | Trimmers, part of variable condenser |
| *C5, C6, C7, C8 | | Trimmers, part of i-f transformers |
| C9 | 920040 | 0.1 mfd., 200 volt condenser |
| C10 | 910000 | 0.00022 mfd. mica condenser |
| C11 | 920010 | 0.002 mfd., 600 volt condenser |
| C12 | 920240 | 0.0005 mfd., 600 volt condenser |
| C13, C14 | 920020 | 0.02 mfd., 400 volt condenser |
| C15 | 920050 | 0.2 mfd., 200 volt condenser (Used when T1 and T2 are 720000 and 720100 respectively), or |
| C15 | 479199 | 0.2 mfd., 200 volt condenser (Used when T1 and T2 are 720525 and 720529 respectively) |
| C16 | 920030 | 0.05 mfd., 400 volt condenser |
| C17, C18 | 925009 | 50-50 mfd., 150 volt dual electrolytic condenser, or |
| C17, C18 | 925000 | 30-50 mfd., 150 volt dual electrolytic condenser |
| L1 | 700000 | Loop antenna, or |
| L1 | 700200 | Loop antenna |
| *PL1 | | Power plug, part of line cord |

| | | |
|---|---|---|
| R1 | 310810 | 22,000 ohms, ¼ watt resistor |
| R2, R6 | 397000 | 15 meg., ½ watt resistor |
| R3 | 340310 | 180 ohms, ½ watt resistor |
| R4 | 321290 | 2.2 meg., ¼ watt resistor |
| R5 | 390000 | 0.5 meg. volume control |
| R7, R8 | 321130 | 470,000 ohms, ¼ watt resistor |
| R9 | 340290 | 150 ohms, ½ watt resistor |
| R10 | 370490 | 1,000 ohms, 1 watt resistor |
| R11 | 321050 | 220,000 ohms, ¼ watt resistor |
| R12 | 340050 | 15 ohms, ½ watt resistor |
| R13 | 340010 | 10 ohms, ½ watt resistor |
| SP1 | 180000 | P.M. speaker |
| *SW1 | | Line switch on volume control |
| T1 | 720000 | First i-f transformer, or |
| T1 | 720525 | First i-f transformer, midget |
| T2 | 720100 | Second i-f transformer, or |
| T2 | 720529 | Second i-f transformer, midget |
| T3 | 734000 | Output transformer |
| T4 | 716010 | Oscillator coil |
| | 807000 | Pilot light, Mazda No. 47 |
| | 507090 | Pilot light socket |
| | 583010 | Line cord |

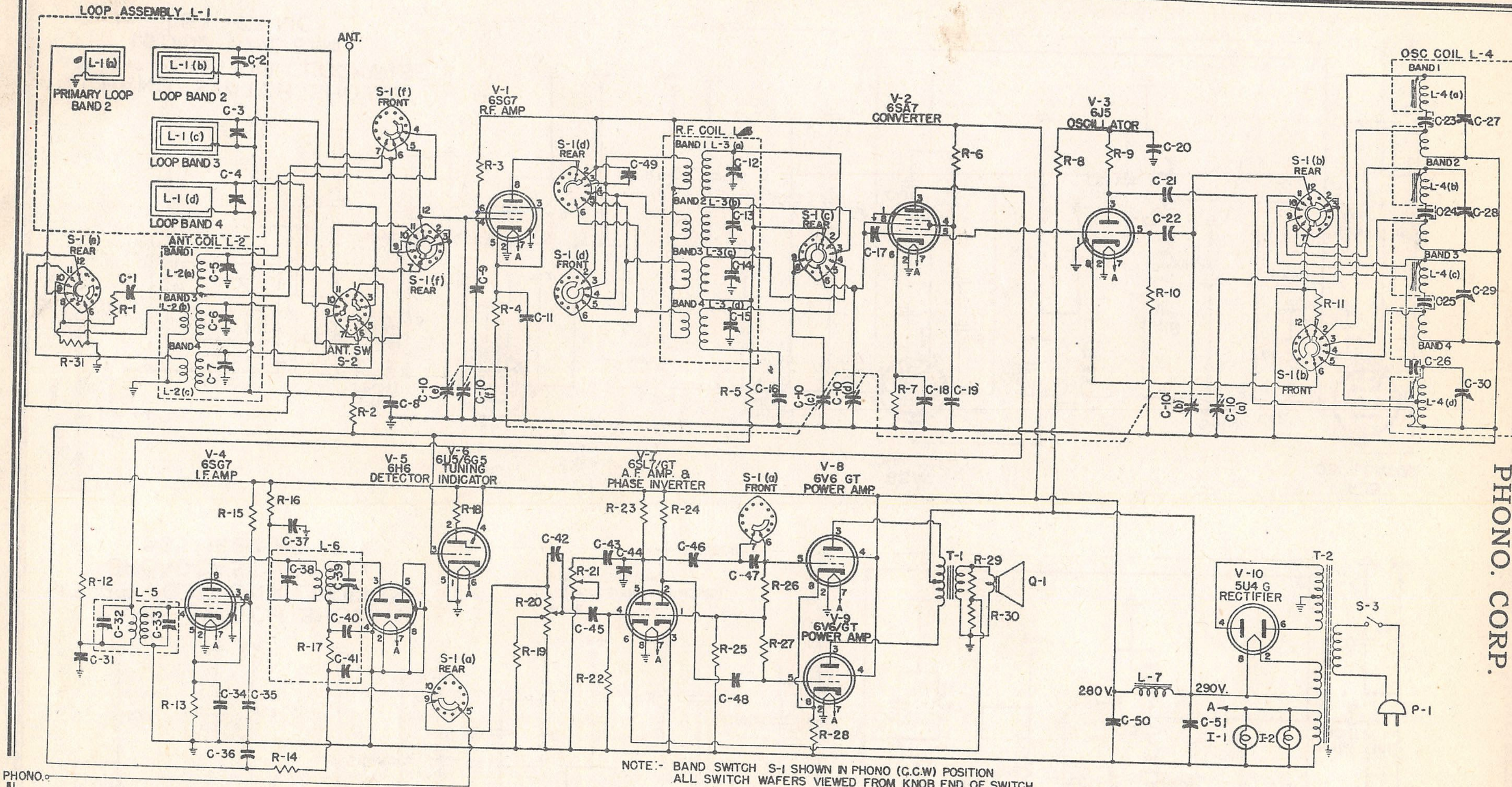
**The color coding of the i-f transformer leads is as follows:**

| | |
|---|---|
| **Grid—green** | **Plate—blue** |
| **Grid return—black** | **B+—red** |

For alignment, voltages, and additional parts list, see P. 16-2.

## EMERSON RADIO & PHONO. CORP.

## MODEL 524, Chassis 120011
## 524-2, Chassis 120022


LOOP ASSEMBLY L-1
L-1(a)
PRIMARY LOOP BAND 2
L-1(b)
LOOP BAND 2
L-1(c)
LOOP BAND 3
L-1(d)
LOOP BAND 4
ANT.
ANT. COIL L-2
BAND 1
L-2(a)
BAND 3
L-2(b)
BAND 4
L-2(c)
S-1(e) REAR
S-1(f) FRONT
S-1(f) REAR
ANT. SW S-2
R-1
R-2
R-31
C-1
C-2
C-3
C-4
C-5
C-6
C-7
C-8
C-9
C-10
V-1 6SG7 R.F. AMP
R-3
R-4
C-11
S-1(d) REAR
S-1(d) FRONT
C-49
R.F. COIL L-3
BAND 1 L-3(a)
BAND 2 L-3(b)
BAND 3 L-3(c)
BAND 4 L-3(d)
C-12
C-13
C-14
C-15
R-5
C-16
S-1(c) REAR
V-2 6SA7 CONVERTER
R-6
R-7
C-17
C-18
C-19
V-3 6J5 OSCILLATOR
R-8
R-9
R-10
C-20
C-21
C-22
S-1(b) REAR
S-1(b) FRONT
R-11
OSC COIL L-4
BAND 1
L-4(a)
BAND 2
L-4(b)
BAND 3
L-4(c)
BAND 4
L-4(d)
C-23
C-24
C-25
C-26
C-27
C-28
C-29
C-30
V-4 6SG7 I.F. AMP
L-5
C-31
C-32
C-33
C-34
C-35
C-36
R-12
R-13
R-14
R-15
R-16
C-37
L-6
C-38
C-39
C-40
C-41
R-17
V-5 6H6 DETECTOR
V-6 6U5/6G5 TUNING INDICATOR
R-18
S-1(a) REAR
C-42
R-19
R-20
R-21
R-22
V-7 6SL7/GT A.F. AMP. & PHASE INVERTER
R-23
R-24
C-43
C-44
C-45
C-46
S-1(a) FRONT
C-47
C-48
R-25
R-26
R-27
R-28
V-8 6V6 GT POWER AMP
V-9 6V6/GT POWER AMP
T-1
R-29
R-30
Q-1
280V.
L-7
290V.
C-50
C-51
A
I-1
I-2
V-10 5U4 G RECTIFIER
T-2
S-3
P-1
PHONO.

NOTE:- BAND SWITCH S-1 SHOWN IN PHONO (C.C.W) POSITION
ALL SWITCH WAFERS VIEWED FROM KNOB END OF SWITCH.

**TYPE OF TUBES:**

2—6SG7, pentode r-f amplifier and i-f amplifier
1—6SA7, pentagrid modulator
1—6J5, triode oscillator
1—6H6, diode detector, a.v.c
1—6SL7, dual triode audio amplifier and inverter
2—6V6GT, beam power push-pull output
1—5U4G, rectifier
1—6U5/6G5, tuning indicator

**POWER SUPPLY:** 50-60 cycle A.C.

**VOLTAGE RATING:**

Model 524—105-125 volts
Model 524-2—105-125 volts and 210-250 volts

**POWER CONSUMPTION:** 100 watts

**TYPE:** Four band superheterodyne.

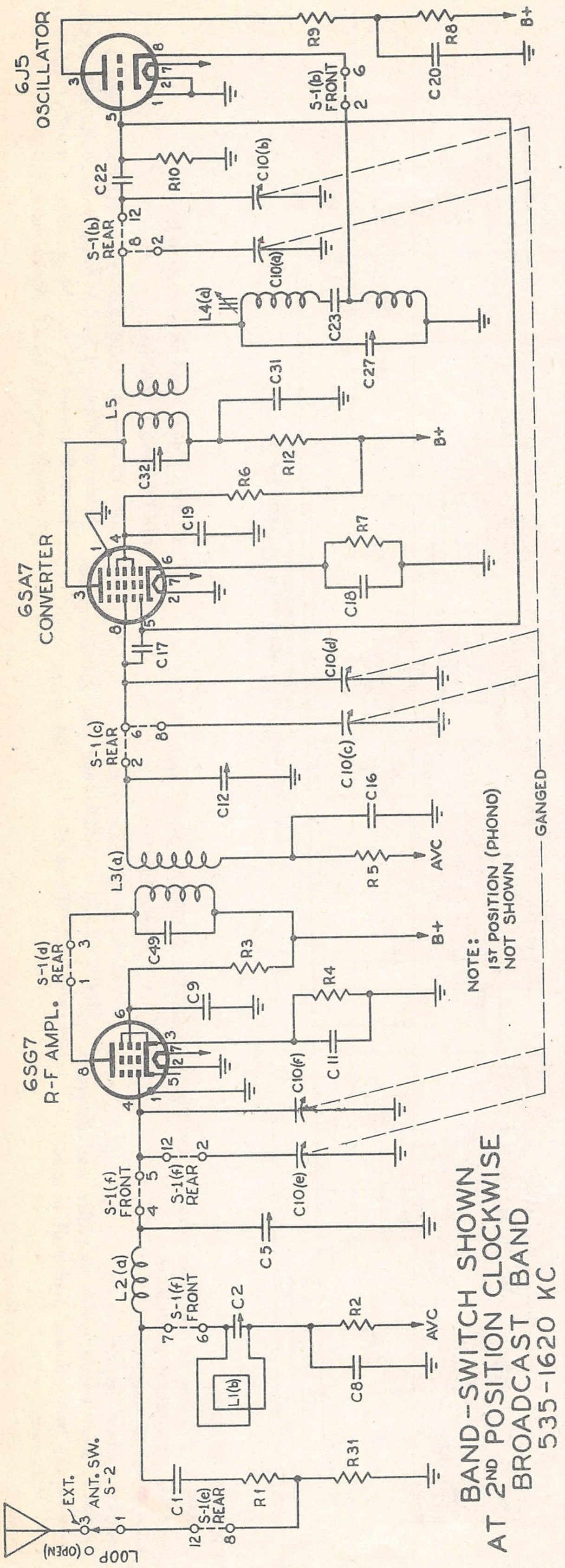
**FREQUENCY RANGE:**

| | | |
|---|---|---|
| Broadcast | 535-1620 Kilocycles | (185-560 Meters) |
| Medium Wave | 1.54-4.3 Megacycles | (69.8-195 Meters) |
| Short-Wave | 4.15-10.4 Megacycles | (28.9-72.3 Meters) |
| Short-Wave | 10.1-22.7 Megacycles | (13.2-29.7 Meters) |

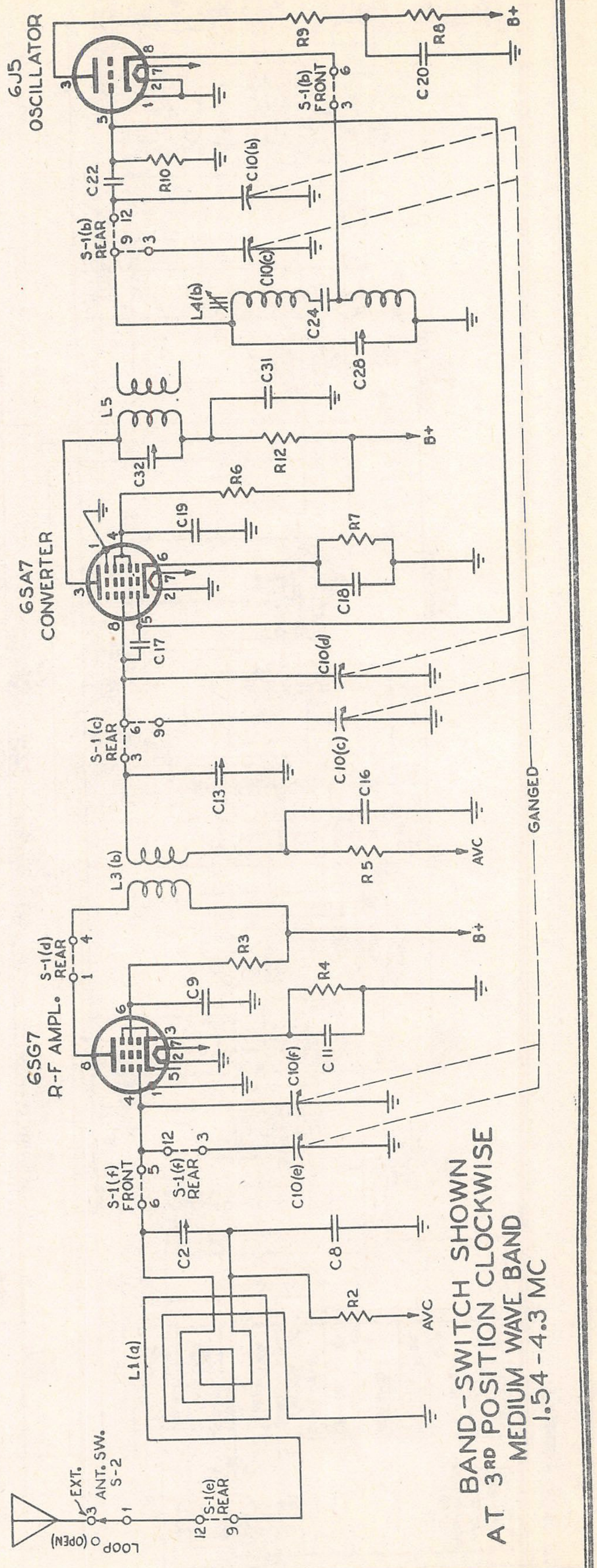
"clarified schematics"

**MODEL 524**
**MODEL 524-2**

## EMERSON RADIO & PHONO. CORP.


6J5 OSCILLATOR
6SA7 CONVERTER
6SG7 R-F AMPL.
S-1(b) FRONT
S-1(b) REAR
S-1(c) REAR
S-1(d) REAR
S-1(f) FRONT
S-1(f) REAR
S-1(e) REAR
EXT. ANT. SW. S-2
LOOP (OPEN)
L1(b)
L2(a)
L3(a)
L4(a)
L5
C1
C2
C5
C8
C9
C10(a)
C10(b)
C10(c)
C10(d)
C10(e)
C10(f)
C11
C12
C16
C17
C18
C19
C20
C22
C23
C27
C31
C32
C49
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R12
R31
B+
AVC
GANGED
NOTE: 1ST POSITION (PHONO) NOT SHOWN

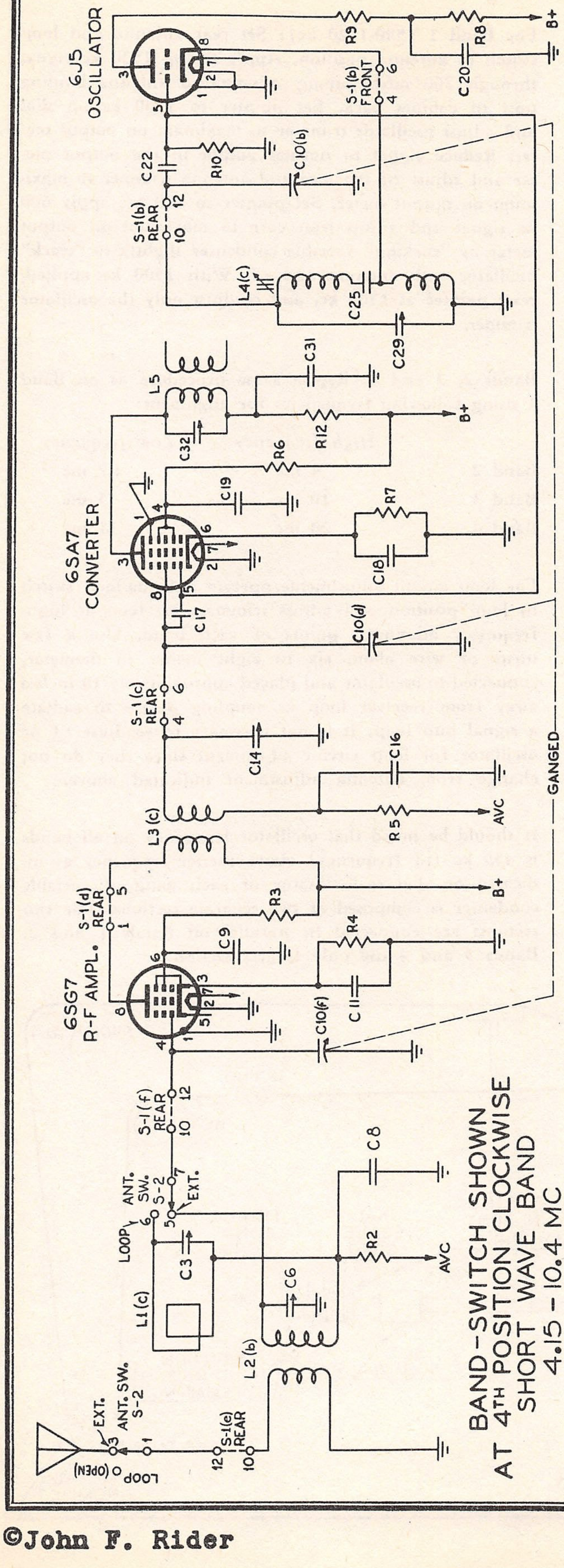
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE
BROADCAST BAND
535-1620 KC


6J5 OSCILLATOR
6SA7 CONVERTER
6SG7 R-F AMPL.
S-1(b) FRONT
S-1(b) REAR
S-1(c) REAR
S-1(d) REAR
S-1(f) FRONT
S-1(f) REAR
S-1(e) REAR
EXT. ANT. SW. S-2
LOOP (OPEN)
L1(a)
L3(b)
L4(b)
L5
C2
C8
C9
C10(b)
C10(c)
C10(d)
C10(e)
C10(f)
C11
C13
C16
C17
C18
C19
C20
C22
C24
C28
C31
C32
R2
R3
R4
R5
R6
R7
R8
R9
R10
R12
B+
AVC
GANGED

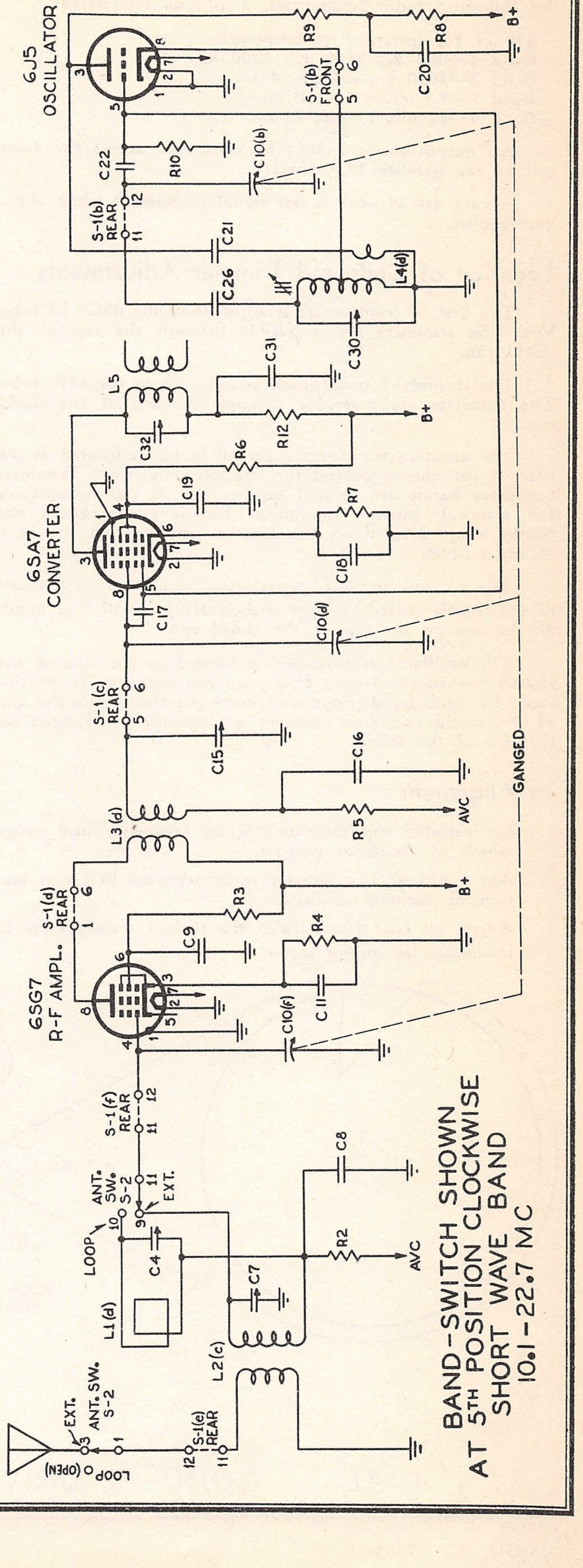
BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE
MEDIUM WAVE BAND
1.54-4.3 MC

# EMERSON RADIO & PHONO. CORP.

**MODEL 524,**
**MODEL 524-2**


6J5
OSCILLATOR
R9
R8
B+
S-1(b)
FRONT
6
4
C20
C22
R10
C10(b)
S-1(b)
REAR
12
10
L4(c)
C25
C29
L5
C31
B+
R12
C32
R6
C19
R7
C18
6SA7
CONVERTER
C17
C10(d)
S-1(c)
REAR
6
4
C14
C16
GANGED
L3(c)
R5
AVC
S-1(d)
REAR
1
5
B+
R3
C9
R4
6SG7
R-F AMPL.
C10(f)
C 11
S-1(f)
REAR
10
12
ANT.
SW.
S-2
6
7
5
EXT.
LOOP
C8
C3
R2
AVC
C6
L1(c)
L2(b)
EXT.
ANT. SW.
S-2
3
1
LOOP O (OPEN)
S-1(e)
REAR
12
10

BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE
SHORT WAVE BAND
4.15 - 10.4 MC


6J5
OSCILLATOR
R9
R8
B+
S-1(b)
FRONT
6
5
C20
C22
R10
C10(b)
S-1(b)
REAR
12
11
C21
C26
L4(d)
C30
L5
C31
B+
R12
C32
R6
C19
R7
C18
6SA7
CONVERTER
C17
C10(d)
S-1(c)
REAR
6
5
C15
C16
GANGED
L3(d)
R5
AVC
S-1(d)
REAR
1
6
B+
R3
C9
R4
6SG7
R-F AMPL.
C10(f)
C 11
S-1(f)
REAR
11
12
ANT.
SW.
S-2
10
11
9
EXT.
LOOP
C8
C4
R2
AVC
C7
L1(d)
L2(c)
EXT.
ANT. SW.
S-2
3
1
LOOP O (OPEN)
S-1(e)
REAR
12
11

BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE
SHORT WAVE BAND
10.1 - 22.7 MC

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MODEL 524
MODEL 524-2

EMERSON RADIO & PHONO. CORP.

# ADJUSTMENTS

A signal generator or oscillator is required, containing the following radio frequencies, amplitude modulated:

455 kc for intermediate frequencies
Band 1—600 kc, 1000 kc, 1500 kc
Band 2—1600 kc, 2.5 mc, 4 mc
Band 3—4.5 mc, 6 mc, 10 mc
Band 4—11 mc, 13 mc, 22 mc

An output meter should be connected across the voice coil of the speaker (3.5 ohms).

Always use as weak a test signal as possible when aligning receiver.

## Location of Coils and Trimmer Adjustments

The first i-f transformer is adjacent to the 6SG7 i-f tube, V-4. The trimmers are accessible through the top of the shield can.

The second i-f transformer is adjacent to the 6H6 tube. The trimmers are accessible through the top of the shield can.

The antenna transformer for all bands is located at the rear of the chassis behind the variable condenser. Trimmers for three bands are located on the top of the transformer for external antenna operation. For loop operation, the trimmers are located on the loop accessible from the back of the cabinet.

The r-f and amplifier transformer is located on the side of the chassis toward the rear. Adjustments for all four bands are located on the top of the shield can.

The oscillator transformer is located at the side of the chassis toward the front. There are two adjustments on this stage for each band. Four iron cores protrude from the top of the shield and four trimmer adjustments are located on the side of the shield.

## I-f Alignment

1. Set variable condenser to highest frequency and range switch to broadcast position.
2. Apply 455 kc to converter stator terminal in center section of variable condenser.
3. Adjust all four trimmers of the two i-f transformers to maximum on output meter.

## R-f Alignment

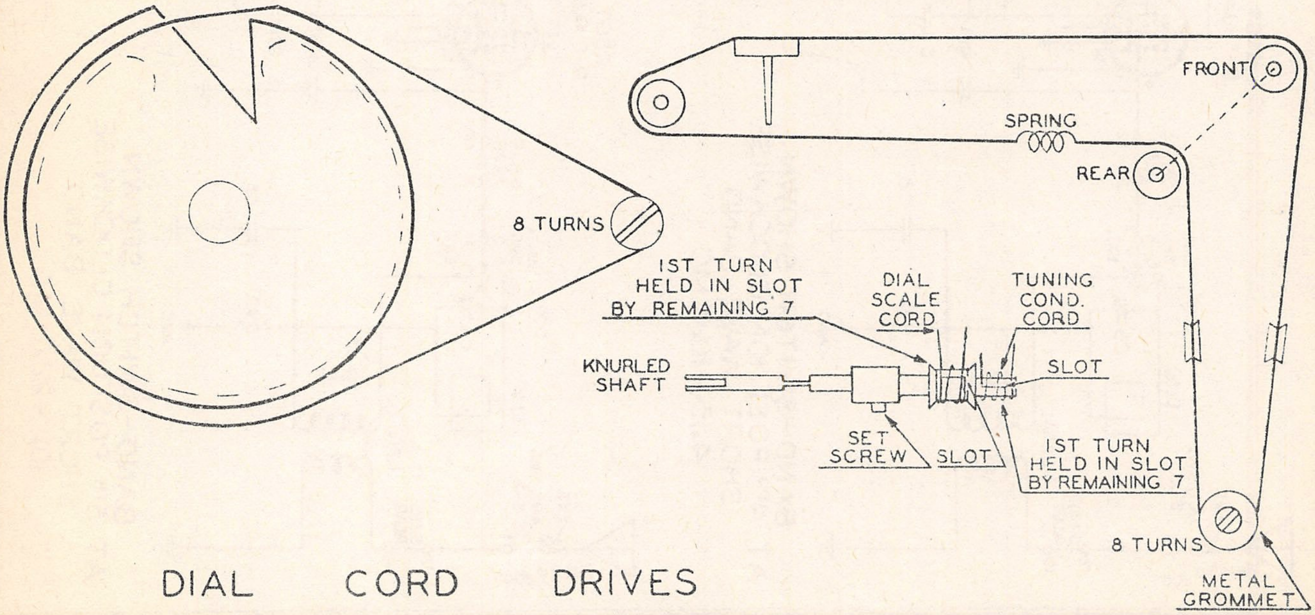
1. For Band 1 (540-1620 kc): Set rear antenna and loop switch to antenna position. Apply strong 1500 kc signal through 200 mfd. dummy antenna to antenna binding post in cabinet back. Set pointer to 1500 kc on dial and adjust oscillator trimmer to maximum on output meter. Reduce signal to normal output in the output meter and adjust r-f trimmer and antenna trimmer to maximum on output meter. Set pointer to 600 kc. apply 600 kc signal and adjust iron core to maximum on output meter by "rocking" variable condenser slightly to "track" oscillator with antenna and r-f. With 1500 kc applied, reset pointer at 1500 kc, and readjust only the oscillator trimmer.

2. Bands 2, 3 and 4: Repeat same procedure as on Band 1 using following frequencies for alignment:

| | *High frequency* | *Low frequency* |
|---|---|---|
| Band 2 | 4 mc | 1.7 mc |
| Band 3 | 10 mc | 5 mc |
| Band 4 | 20 mc | 11 mc |

3. For loop circuit adjustments operate antenna-loop switch to loop position and adjust trimmers on loop at high-frequnecy alignment points of each band. Use a few turns of wire about six to eight inches in diameter, connected to oscillator and placed approximately 18 inches away from receiver loop as coupling device to radiate a signal into loop. It is not necessary to readjust r-f or oscillator for loop circuit adjustment since they do not change from antenna adjustment indicated above.

4. It should be noted that oscillator frequency on all bands is 455 kc (i-f frequency) above carrier frequency as indicated on dial scale. Stator of each gang of variable condenser is composed of two separate sections. The two sections are connected in parallel on Bands 1 and 2. Bands 3 and 4 use only largest section.



DIAL CORD DRIVES

# EMERSON RADIO & PHONO. CORP.

MODEL 524
MODEL 524-2

## REPLACEMENT PARTS LIST

| Schematic Symbol | †Part No. | DESCRIPTION |
|---|---|---|
| C1 | 910180 | 0.001 mfd., 500 volt mica condenser |
| *C2, C3, C4 | | Trimmers, part of loop assembly |
| *C5, C6, C7 | | Trimmers, part of antenna coil |
| C8, C16 | 920060 | 0.05 mfd., 200 volt condenser |
| C9, C19, C35, C43, C46, C48 | 920210 | 0.01 mfd., 600 volt condenser |
| C10a, b, c, d, e, f | 900200 | Three-gang variable condenser |
| C11, C18, C34 | 920040 | 0.1 mfd., 200 volt condenser |
| *C12, C13, C14, C15 | | Trimmers, part of r-f coil |
| C17 | 915040 | 0.68 mmfd., 500 volt ceramic condenser |
| C20 | 925030 | 16 mfd., 300 volt electrolytic condenser |
| C21 | 910170 | 0.003 mfd., 500 volt mica condenser |
| C22, C42, C44, C49 | 910100 | 0.0001 mfd., 500 volt mica condenser |
| C23 | 915030 | 0.00056 mfd. silver mica condenser |
| C24 | 915020 | 0.0015 mfd. silver mica condenser |
| C25 | 915010 | 0.003 mfd. silver mica condenser |
| C26 | 915000 | 0.0068 mfd. silver mica condenser |
| *C27, C28, C29, C30 | | Trimmers, part of oscillator coil |
| C31, C37 | 920270 | 0.05 mfd., 600 volt condenser |
| *C32, C33 | | Trimmers, part of first i-f transformer |
| C36 | 920090 | 0.01 mfd., 400 volt condenser |
| *C38, C39 | | Trimmers, part of second i-f transformer |
| *C40, C41 | | 50 mmfd. condenser, part of second i-f transformer |
| C45 | 920230 | 0.005 mfd., 600 volt condenser |
| C47 | 920240 | 0.0005 mfd., 600 volt condenser |
| C50 | 925010 | 40 mfd., 400 volt electrolytic condenser |
| C51 | 925220 | 40 mfd., 400 volt electrolytic condenser |
| I1, I2 | 807020 | Pilot light, Mazda No. 44 |

| Schematic Symbol | †Part No. | DESCRIPTION |
|---|---|---|
| L1 | 700110 | Loop assembly |
| L2 | 710020 | Antenna coil |
| L3 | 713010 | R-F coil |
| L4 | 716110 | Oscillator coil |
| L5 | 720330 | First i-f transformer |
| L6 | 720340 | Second i-f transformer |
| L7 | 737030 | Filter choke |
| P1 | 583180 | Line cord and plug |
| Q1 | 180024 | P.M. speaker |
| R1 | 310430 | 560 ohms, ¼ watt resistor |
| R2, R5, R25 | 321050 | 0.22 meg., ¼ watt resistor |
| R3, R15 | 370910 | 56,000 ohms, 1 watt resistor |
| R4, R13 | 320290 | 150 ohms, ¼ watt resistor |
| R6 | 397080 | 22,000 ohms, 2 watt resistor |
| R7 | 310350 | 270 ohms, ¼ watt resistor |
| R8, R9 | 340650 | 4,700 ohms, ½ watt resistor |
| R10 | 310810 | 22,000 ohms, ¼ watt resistor |
| R11 | 320730 | 10,000 ohms, ¼ watt resistor |
| R12, R31 | 320650 | 4,700 ohms, ¼ watt resistor |
| R14 | 321210 | 1 meg., ¼ watt resistor |
| R16 | 310650 | 4,700 ohms, ¼ watt resistor |
| *R17 | | 4,700 ohms, ¼ watt resistor, part of second i-f transformer |
| *R18 | | 1 meg., ¼ watt resistor, part of tuning indicator socket cable |
| R19 | 310830 | 27,000 ohms, ¼ watt resistor |
| R20 | 390070 | 0.5 meg., ½ watt volume control |
| R21 | 390360 | 0.5 meg., ½ watt volume control, or |
| R21 | 390080 | 0.5 meg., ½ watt volume control |
| R22 | 321450 | 10 meg., ¼ watt resistor |
| R23, R24 | 351050 | 0.22 ohms, ½ watt resistor |
| R26, R27 | 311050 | 0.22 ohms, ¼ watt resistor |
| R28 | 394140 | 180 ohms, 2 watt wire-wound resistor |
| R29 | 320410 | 470 ohms, ¼ watt resistor |
| R30 | 310070 | 18 ohms, ¼ watt resistor |
| S1 | 510280 | 7-wafer, 5-position band switch |
| S2 | 510290 | 3-pole double throw antenna switch |
| *S3 | | Line switch, part of volume control R20 |
| T1 | 734160 | Output transformer |
| T2 | 730000 | Power transformer (Chassis 120011) |
| T2 | 730010 | Power transformer (Chassis 120022) |

## CABINET AND DIAL PARTS

| | | |
|---|---|---|
| | 140004 | Cabinet |
| | 620030 | Knob |
| | 620012 | Knob, with indicator dot |
| | 587040 | Drive cord spring |
| | 525110 | Pointer |
| | 280023 | Drive shaft |
| | 280033 | Clutch shaft |

| | | |
|---|---|---|
| | 280043 | Drive shaft pulley |
| | 411361 | Dial bracket |
| | 520006 | Dial glass |
| | 470035 | Dial bracket assembly (left) |
| | 470032 | Dial bracket assembly (right) |
| | 507219 | Dial light assembly |

* Not supplied separately.

† Specify part numbers when ordering. When in doubt of chassis or model also include complete serial number.

## VOLTAGE ANALYSIS

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings. Readings indicated by an asterisk (*) are a.c. Line voltage is 117.5 volts, 60 cycles a.c. Set volume control at minimum and variable condenser to 1000 kc.

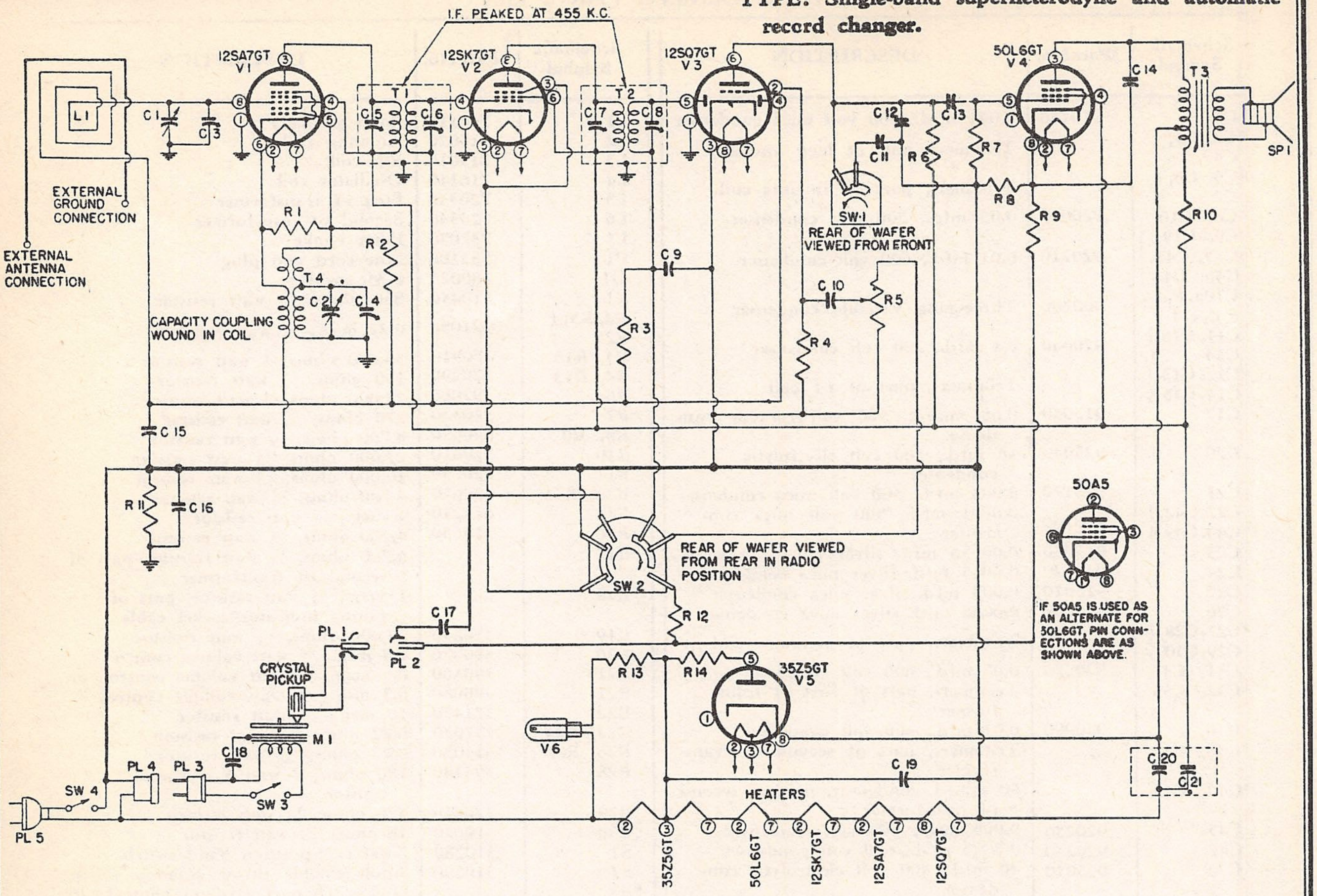
| | PIN NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TUBE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 6SG7(V1) | | | 1.6 | | 1.6 | 130 | *6.3 | 280 |
| 6SA7 | | | 275 | 90 | —0.02 | 2.4 | *6.3 | |
| 6J5 | | | 215 | | —0.02 | | *6.3 | |
| 6SG7(V4) | | | 1.5 | | 1.5 | 120 | *6.3 | 280 |
| 6H6 | | | —0.04 | | | | *6.3 | |
| 6SL7 | | 70 | | —0.04 | 60 | | | *6.3 |
| 6V6(V8, V4) | | | 285 | 280 | | | *6.3 | 17 |
| 5U4G | | 290 | | *285 | | *285 | | 290 |

Voltage readings for 6U5/6G5 measured at lead terminals are as follows: black—0; green— —0.04; red—280; brown—0; black—6.3.

**MODELS 525,552**
**Chassis 120037**

# EMERSON RADIO & PHONOGRAPH CORP.

**TYPE: Single-band superheterodyne and automatic record changer.**


I.F. PEAKED AT 455 K.C.
12SA7GT V1
12SK7GT V2
12SQ7GT V3
50L6GT V4
35Z5GT V5
50A5
L1
C1
C3
C2
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
T1
T2
T3
T4
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
SP1
SW·1
SW 2
SW 3
SW 4
PL 1
PL 2
PL 3
PL 4
PL 5
M1
V6
EXTERNAL GROUND CONNECTION
EXTERNAL ANTENNA CONNECTION
CAPACITY COUPLING WOUND IN COIL
REAR OF WAFER VIEWED FROM FRONT
REAR OF WAFER VIEWED FROM REAR IN RADIO POSITION
CRYSTAL PICKUP
IF 50A5 IS USED AS AN ALTERNATE FOR 50L6GT, PIN CONNECTIONS ARE AS SHOWN ABOVE.
HEATERS
35Z5GT
50L6GT
12SK7GT
12SA7GT
12SQ7GT

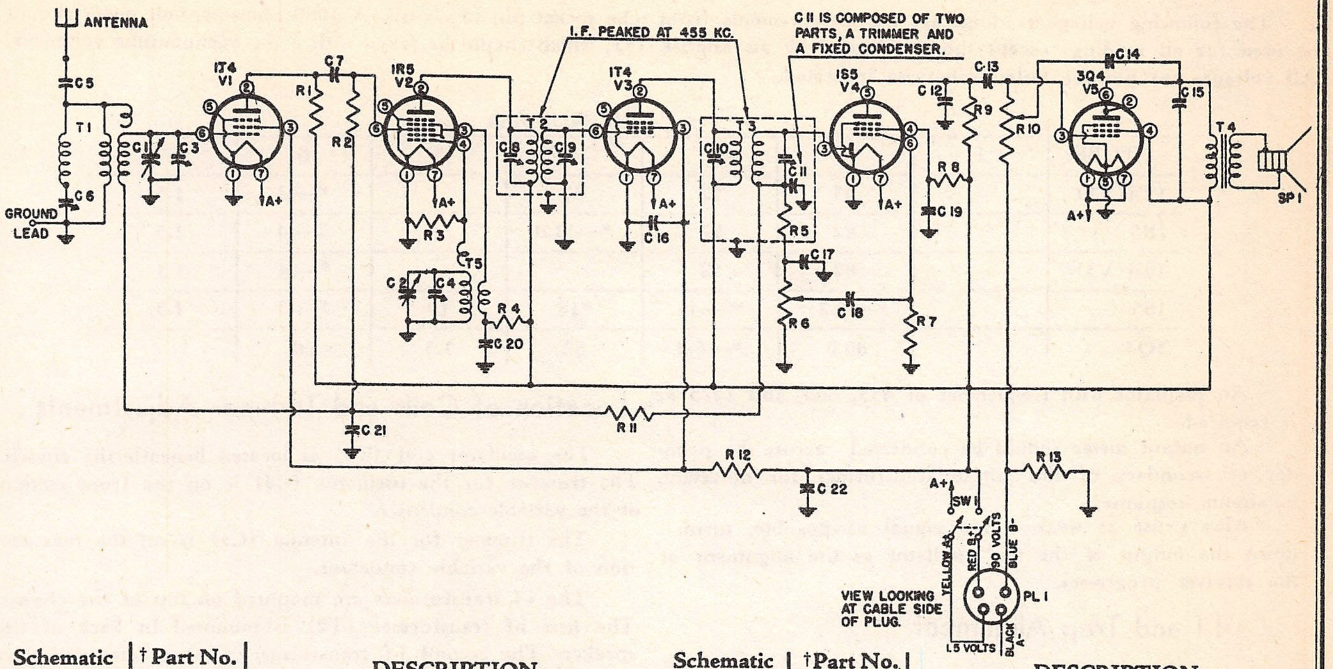
| Schematic Symbol | †Part No. | DESCRIPTION |
|---|---|---|
| C1, C2 | 900290 | Two-gang variable condenser |
| *C3, C4 | | Trimmers, part of variable condenser |
| *C5, C6, C7, C8 | | Trimmers, part of i-f transformers |
| C9 | 910000 | 0.00022 mfd. mica condenser |
| C10 | 920010 | 0.002 mfd., 600 volt condenser |
| C11 | 920515 | 0.002 mfd., 400 volt condenser |
| C12 | 920240 | 0.0005 mfd., 600 volt condenser |
| C13, C14 | 920020 | 0.02 mfd., 400 volt condenser |
| C15 | 920040 | 0.1 mfd., 200 volt condenser |
| C16 | 920050 | 0.2 mfd., 200 volt condenser (used only when T1 and T2 are 720000 and 720100 respectively) |
| C17, C19 | 920030 | 0.05 mfd., 400 volt condenser |
| C18 | 922090 | 0.05 mfd., 400 volt condenser (used up to serial No. 8,550,551), or |
| C18 | 922101 | 0.05 mfd., 400 volt condenser (used after serial No. 8,550,551) |
| C20, C21 | 925267 | 30-50 mfd., 150 volt dual electrolytic condenser (used up to serial No. 8,550,551), or |
| C20, C21 | 925110 | 30-50 mfd., 150 volt dual electrolytic condenser (used after serial No. 8,550,551) |
| L1 | 700000 | Loop antenna, or |
| L1 | 700200 | Loop antenna, or |
| L1 | 700210 | Loop antenna |
| M1 | 819019 | Automatic record changer |
| PL1 | 505040 | Connector plug |

| Schematic Symbol | †Part No. | DESCRIPTION |
|---|---|---|
| PL2 | 508010 | Pickup socket |
| *PL3 | | Polarized male plug, part of record changer |
| PL4 | 585070 | Female plug and cable |
| *PL5 | | Power plug, part of line cord |
| R1 | 310810 | 22,000 ohms, ¼ watt resistor |
| R2, R4 | 397000 | 15 meg., ½ watt resistor |
| R3 | 321330 | 3.3 meg., ¼ watt resistor |
| R5 | 390010 | 0.5 meg. volume control |
| R6, R7 | 321130 | 470,000 ohms, ¼ watt resistor |
| R8 | 340290 | 150 ohms, ½ watt resistor |
| R9 | 321290 | 2.2 meg., ¼ watt resistor |
| R10 | 370490 | 1,000 ohms, 1 watt resistor |
| R11 | 321050 | 220,000 ohms, ¼ watt resistor |
| R12 | 321210 | 1 meg., ¼ watt resistor |
| R13 | 340010 | 10 ohms, ½ watt resistor |
| R14 | 340050 | 15 ohms, ½ watt resistor |
| SP1 | 180000 | P.M. speaker |
| SW1 | 510130 | Tone control switch |
| SW2 | 510390 | Phono-radio switch |
| *SW3 | | Motor switch, part of record changer |
| *SW4 | | Line switch on volume control |
| T1 | 720000 | First i-f transformer, or |
| T1 | 720525 | First i-f transformer |
| T2 | 720100 | Second i-f transformer, or |
| T2 | 720529 | Second i-f transformer |
| T3 | 734200 | Output transformer |
| T4 | 716010 | Oscillator coil |

For alignment, see P.16-2
For voltage analysis and cabinet parts, see P.16-7

# EMERSON RADIO & PHONO. CORP.

**MODELS 531,532,533**
**Chassis 120040**


ANTENNA
C5
T1
C6
GROUND LEAD
C1
C3
1T4
V1
C7
R1
R2
1R5
V2
A+
R3
T5
C2
C4
R4
C20
C21
I.F. PEAKED AT 455 KC.
T2
C8
C9
1T4
V3
A+
C16
R11
C11 IS COMPOSED OF TWO PARTS, A TRIMMER AND A FIXED CONDENSER.
T3
C10
C11
R5
C17
R6
C18
R7
R12
C22
1S5
V4
C12
C13
R9
R10
R8
C19
A+
C14
3Q4
V5
C15
T4
SP1
A+
R13
A+
SW1
YELLOW 9V
RED B+
90 VOLTS
BLUE B-
PL1
BLACK A-
1.5 VOLTS
VIEW LOOKING AT CABLE SIDE OF PLUG.

| Schematic Symbol | † Part No. | DESCRIPTION |
|---|---|---|
| C1, C2 | 900070 | Two-gang variable condenser |
| *C3, C4 | | Trimmers, part of variable condenser |
| C5, C15 | 920170 | 0.001 mfd., 600 volt condenser |
| *C6 | | Trimmer, part of antenna transformer |
| C7, C12 | 910000 | 0.00022 mfd. mica condenser |
| *C8, C9, C10 | | Trimmers, part of i-f transformer |
| *C11 | | Trimmer and fixed condenser, part of second i-f transformer |
| C13, C16, C19, C20 | 920100 | 0.02 mfd., 200 volt condenser |
| C14 | 910250 | 0.00005 mfd. mica condenser |
| C17 | 910010 | 0.00011 mfd. mica condenser |
| C18 | 920515 | 0.002 mfd., 400 volt condenser |
| C21 | 920040 | 0.1 mfd., 200 volt condenser |
| C22 | 925003 | 16 mfd., 150 volt electrolytic condenser |
| PL1 | 585311 | Battery plug and cable assembly, or |
| PL1 | 585312 | Battery plug and cable assembly |
| R1, R4 | 310730 | 10,000 ohms, ¼ watt resistor |

| Schematic Symbol | † Part No. | DESCRIPTION |
|---|---|---|
| R2 | 321130 | 470,000 ohms, ¼ watt resistor |
| R3 | 320970 | 100,000 ohms, ¼ watt resistor |
| *R5 | | 47,000 ohms, ¼ watt resistor, part of second i-f transformer |
| R6 | 390180 | 0.5 meg. volume control |
| R7 | 321450 | 10 meg., ¼ watt resistor |
| R8, R11 | 321330 | 3.3 meg., ¼ watt resistor |
| R9 | 321210 | 1 meg., ¼ watt resistor |
| R10 | 390280 | 0.4 meg. tone control |
| R12 | 310770 | 15,000 ohms, ¼ watt resistor |
| R13 | 310410 | 470 ohms, ¼ watt resistor |
| SP1 | 180008 | P.M. speaker |
| SW1 | 510401 | Battery switch, or |
| SW1 | 510001 | Battery switch |
| T1 | 710001 | Antenna transformer and trap |
| T2 | 720530 | First i-f transformer |
| T3 | 720531 | Second i-f transformer |
| T4 | 734203 | Output transformer |
| T5 | 716001 | Oscillator coil |

Battery replacement — Replace battery pack with one of the following types: Eveready No. 748 or No. 758, Rayovac No. AB82, Burgess No. 17GD60, General No. 60D10L, or Bright Star No. 6105.

* Not supplied separately.

† Specify part numbers when ordering.

MODELS 531,532,533

# EMERSON RADIO & PHONOGRAPH CORP.

The following voltage readings are d-c measurements from tube socket pin to chassis. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. All voltages are positive unless otherwise indicated.

|  | PIN NUMBER |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
| TUBE | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1T4(V1) |  | 55 | 52 | 82 |  | *—.3 | 1.5 |
| 1R5 |  | 82 | 57 | *—11.0 |  | *—.4 | 1.5 |
| 1T4(V3) |  | 82 | 52 |  |  | *—.4 | 1.5 |
| 1S5 |  | —6.2 | *—.45 | *18 | 10 | *—.3 | 1.5 |
| 3Q4 |  | 80.0 | *—6.2 | 82 | 1.5 | 80 |  |

An oscillator with frequencies of 455, 600, and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible, turning down the output of the test oscillator as the alignment of the receiver progresses.

## I-f and Trap Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the grid (pin 6) of the 1R5 tube through a 0.1 mfd. condenser.
3. Adjust the four i-f trimmer screws (C8, C9, C10, C11) for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a 0.002 mfd. condenser may be used as a substitute) and adjust the wave-trap trimmer for minimum response.

The color coding of the i-f transformer leads is as follows:

| | |
|---|---|
| Grid—green | Plate—blue |
| Grid return—black | B+—red |

## Location of Coils and Trimmer Adjustments

The oscillator coil (T5) is located beneath the chassis. The trimmer for the oscillator (C4) is on the front section of the variable condenser.

The trimmer for the antenna (C3) is on the rear section of the variable condenser.

The i-f transformers are mounted on top of the chassis. The first i-f transformer (T2) is mounted in back of the speaker. The second i-f transformer (T3) is mounted next to the output transformer.

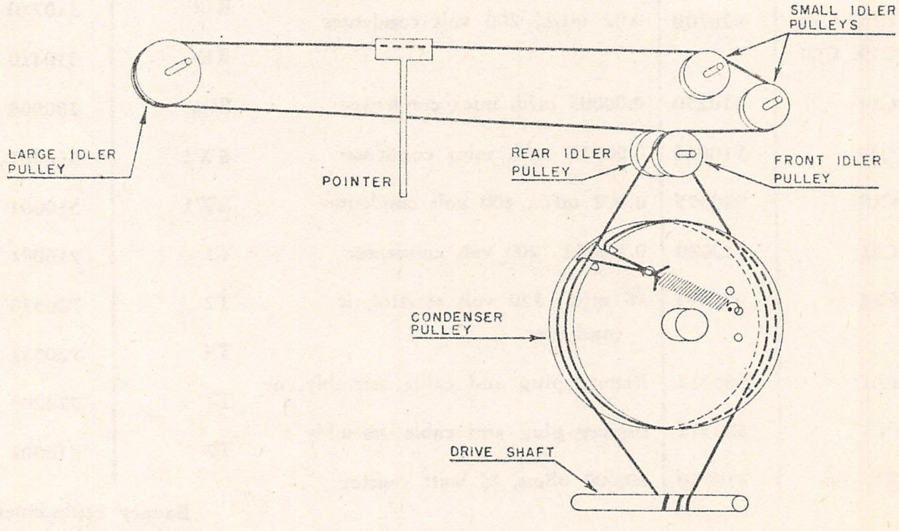
The 455 kc wave-trap is part of the antenna coil assembly, which is located on the underside of the chassis.

## R-f Alignment

Feed 1620 kc through a standard broadcast dummy antenna to the antenna lead (A 0.0002 mfd. condenser may be used as a substitute). Adjust oscillator trimmer (C4). Move pointer to 1425 kc and feed 1425 kc signal. Adjust antenna trimmer (3C), for maximum response.

## CABINET AND DIAL PARTS

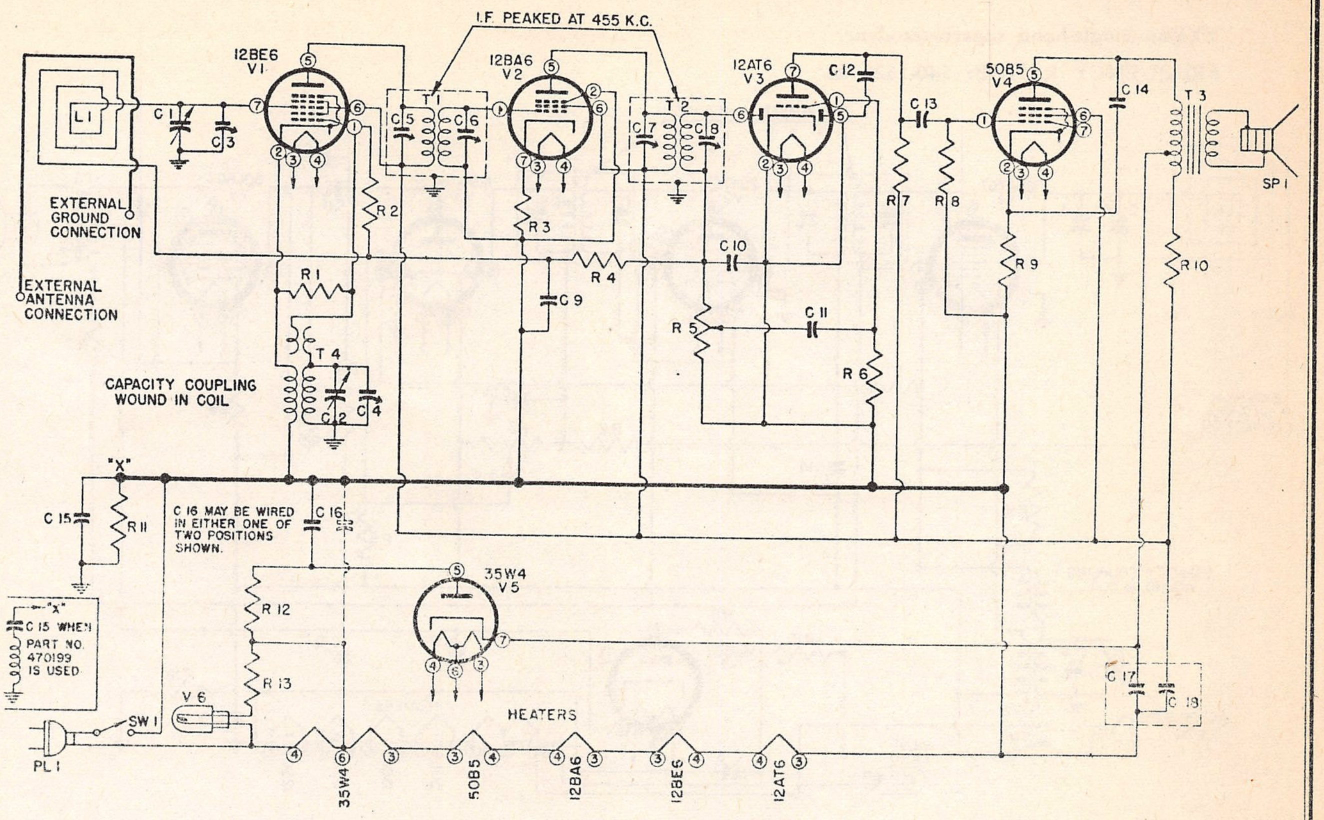
| | |
|---|---|
| 560190 | Rear cover (Model 533) |
| 280313 | Drive shaft |
| 520360 | Dial backplate |
| 520450 | Dial Glass |
| 525012 | Dial pointer |
| 140062 | Cabinet (Model 531) |
| 140029 | Cabinet (Model 532) |
| 140051 | Cabinet (Model 533) |
| 460140 | Knob (Model 531) |
| 460470 | Knob (Model 532, 533) |
| 560200 | Rear cover (Model 532) |



CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS.

MODELS 543,544
Chassis 120046

# EMERSON RADIO & PHONOGRAPH CORP.


I.F. PEAKED AT 455 K.C.
12BE6
V1
12BA6
V2
12AT6
V3
50B5
V4
L1
C1
C3
T1
C5
C6
T2
C7
C8
C12
C13
C14
T3
SP1
R2
R3
R7
R8
EXTERNAL GROUND CONNECTION
EXTERNAL ANTENNA CONNECTION
R1
R4
C10
C9
C11
R5
R6
R9
R10
T4
CAPACITY COUPLING WOUND IN COIL
C2
C4
"X"
C15
R11
C16 MAY BE WIRED IN EITHER ONE OF TWO POSITIONS SHOWN.
C16
35W4
V5
R12
R13
"X"
C15 WHEN PART NO. 470199 IS USED
V6
SW1
PL1
HEATERS
35W4
50B5
12BA6
12BE6
12AT6
C17
C18

Schematic Circuit Diagram Chassis 120046

## CHASSIS 120046

| | | |
|---|---|---|
| C1, C2 | 900013 | Two-gang variable condenser |
| *C3, C4 | | Trimmers, part of variable condenser |
| *C5, C6,<br>C7, C8 | | Trimmers, part of i-f transformers |
| C9 | 920040 | 0.1 mfd., 200 volt condenser |
| C10 | 910000 | 0.00022 mfd. mica condenser |
| C11 | 920010 | 0.002 mfd., 600 volt condenser |
| C12 | 920240 | 0.0005 mfd., 600 volt condenser |
| C13, C14 | 920020 | 0.02 mfd., 400 volt condenser |
| C15 | 920050 | 0.2 mfd., 200 volt condenser (used when T1 and T2 are 720000, and 720100 respectively), or |
| C15 | 470199 | 0.2 mfd., 200 volt assembly (used when T1 and T2 are 720525 and 720529 respectively) |
| C16 | 920030 | 0.05 mfd., 400 volt condenser |
| C17, C18 | 925009 | 50-50 mfd., 150 volt dual electrolytic condenser |
| L1 | 700000 | Loop antenna |
| *PL1 | | Power plug, part of line cord |
| R1 | 310810 | 22,000 ohms, ¼ watt resistor |
| R2, R6 | 397000 | 15 meg., ½ watt resistor |
| R3 | 340310 | 180 ohms, ½ watt desisteor |
| R4 | 321290 | 2.2 meg., ¼ watt resistor |
| R5 | 390015 | 0.5 meg. volume control |
| R7, R8 | 321130 | 470,000 ohms, ¼ watt resistor |
| R9 | 340290 | 150 ohms, ½ watt resistor |
| R10 | 370490 | 1,000 ohms, 1 watt resistor |
| R11 | 321050 | 220,000 ohms, ¼ watt resistor |
| R12 | 340050 | 15 ohms, ½ watt resistor |
| R13 | 340010 | 10 ohms, ½ watt resistor |
| SP1 | 180000 | P.M. speaker |
| *SW1 | | Line switch on volume control |
| T1 | 720000 | First i-f transformer, or |
| T1 | 720525 | First i-f transformer, midget |
| T2 | 720100 | Second i-f transformer, or |
| T2 | 720529 | Second i-f transformer, midget |
| T3 | 734000 | Output transformer |
| T4 | 716010 | Oscillator coil |
| | 583010 | Pilot light |
| | 807000 | Line cord |
| | 507090 | Pilot light socket |

## CABINET AND DIAL PARTS

| | |
|---|---|
| 280024 | Drive shaft |
| 520033 | Dial face |
| 525015 | Dial pointer |
| 140080B | Cabinet, ivory |
| 140082B | Cabinet, black |
| 410090 | Metal grille |
| 520034 | Dial crystal |
| 460470 | Knob |

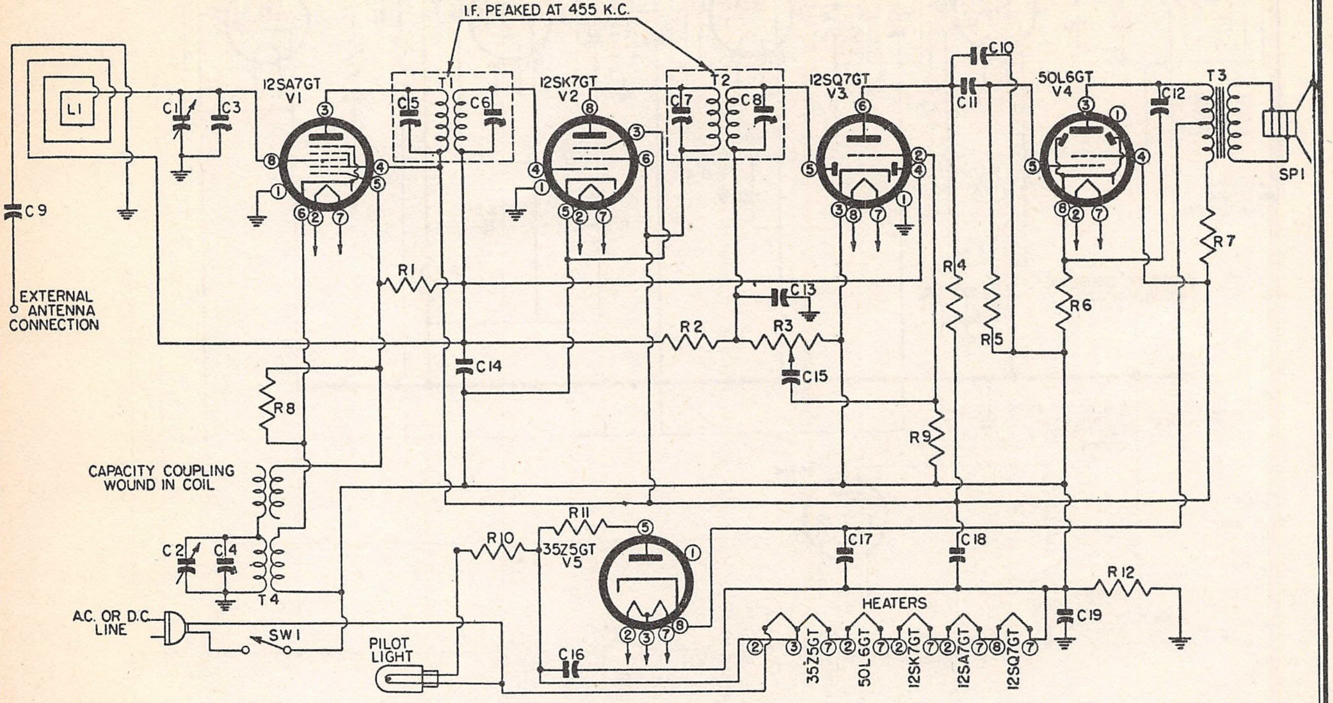
For alignment and voltage, see P. 16-2

**MODELS 543,544**
**Chassis 120052**

## EMERSON RADIO & PHONOGRAPH CORP.

**TYPE:** Single-band superheterodyne.

**FREQUENCY RANGE:** 540-1620 kc.


I.F. PEAKED AT 455 K.C.
L1
C1
C3
C9
EXTERNAL ANTENNA CONNECTION
12SA7GT V1
T1
C5
C6
12SK7GT V2
T2
C7
C8
12SQ7GT V3
C10
C11
50L6GT V4
C12
T3
SP1
R1
R2
R3
C13
C14
C15
R4
R5
R6
R7
R8
R9
CAPACITY COUPLING WOUND IN COIL
C2
C4
T4
AC. OR D.C. LINE
SW1
PILOT LIGHT
R10
R11
35Z5GT V5
C16
C17
C18
R12
C19
HEATERS
35Z5GT
50L6GT
12SK7GT
12SA7GT
12SQ7GT

Schematic Circuit Diagram Chassis 120052

## CHASSIS 120052

| Schematic Symbol | †Part No. | DESCRIPTION | Schematic Symbol | †Part No. | DESCRIPTION |
|---|---|---|---|---|---|
| C1, C2 | 900160 | Two-gang variable condenser | R3 | 390015 | 0.5 meg. volume control |
| *C3, C4 | | Trimmer, part of variable condenser | R4, R5 | 321130 | 470,000 ohms, ¼ watt resistor |
| *C5, C6, C7, C8 | | Trimmers, part of i-f transformers | R6 | 340290 | 150 ohms, ½ watt resistor |
| | | | R7 | 370490 | 1000 ohms, 1 watt resistor |
| C9, C15 | 920010 | 0.002 mfd., 600 volt condenser | R8 | 310810 | 22,000 ohms, ¼ watt resistor |
| C10 | 920240 | 0.0005 mfd., 600 volt condenser | R10 | 340010 | 10 ohms, ½ watt resistor |
| C11, C12 | 920020 | 0.02 mfd., 400 volt condenser | R11 | 397040 | 15 ohms, 1 watt wire-wound resistor |
| C13 | 910000 | 0.00022 mfd. mica condenser | R12 | 321050 | 220,000 ohms, ¼ watt resistor |
| C14 | 920040 | 0.1 mfd., 200 volt condenser | SP1 | 180000 | P.M. speaker |
| C16 | 920030 | 0.05 mfd., 400 volt condenser | *SW1 | | Line switch on volume control |
| C17, C18 | 925000 | 30-50 mfd., 150 volt dual electrolytic condenser | T1 | 720000 | First i-f transformer |
| | | | T2 | 720100 | Second i-f transformer |
| C19 | 920050 | 0.02 mfd., 200 volt condenser | T3 | 734000 | Output transformer |
| L1 | 700000 | Loop antenna, or | T4 | 716010 | Oscillator coil |
| L1 | 700200 | Loop antenna | | 583010 | Line cord |
| R1, R9 | 397000 | 15 meg., ¼ watt resistor | | 807000 | Pilot light |
| R2 | 321330 | 3.3 meg., ¼ watt resistor | | 507090 | Pilot light socket |

† Specify part numbers when ordering.
* Not supplied separately.

The color coding of the i-f transformer leads is as follows:

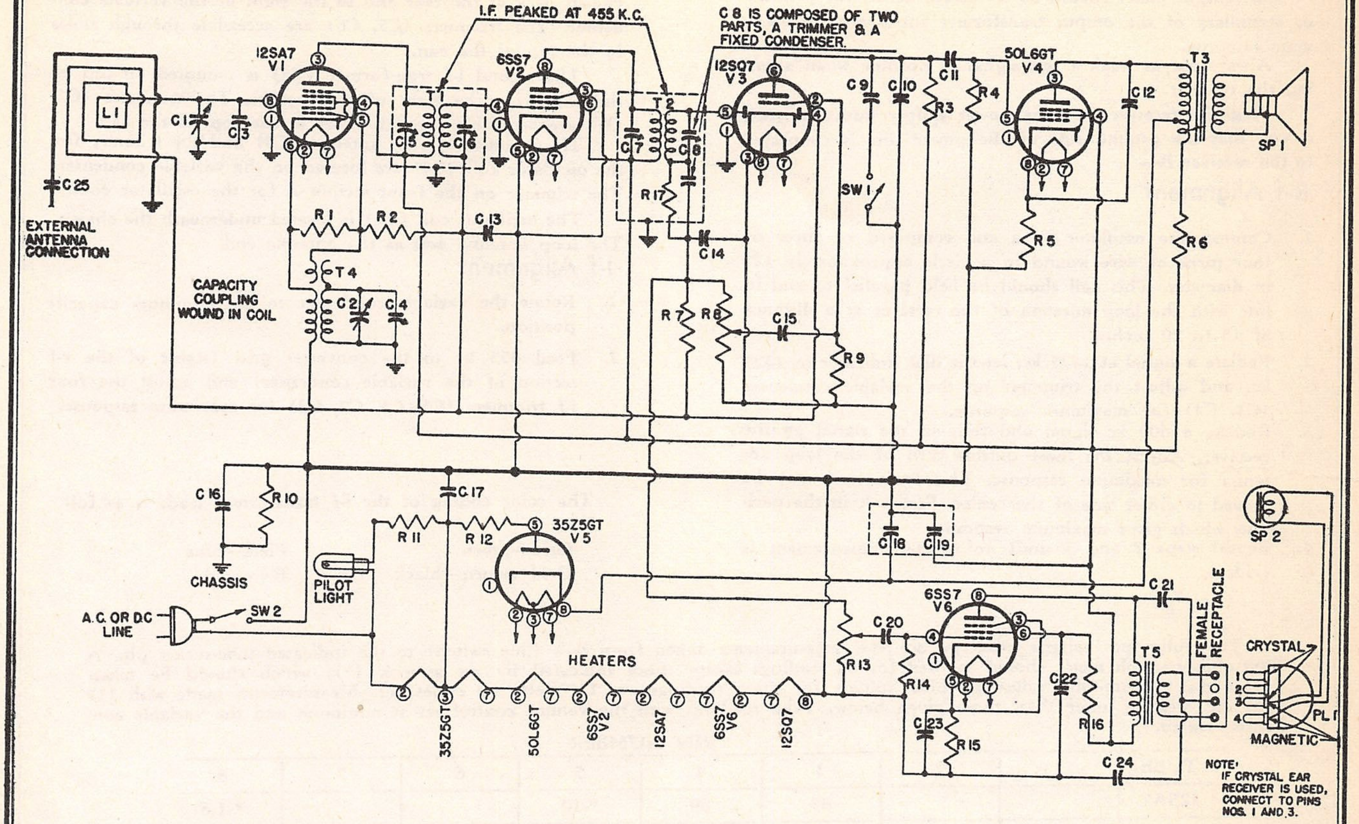
| | |
|---|---|
| Grid—green | Plate—blue |
| Grid return—black | B+—red |

# EMERSON RADIO & PHONOGRAPH CORP.

**MODELS 1002,1003**
**Chassis 129003**

**TYPE: Single-band superheterodyne with hearing aid receiver.**

**FREQUENCY RANGE: 540-1620 kc.**


I.F. PEAKED AT 455 K.C.

C 8 IS COMPOSED OF TWO PARTS, A TRIMMER & A FIXED CONDENSER.

NOTE: IF CRYSTAL EAR RECEIVER IS USED, CONNECT TO PINS NOS. 1 AND 3.

12SA7 V1
6SS7 V2
12SQ7 V3
50L6GT V4
35Z5GT V5
6SS7 V6
L1
C1
C3
C2
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
T1
T 2
T3
T4
T5
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
SW 1
SW 2
SP 1
SP 2
PL 1
EXTERNAL ANTENNA CONNECTION
CAPACITY COUPLING WOUND IN COIL
CHASSIS
PILOT LIGHT
A.C. OR DC LINE
HEATERS
35Z5GT
50L6GT
6SS7 V2
12SA7
6SS7 V6
12SQ7
FEMALE RECEPTACLE
CRYSTAL
MAGNETIC

| Schematic Symbol | †Part No. | DESCRIPTION |
|---|---|---|
| C1, C2 | 900070 | Two-gang variable condenser |
| *C3, C4 | | Trimmers, part of variable condenser |
| *C5, C6, C7, C8 | | Trimmers, part of i-f transformers |
| C9, C15, C20, C25 | 920010 | 0.002 mfd., 600 volt condenser |
| C10 | 920240 | 0.0005 mfd., 600 volt condenser |
| C11, C12, C21 | 920020 | 0.02 mfd., 400 volt condenser |
| C13 | 920040 | 0.1 mfd., 200 volt condenser |
| C14 | 910010 | 0.00011 mfd. mica condenser |
| C16 | 920050 | 0.2 mfd., 200 volt condenser |
| C17, C24 | 920030 | 0.05 mfd., 400 volt condenser |
| C18, C19 | 925011 | 50-50 mfd., 150 volt dual electrolyti condenser |
| C22 | 920060 | 0.05 mfd., 200 volt condenser |
| C23 | 925180 | 10 mfd., 25 volt electrolytic condenser |
| L1 | 700000 | Loop antenna |
| R1 | 340810 | 22,000 ohms, ½ watt resistor |
| R2, R9 | 397000 | 15 meg., ½ watt resistor |
| R3, R4 | 351130 | 470,000 ohms, ½ watt resistor |
| R5 | 340290 | 150 ohms, ½ watt resistor |
| R6 | 370490 | 1000 ohms, 1 watt resistor |
| R7, R14 | 351330 | 3.3 meg., ½ watt resistor |
| R8 | 390190 | 0.5 meg. volume control |
| R10 | 351050 | 220,000 ohms, ½ watt resistor |
| R11 | 340010 | 10 ohms, ½ watt resistor |
| R12 | 340050 | 15 ohms, ½ watt resistor |
| R13 | 390180 | 0.5 meg. volume control (sets below 8,767,450), or |
| R13 | 390014 | 2 meg. volume control (sets 8,767,450 and higher) |
| R15 | 340410 | 470 ohms, ½ watt resistor |
| R16 | 351050 | 220,000 ohms, ½ watt resistor (sets below 8,767,450), or |
| R16 | 340970 | 100,000 ohms, ½ watt resistor (sets 8,767,450 and higher) |
| SP1 | 180008 | P.M. speaker |
| SP2 | 829001 | Telex ear receiver (name imprinted), or |
| SP2 | 829002 | American Earphone ear receiver (no imprint) |
| SW1 | 510120 | Tone control switch |
| *SW2 | | Line switch on volume control |
| T1 | 720380 | First i-f transformer |
| T2 | 720390 | Second i-f transformer |
| T3 | 734080 | Output transformer (used with speaker) |
| T4 | 716070 | Oscillator coil (sets below 8,767,450), or |
| T4 | 716005 | Oscillator coil (sets 8,767,450 and higher) |
| T5 | 734001 | Output transformer (used with ear receiver) |
| | 807000 | Pilot light |
| | 507215 | Pilot light socket |
| | 583150 | Line cord |

An oscillator with frequencies of 455, 600 and 1425 kc is required.

An output meter should be connected across the primary or secondary of the output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Plug the receiver into the power supply outlet in such a way that the ground side of the power line is connected to the receiver B—

## R-f Alignment

1. Connect the oscillator to a coil composed of three or four turns of wire wound in a circle approximately 12" in diameter. This coil should be held parallel to and in line with the loop antenna of the receiver at a distance of 15 to 20 inches.
2. Radiate a signal at 1425 kc, set the dial indicator to 1425 kc, and adjust the trimmers on the variable condenser (C3. C4) for maximum response.
3. Radiate a 600 kc signal and tune in the signal on the receiver. Adjust the loose outside turn of the loop antenna for maximum response. This loose turn may be moved to either side of the center. Fasten it in the position which gives maximum response.
4. Repeat steps 2 and 3 until no further improvement is evident.

## Location of Coils and Trimmer Adjustments

The first i-f transformer (T1) is mounted on top of the chassis deck at the rear and to the right of the variable condenser. The trimmers (C5, C6) are accessible through holes in the top of the can.

The second i-f transformer (T2) is mounted on top of the chassis to the right of the speaker. The trimmers (C7, C8) are accessible through holes in the top of the can.

The trimmer for the antenna (C3) and the trimmer for the oscillator coil (C4) are located on the variable condenser. The trimmer on the front section is for the oscillator coil.

The oscillator coil (T4) is located underneath the chassis. The loop antenna acts as the antenna coil.

## I-f Alignment

1. Rotate the variable condenser to the minimum capacity position.
2. Feed 455 kc to the converter grid (stator of the r-f section of the variable condenser) and adjust the four i-f trimmers (C5, C6, C7, C8) for maximum response.

The color coding of the i-f transformer leads is as follows:

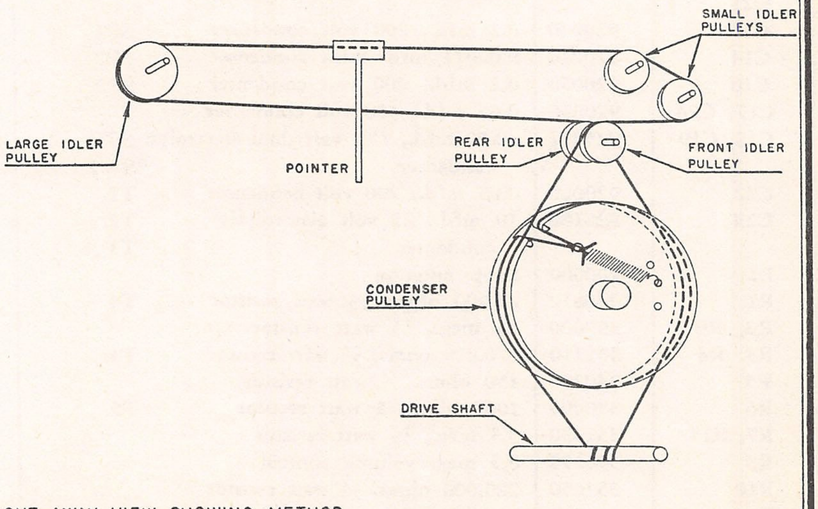
| | |
|---|---|
| Grid—green | Plate—blue |
| Grid return—black | B+—red |

The following voltage readings are d-c measurements taken from B— (line switch) to the indicated tube-socket pin. A 1000 ohms-per-volt meter should be used for all readings except those indicated by an asterisk (*), which should be taken with a d-c vacuum-tube voltmeter. Line voltage for these readings was 117 volts, 60 cycles, a.c. Measurements made with 117 volts d.c. will be lower than those given below. Take readings with the volume control set at minimum and the variable condenser closed.

| | PIN NUMBER | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TUBE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 12SA7 | | | 89 | 89 | *-10 | | | *-1.6 |
| 6SS7(V2) | | | | *-1.6 | | 89 | | 89 |
| 12SQ7 | | *-0.7 | | *-1.6 | *-0.5 | *52.0 | | |
| 50L6GT | | | 110 | 89 | | | | 6.2 |
| 35Z5GT | | | | 116 | | | | 117 |
| 6SS7(V6) | | | 1.4 | | 1.4 | *40.0 | | 89 |

## CABINET, DIAL AND ACCESSORY PARTS

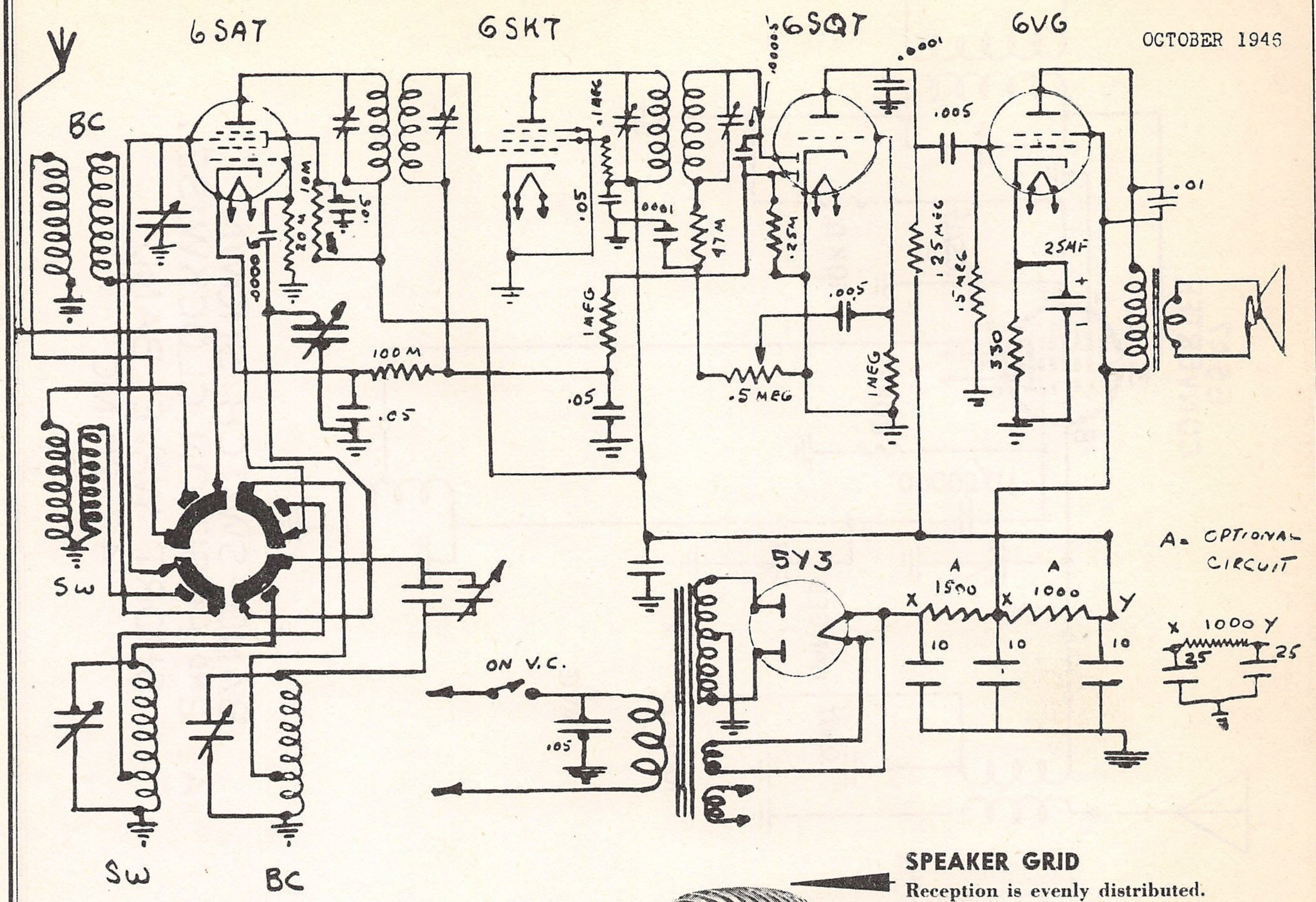
| | |
|---|---|
| 520480 | Dial backplate |
| 280313 | Drive shaft |
| 520450 | Dial glass |
| 525012 | Pointer |
| 140029 | Cabinet (Model 1002) |
| 560101 | Cabinet back (Model 1002) |
| 460470 | Knob (Model 1002) |
| 140054 | Cabinet (Model 1003) |
| 460140 | Knob (Model 1003) |
| 470222 | Plug and cable with ear receiver, complete |
| 585315 | Plug and cable (for ear receiver 829001) |
| 585122 | Plug and cable (for ear receiver 829002) |
| 508115 | Socket for ear receiver plug |
| 460005 | Ear mold, or |
| 460006 | Ear mold |
| 505057 | Plug, less cover and screw |
| 505058 | Plug cover |
| 204116 | Machine screw |
| 470220 | Under-pillow speaker, with plug |
| 829003 | Under-pillow speaker, less plug |

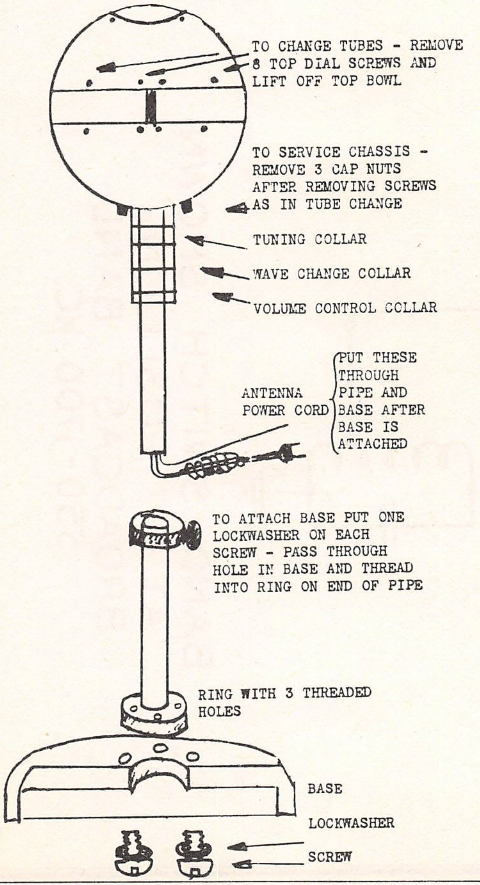


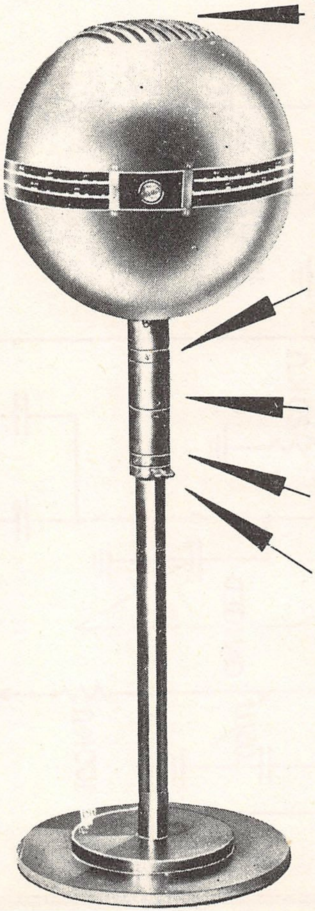
CUT-AWAY VIEW SHOWING METHOD OF STRINGING PULLEYS.

# EMOR RADIO, LTD.

OCTOBER 1946


6SA7
6SK7
6SQ7
6VG
BC
SW
.0001
.0005
.005
.01
.05
10M
20M
.1MEG
47M
.25M
1MEG
100M
.5MEG
1.25MEG
1.5MEG
330
25MF
5Y3
ON V.C.
A
1500
1000
X
Y
10
A = OPTIONAL CIRCUIT
X 1000 Y
25
SW
BC


TO CHANGE TUBES - REMOVE 8 TOP DIAL SCREWS AND LIFT OFF TOP BOWL
TO SERVICE CHASSIS - REMOVE 3 CAP NUTS AFTER REMOVING SCREWS AS IN TUBE CHANGE
TUNING COLLAR
WAVE CHANGE COLLAR
VOLUME CONTROL COLLAR
ANTENNA
POWER CORD
PUT THESE THROUGH PIPE AND BASE AFTER BASE IS ATTACHED
TO ATTACH BASE PUT ONE LOCKWASHER ON EACH SCREW - PASS THROUGH HOLE IN BASE AND THREAD INTO RING ON END OF PIPE
RING WITH 3 THREADED HOLES
BASE
LOCKWASHER
SCREW



**SPEAKER GRID**
Reception is evenly distributed.

**TUNING**
Tuning control in top sleeve over tubular stand revolves entire globe that has oversize dial. Indicator illuminates on station location.

**WAVE CHANGE CONTROL**
Long and Short Wave.

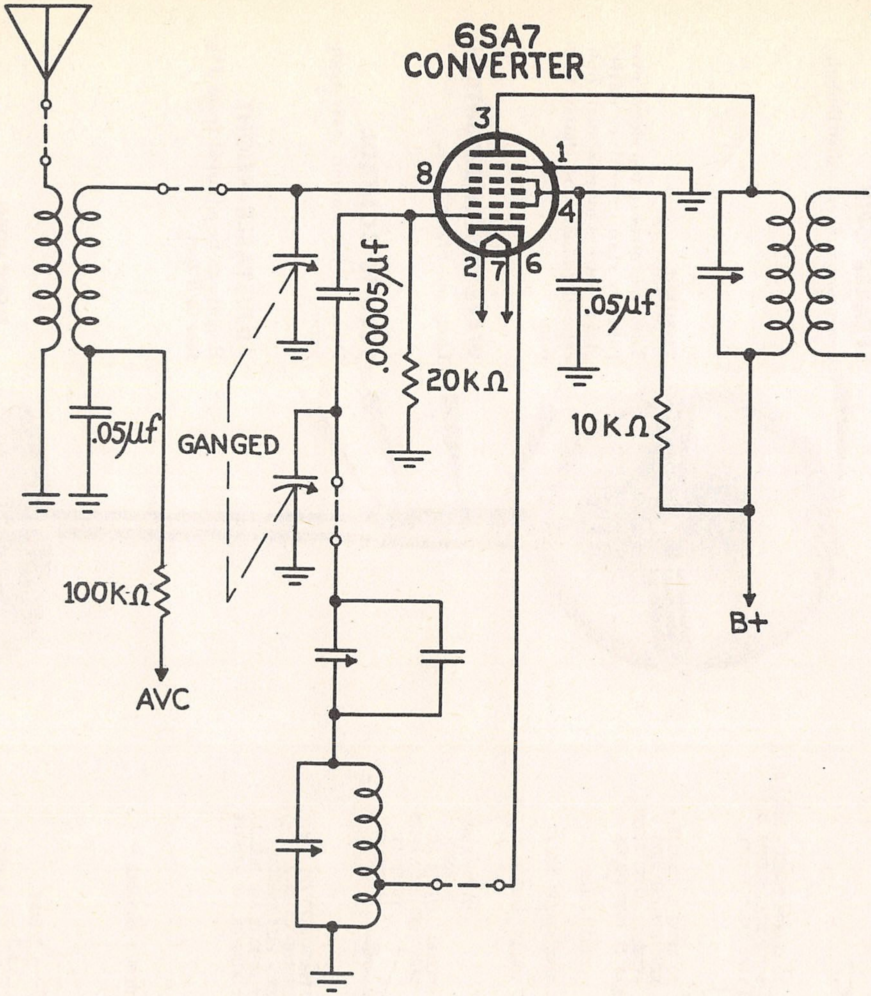
**VOLUME CONTROL**
Designed for smooth, easy regulation.

**ADJUSTABLE HEIGHT**
Height can be adjusted from 3½' feet to 5 feet.

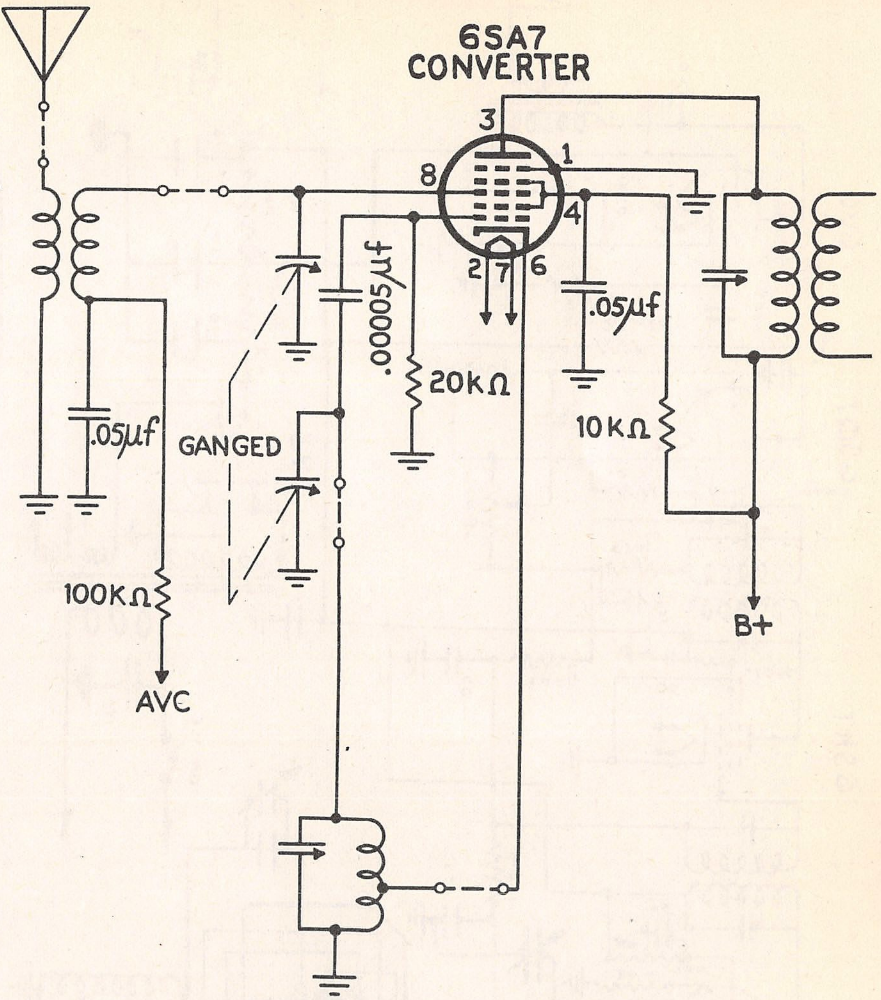
**FLOOR MODEL**

"clarified schematics"

EMOR RADIO, LTD.


6SA7
CONVERTER
3
1
8
4
2
7
6
.00005µf
.05µf
20KΩ
10KΩ
.05µf
GANGED
100KΩ
AVC
B+

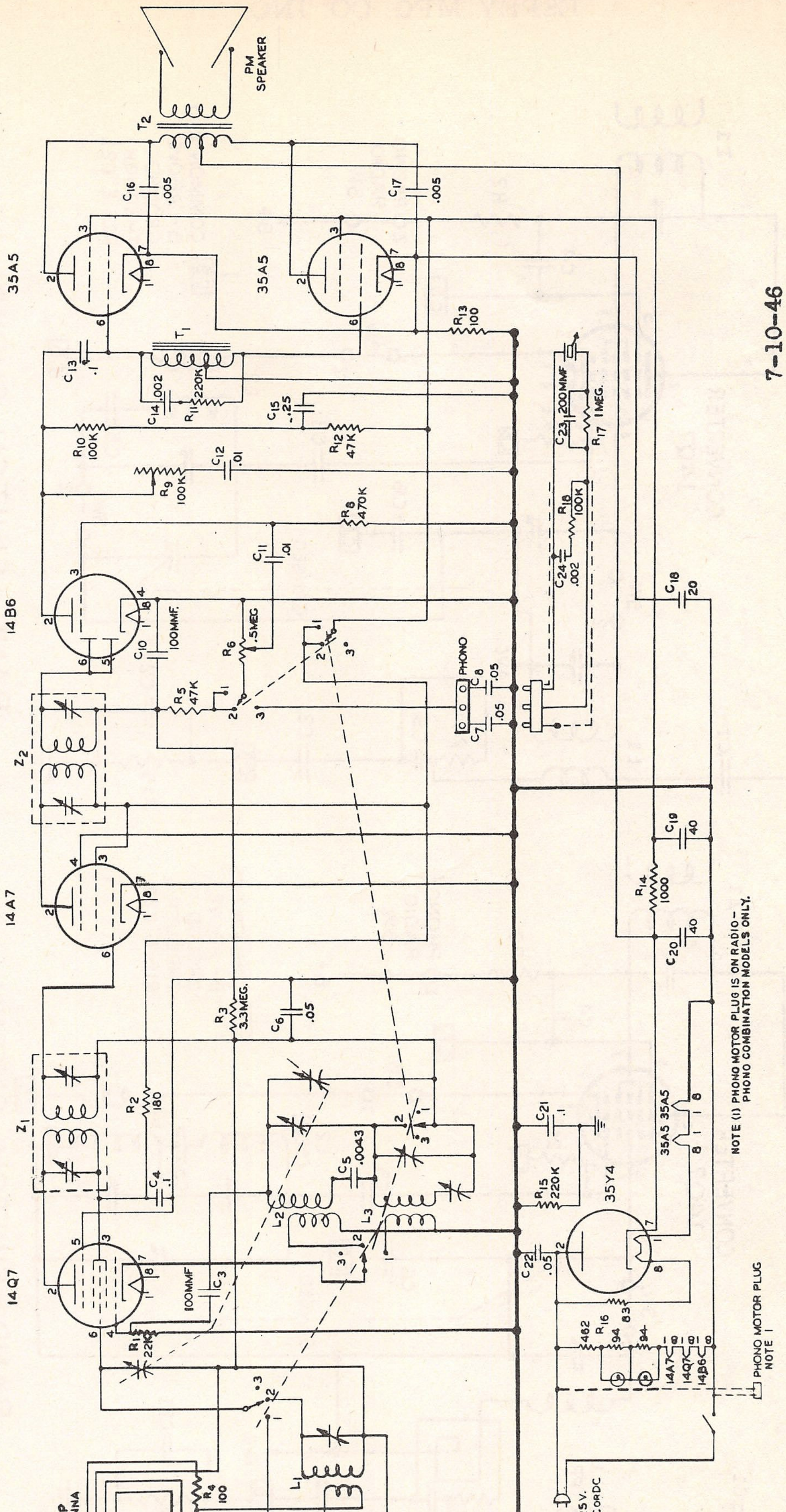
BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
550-1700 KC.


6SA7
CONVERTER
3
1
8
4
2
7
6
.00005µf
.05µf
20KΩ
10KΩ
.05µf
GANGED
100KΩ
AVC
B+

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND
4.7-20 MC.

ESPEY MFG. CO. INC.

CHASSIS FJ-97A.Revised


PM SPEAKER
T2
C16 .005
C17 .005
35A5
35A5
R13 100
T1
C13 .1
C14 .002
R11 220K
C15 .25
R12 47K
R10 100K
C12 .01
R9 100K
R8 470K
C23 200MMF
R17 1MEG.
R18 100K
C24 .002
14B6
C11 .01
C10 100MMF.
R6 .5MEG
R5 47K
PHONO
C8 .05
C7 .05
C18 20
Z2
14A7
C19 40
R14 1000
C20 40
R3 3.3MEG.
C6 .05
Z1
R2 180
C4 .1
C5 .0043
L2
L3
C21 .1
R15 220K
35Y4
35A5 35A5
14Q7
100MMF C3
R1 22K
C22 .05
R16 462 94 83 94
14A7 14Q7 14B6
PHONO MOTOR PLUG NOTE 1
L1
R4 100
LOOP ANTENNA
C9 250 MMF
ANT.
C1 .005
C2 .005
105-125V. 60~AC OR DC

NOTE (1) PHONO MOTOR PLUG IS ON RADIO-PHONO COMBINATION MODELS ONLY.

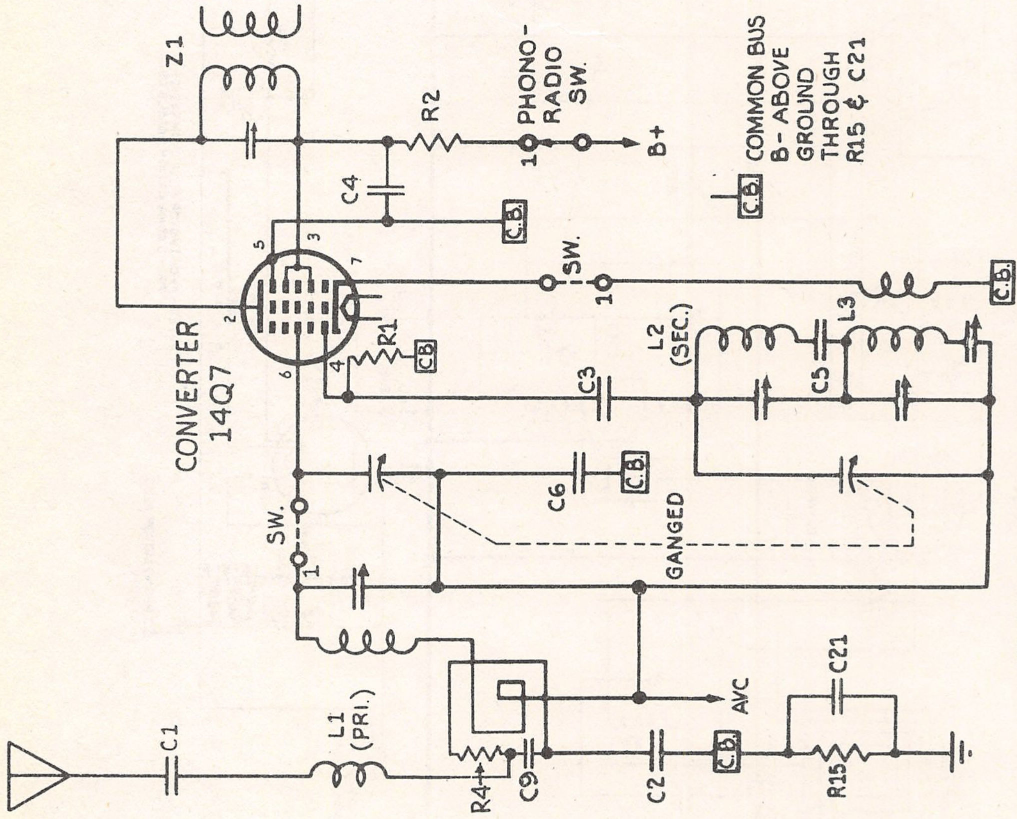
7-10-46

**REVISIONS**
Circ. revised
C9,R4,R7 deleted
R17 was 2 meg.
Nov. 4,1946 app.

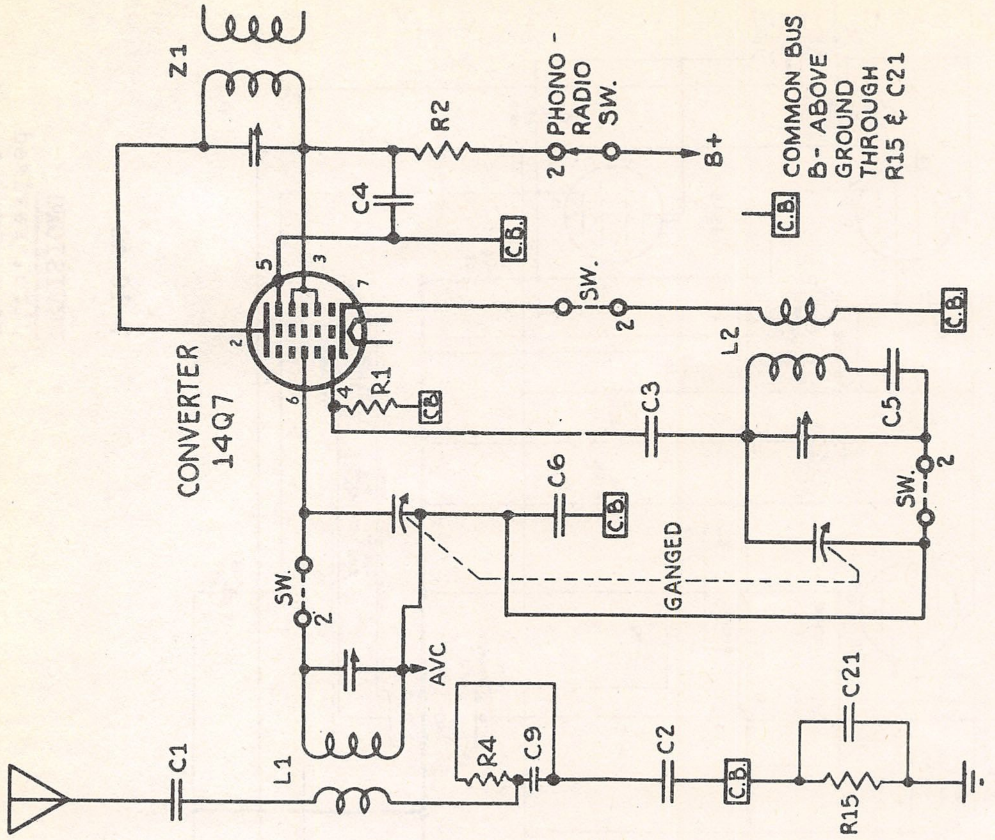
RECORD CHANGER: Seeburg Model K, P.15-6

CHASSIS FJ-97A.Revised

ESPEY MFG. CO. INC.


Z1
CONVERTER
14Q7
R2
PHONO-
RADIO
SW.
1
B+
C4
C.B.
COMMON BUS
B- ABOVE
GROUND
THROUGH
R15 & C21
5
3
7
2
6
4
R1
SW.
1
L2
(SEC.)
L3
C3
C5
C6
GANGED
AVC
C1
L1
(PRI.)
R4
C9
C2
R15
C21

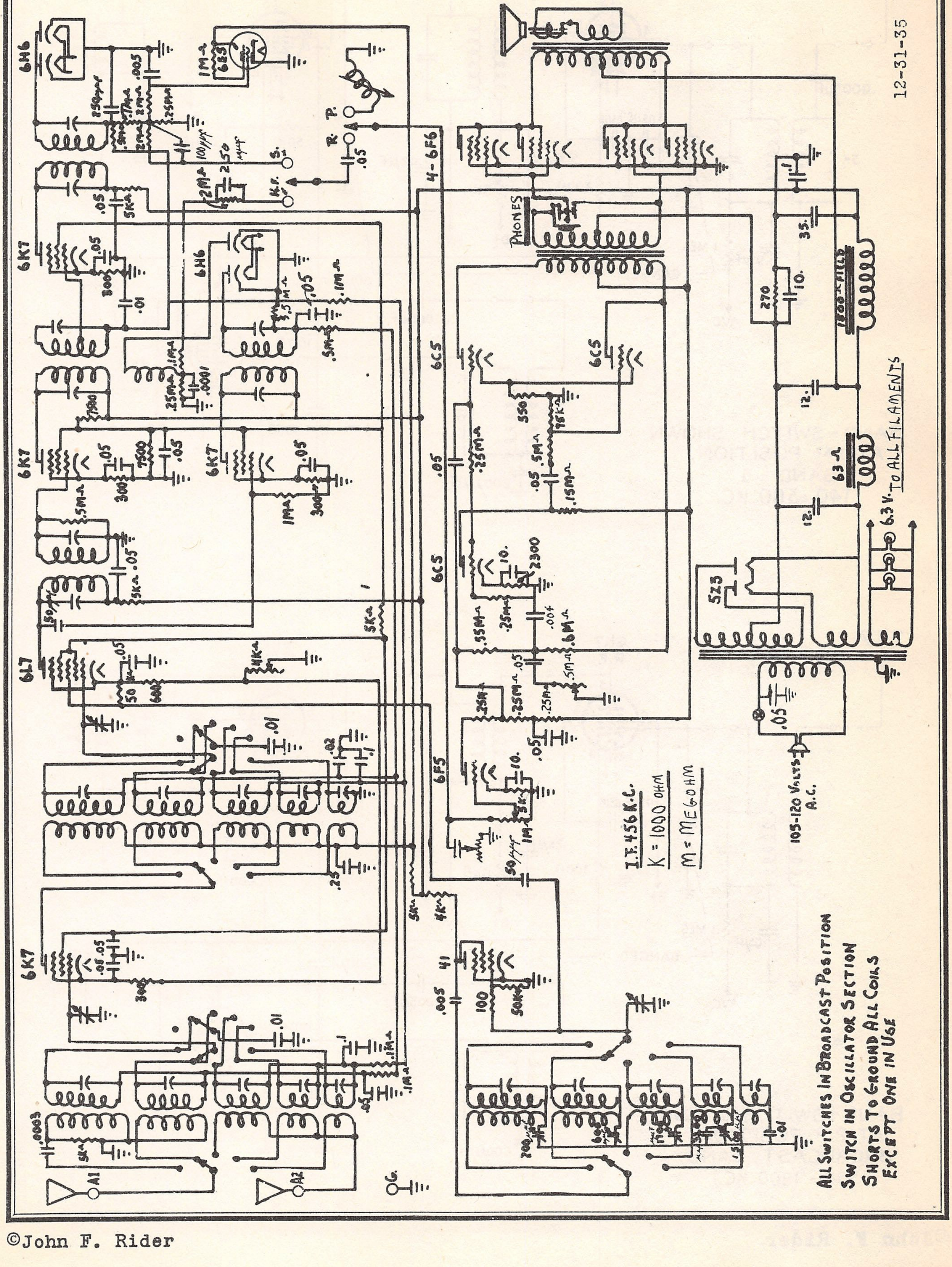
BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND


Z1
CONVERTER
14Q7
R2
PHONO-
RADIO
SW.
2
B+
C4
C.B.
COMMON BUS
B- ABOVE
GROUND
THROUGH
R15 & C21
5
3
7
2
6
4
R1
SW.
2
L2
C3
C5
C6
GANGED
AVC
C1
L1
R4
C9
C2
R15
C21

BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
5.5 - 18 MC.

ESPEY MFG. CO. INC.

MODEL 5181


6H6
6K7
6H6
6K7
6K7
6L7
6K7
41
6F5
6C5
6C5
6C5
4-6F6
5Z3
6E5
PHONES
R. P.
S.
A1
A2
G.
1800Ω FIELD
63Ω
6.3 V.

12-31-35

I.F. 456 K.C.

K = 1000 OHM

M = MEGOHM

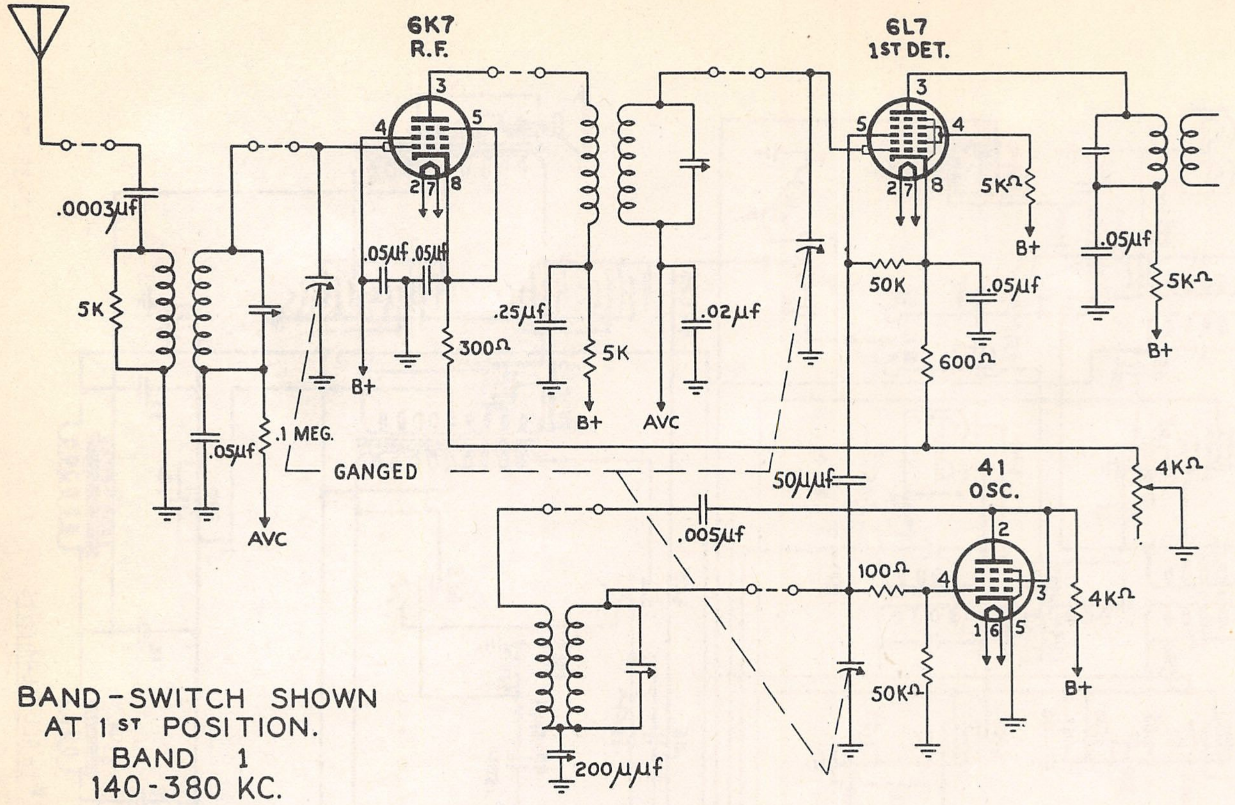
105-120 VOLTS A.C.

TO ALL FILAMENTS

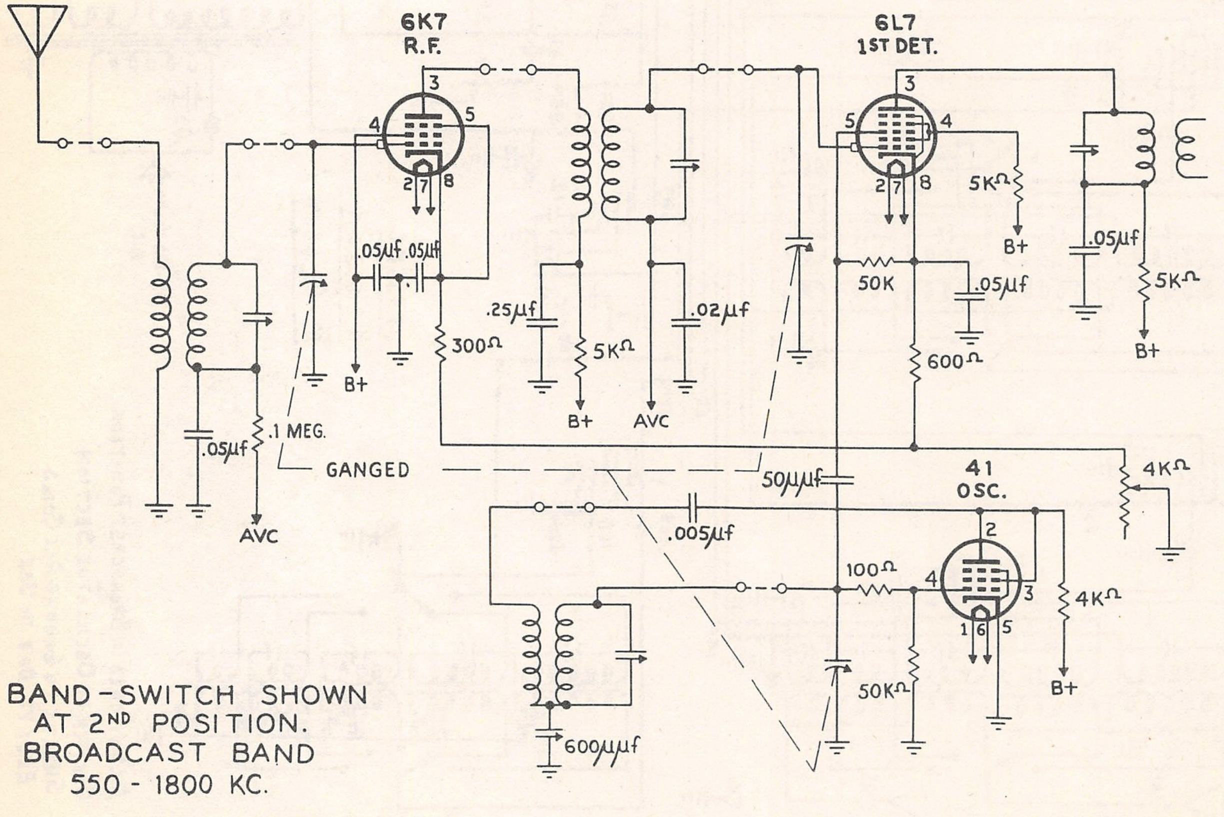
All Switches In Broadcast Position
Switch In Oscillator Section
Shorts To Ground All Coils
Except One In Use

MODEL 5181

# ESPEY MFG. CO. INC.


6K7
R.F.
6L7
1ST DET.
3
4
5
2
7
8
.0003µf
5K
.05µf .05µf
300Ω
B+
.25µf
5K
.02µf
AVC
.05µf
.1 MEG.
AVC
GANGED
5KΩ
B+
50K
.05µf
600Ω
.05µf
5KΩ
B+
4KΩ
50µµf
41
OSC.
.005µf
100Ω
4KΩ
B+
1
6
50KΩ
200µµf

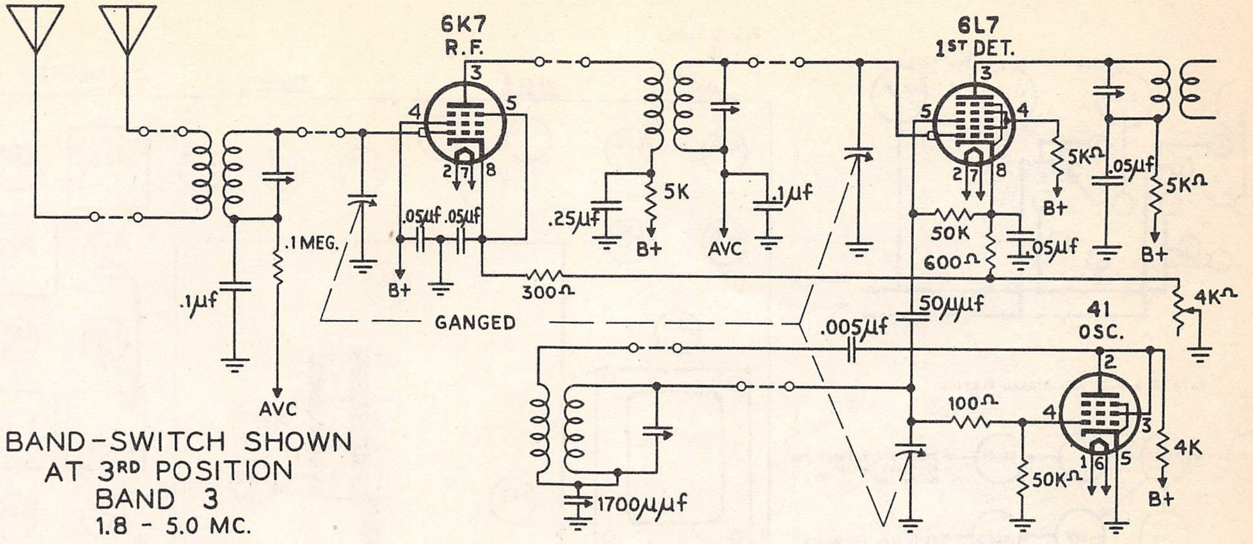
BAND - SWITCH SHOWN
AT 1ST POSITION.
BAND 1
140 - 380 KC.


6K7
R.F.
6L7
1ST DET.
3
4
5
2
7
8
.05µf .05µf
300Ω
B+
.25µf
5KΩ
.02µf
AVC
.05µf
.1 MEG.
AVC
GANGED
5KΩ
B+
50K
.05µf
600Ω
.05µf
5KΩ
B+
4KΩ
50µµf
41
OSC.
.005µf
100Ω
4KΩ
B+
1
6
50KΩ
600µµf

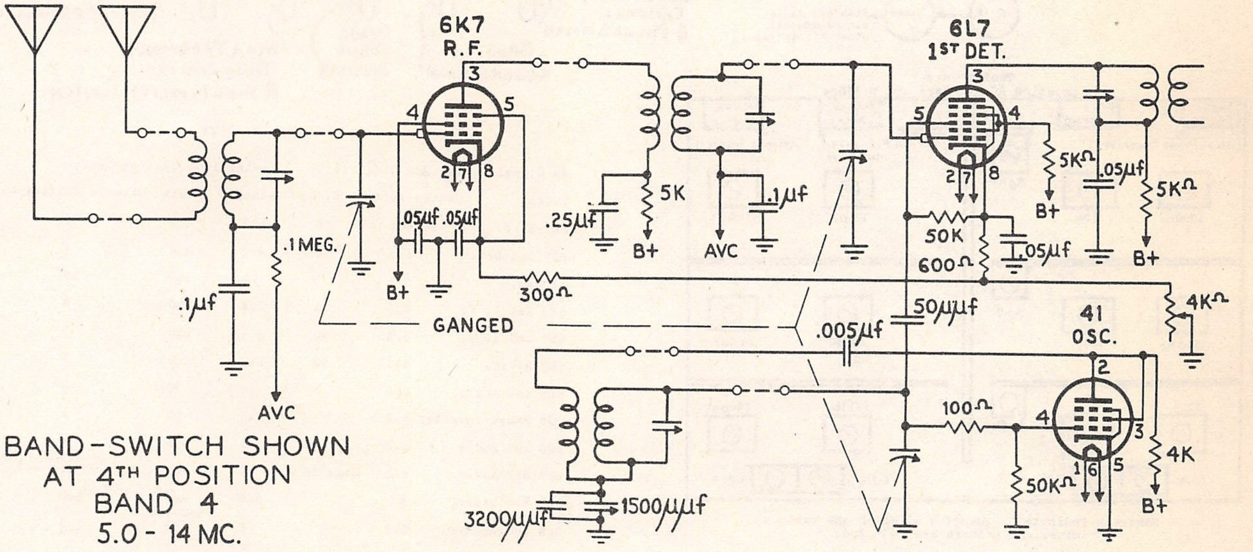
BAND - SWITCH SHOWN
AT 2ND POSITION.
BROADCAST BAND
550 - 1800 KC.

## ESPEY MFG. CO. INC.

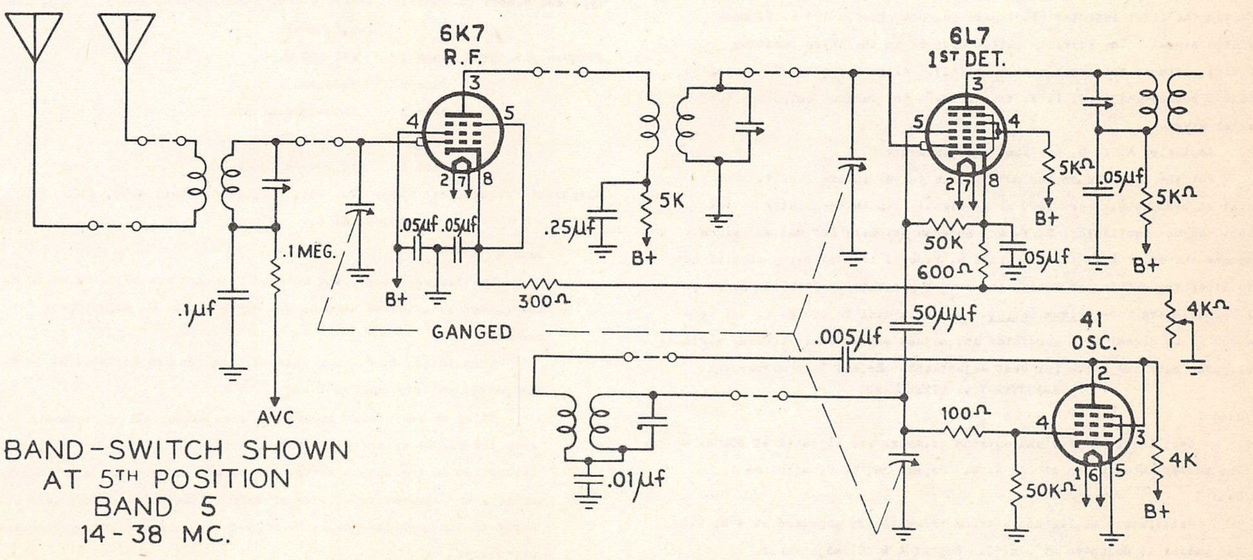
**MODEL 5181**


6K7
R.F.
6L7
1ST DET.
41
OSC.
.1 MEG.
.1μf
AVC
.05μf .05μf
B+
300Ω
GANGED
.25μf
5K
.1μf
5KΩ
.05μf
50K
600Ω
4KΩ
50μμf
.005μf
100Ω
50KΩ
4K
1700μμf

BAND-SWITCH SHOWN
AT 3RD POSITION
BAND 3
1.8 - 5.0 MC.


6K7
R.F.
6L7
1ST DET.
41
OSC.
.1 MEG.
.1μf
AVC
.05μf .05μf
B+
300Ω
GANGED
.25μf
5K
.1μf
5KΩ
.05μf
50K
600Ω
4KΩ
50μμf
.005μf
100Ω
50KΩ
4K
3200μμf
1500μμf

BAND-SWITCH SHOWN
AT 4TH POSITION
BAND 4
5.0 - 14 MC.

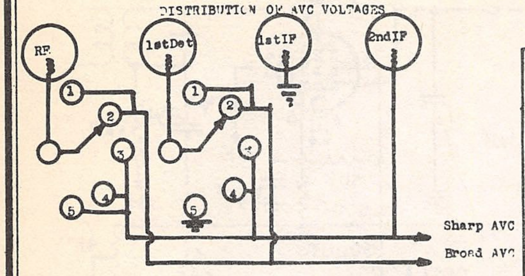

6K7
R.F.
6L7
1ST DET.
41
OSC.
.1 MEG.
.1μf
AVC
.05μf .05μf
B+
300Ω
GANGED
.25μf
5K
5KΩ
.05μf
50K
600Ω
4KΩ
50μμf
.005μf
100Ω
50KΩ
4K
.01μf

BAND-SWITCH SHOWN
AT 5TH POSITION
BAND 5
14 - 38 MC.

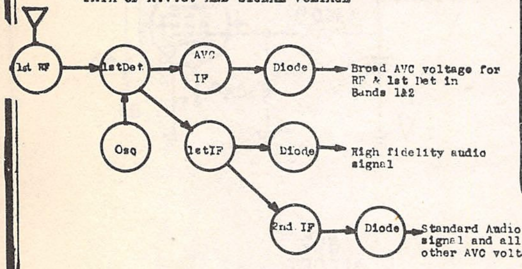
MODEL 5181

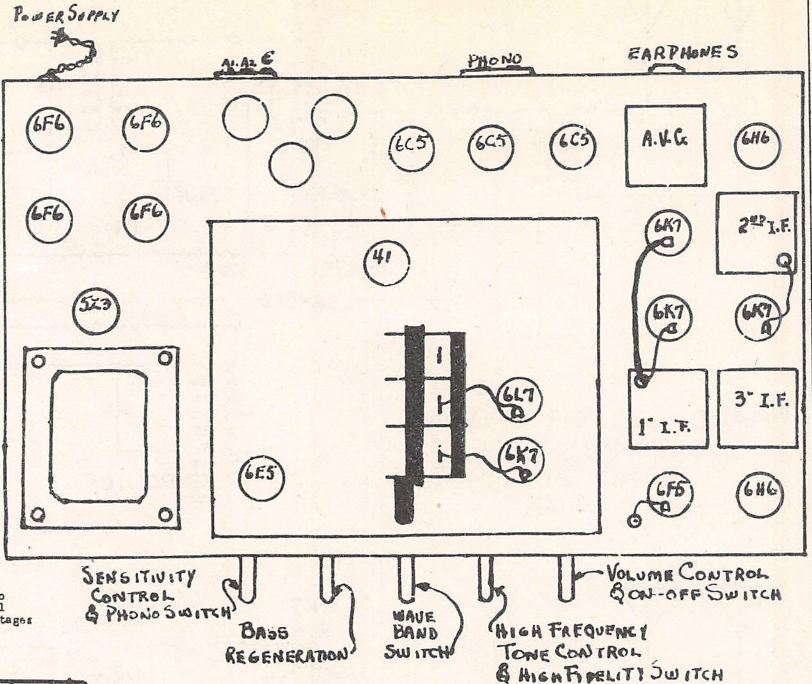
## ESPEY MFG. CO. INC.

DISTRIBUTION OF AVC VOLTAGES

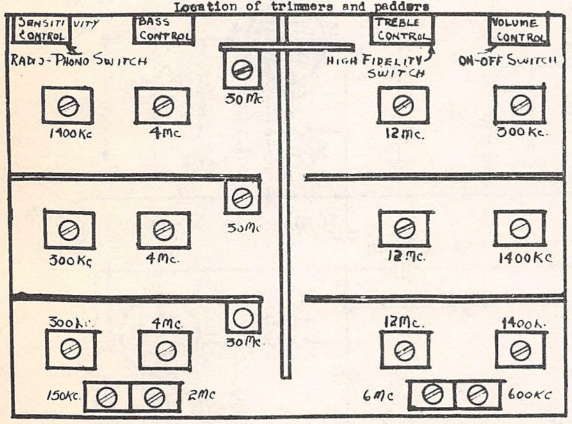

RF.
1stDet
1stIF
2ndIF
1
2
3
4
5
1
2
3
4
5
Sharp AVC
Broad AVC

PATH OF A.V.C. AND SIGNAL VOLTAGE


1st RF
1stDet
AVC IF
Diode
Broad AVC voltage for RF & 1st Det in Bands 1&2
Osc
1stIF
Diode
High fidelity audio signal
2nd IF
Diode
Standard Audio signal and all other AVC voltages


Power Supply
A1. A2 G
PHONO
EARPHONES
6F6
6F6
6F6
6F6
6C5
6C5
6C5
A.V.C.
6H6
2nd I.F.
6K7
41
6K7
6K7
5Z3
6L7
6K7
1st I.F.
3rd I.F.
6E5
6F5
6H6
Sensitivity Control & Phono Switch
Bass Regeneration
Wave Band Switch
High Frequency Tone Control & High Fidelity Switch
Volume Control & On-Off Switch

Tuning unit
Location of trimmers and padders


Sensitivity Control
Bass Control
Treble Control
Volume Control
Radio-Phono Switch
High Fidelity Switch
On-Off Switch
50 Mc
1400 Kc
4 Mc
12 Mc.
500 Kc.
50 Mc
500 Kc
4 Mc.
12 Mc.
1400 Kc
300 Kc.
4 Mc.
30 Mc.
12 Mc.
1400 K.
150 Kc.
2 Mc
6 Mc
600 Kc

Numerals indicate frequencies at which the various trimmers and padders are adjusted.

Socket Voltage Readings

No Signal Maximum Sensitivity Meter 1000 ohms per volt

| Tubes | Heater Volts | S. G. | Cathode | Plate | Cathode Current Ma. |
|---|---|---|---|---|---|
| 6K7 R. F. | 6.3 | 76 | 1.7 | 230 | 6 |
| 6L7 1st Det. | 6.3 | 76 | 2.2 | 220 | 4 |
| 41 Osc. | 6.3 |  | 0 | 160 | 17 |
| 6K7 1st I. F. | 6.3 | 90 | 2.4 | 230 | 8 |
| 6K7 2nd I. F. | 6.3 | 90 | 2 | 210 | 7 |
| 6K7 A.V.C. | 6.3 | 90 | 2.2 | 230 | 7 |
| 6F5 1st Audio | 6.3 |  | .8 | 70 | 2 |
| 6C5 Phase Inverter | 6.3 |  | 2.1 | 65 | 1 |
| 6C5 2nd Audio | 6.3 |  | 6.6 | 230 | 6 |
| 6F6 3rd Audio | 6.3 | Bias 38 V | 0 | 340 | 22 |
| 5Z3 Rectifier | 5 |  | 350 | RMS<br>400-400 | 140 |
| 6E5 Tuning Eye | 6.3 |  | 0 | 90 | 3 |

Voltage Rating: 105-125 Volts A. C. 50-60 Cycles

Power Consumption: 160 Watts

Type and Number of Tubes: 4-6K7, 4-6F6, 3-605, 2-6H6, 1-5Z3, 1-6F5, 1-6L7, 1-6E5, 1-41

| Frequency Ranges: | Band | Range |
|---|---|---|
|  | Band 1 | 140-380 K. C. |
|  | Band 2 | 550-1800 K. C. |
|  | Band 3 | 1800-5000 K. C. |
|  | Band 4 | 5000-14,000 K. C. |
|  | Band 5 | 14,000-38,000 K. C. |

Alignment Frequencies: 150, 300, 456, 600, 1400, 2000, 4000, 6000, 16,000 30,000 K. C.

### Alignment with Output Meter

1. Short either side of the broadcast R. F. coil trimmer to ground. Remove the first detector (6L7) grid cap and apply a 456 K. C. modulated signal. The fidelity switch must be in the sharp position (left). Remove the oscillator tube (41). Align the trimmers of the third, second and first I. F. transformers for maximum output in the order given.

2. Amplified A. V. C. and Band 2 adjustment:

Put the cap back on the 6L7. Place the 41 in its socket. Set dial at 1400 K. C. Feed 1400 K. C. signal from the generator to the set. Adjust oscillator, R. F. and antenna trimmers for maximum signal. Remove the short from the Broadcast R. F. coil trimmer being careful not to alter the setting of either the set or generator. Set both A. V. C. I. F. trimmers for minimum output. Now turn dial to 600 K. C. and feed a 600 K. C. signal from generator and adjust padder while rocking variable slightly back and forth for best adjustment. Repeat 1400 adjustment.

### ADJUSTMENT OF OTHER BANDS

Band 1

Oscillator, R. F., and antenna trimmers are adjusted at 300 K. C The padder is adjusted at 150 K. C. Repeat 300 K. C. adjustment.

Band 3

Oscillator, R. F., and antenna trimmers are adjusted at 4 M. C. The padder is adjusted at 2 M. C. Repeat 4 M. C. adjustment.

Band 4

Oscillator, R. F., and antenna trimmers are adjusted at 12 M. C. The padder is adjusted at 6 M. C. Repeat 12 M. C. adjustment.

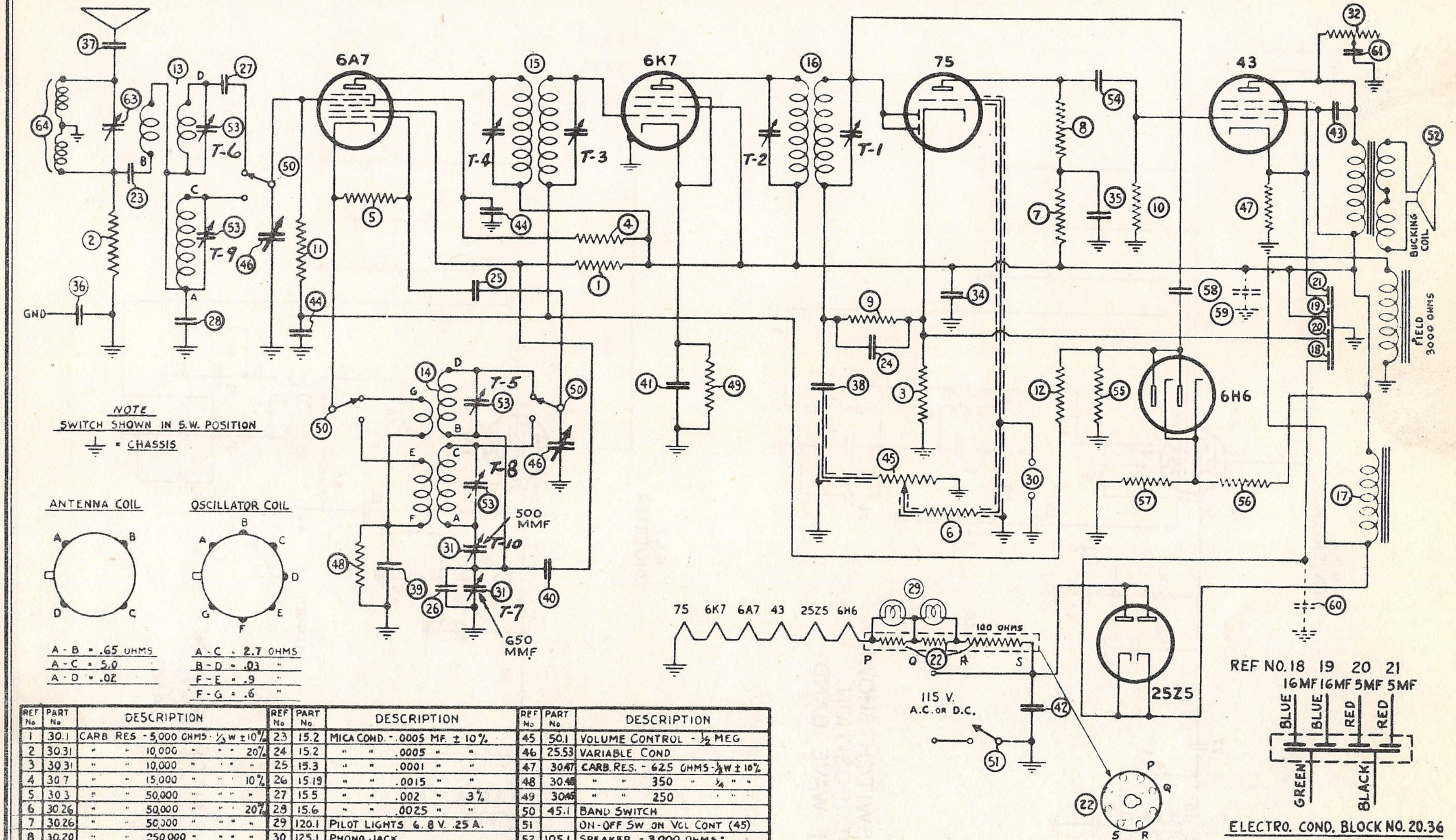
Band 5

Oscillator, R. F., and antenna trimmers are adjusted at 30 M. C. The padder on this band is fixed.

It is of the utmost importance when making all adjustments to keep the output of the generator just high enough to give a readable deflection on the output meter. If strong signals are used in alignment, your adjustments will be of very little value. This does not apply to the amplified A. V. C. adjustments where a strong signal is necessary.

# FADA RADIO & ELEC. CO. INC.

## MODEL 172


6A7
6K7
75
43
6H6
25Z5
T-1
T-2
T-3
T-4
T-5
T-6
T-7
T-8
T-9
T-10
500 MMF
650 MMF
GND
BUCKING COIL
FIELD 3000 OHMS
100 OHMS
115 V. A.C. OR D.C.
P
Q
R
S
75 6K7 6A7 43 25Z5 6H6
A
B
C
D
E
F
G
REF NO.18 19 20 21
16MF 16MF 5MF 5MF
BLUE
BLUE
RED
RED
GREEN
BLACK

*NOTE*

SWITCH SHOWN IN S.W. POSITION

⏚ = CHASSIS

ANTENNA COIL

A - B = .65 OHMS
A - C = 5.0
A - D = .02

OSCILLATOR COIL

A - C = 2.7 OHMS
B - D = .03 "
F - E = .9 "
F - G = .6 "

ELECTRO. COND. BLOCK NO. 20.36

1ST I.F. TRANS.

PRI - 14.5 OHMS
SEC. - 14.5 "

2ND I.F. TRANS

PRI. - 14.5 OHMS
SEC - 14.5 "

I.F. = 456 K.C.

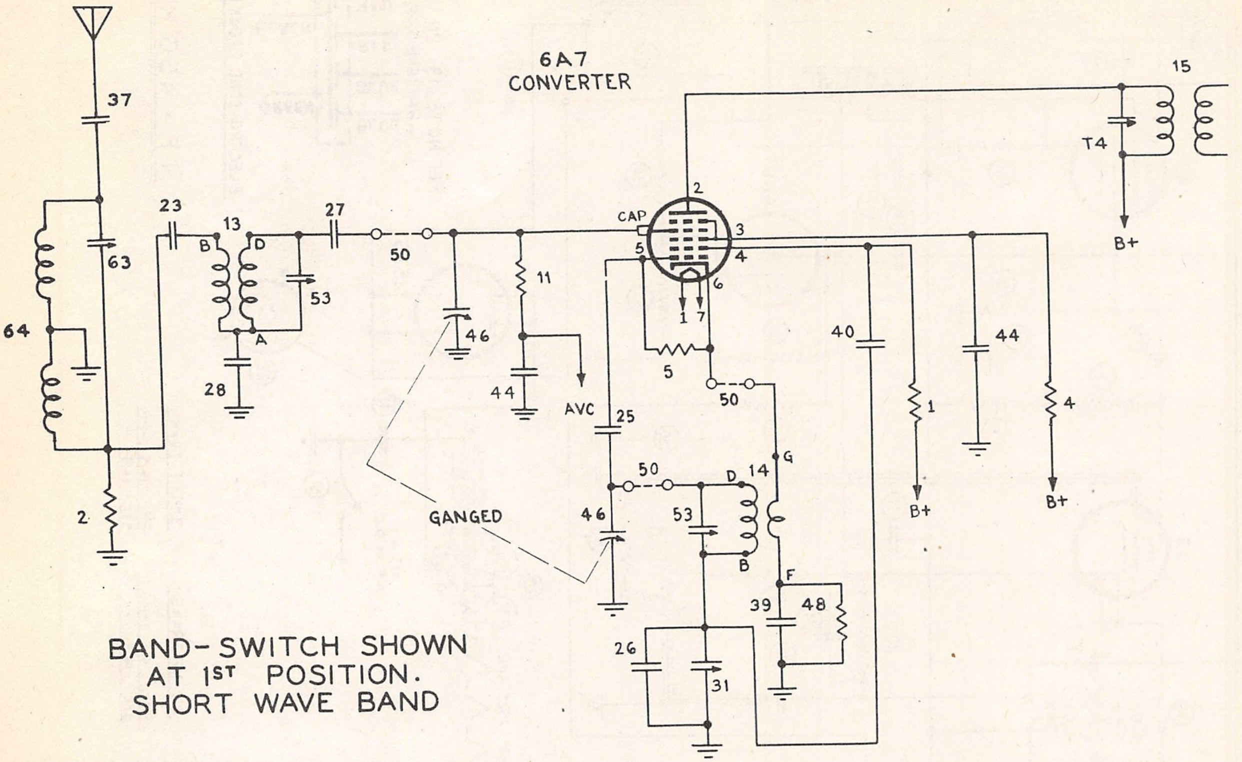
| REF No | PART No | DESCRIPTION | REF No | PART No | DESCRIPTION | REF No | PART No | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 1 | 30.1 | CARB RES - 5,000 OHMS - 1/3 W ± 10% | 23 | 15.2 | MICA COND. - .0005 MF. ± 10% | 45 | 50.1 | VOLUME CONTROL - 1/2 MEG |
| 2 | 30.31 | " " 10,000 " " " 20% | 24 | 15.2 | " " .0005 " " | 46 | 25.53 | VARIABLE COND |
| 3 | 30.31 | " " 10,000 " " " " | 25 | 15.3 | " " .0001 " " | 47 | 30.47 | CARB. RES. - 625 OHMS - 1/3 W ± 10% |
| 4 | 30.7 | " " 15,000 " " " 10% | 26 | 15.19 | " " .0015 " " | 48 | 30.48 | " " 350 " 1/4 " " |
| 5 | 30.3 | " " 50,000 " " " " | 27 | 15.5 | " " .002 " 3% | 49 | 30.46 | " " 250 " " |
| 6 | 30.26 | " " 50,000 " " " 20% | 28 | 15.6 | " " .0025 " " | 50 | 45.1 | BAND SWITCH |
| 7 | 30.26 | " " 50,000 " " " " | 29 | 120.1 | PILOT LIGHTS 6.8 V. .25 A. | 51 | | ON-OFF SW ON VOL CONT (45) |
| 8 | 30.20 | " " 250,000 " " " " | 30 | 125.1 | PHONO JACK | 52 | 105.1 | SPEAKER - 3,000 OHMS |
| 9 | 30.23 | " " 500,000 " " " " | 31 | 25.1 | PADDING COND - 650 - 500 MMF | 53 | | MIN. ADJ. ON COILS |
| 10 | 30.23 | " " 500,000 " " " " | 32 | 55.10 | TONE CONTROL - 200,000 OHMS | 54 | 10.4 | TUBULAR COND - .01 MF. - 200 V |
| 11 | 30.22 | " " 1 MEG " " " | 33 | | | 55 | 30.5 | CARB. RES. - 500,000 OHMS - 1/3 W. ± 10% |
| 12 | 30.22 | " " 1 " " " " | 34 | 10.2 | TUBULAR COND. .1 MF 200 WV | 56 | 30.4 | " " 250,000 " " " " |
| 13 | 2026 | ANTENNA COIL | 35 | 10.2 | " " .1 " " " | 57 | 30.2 | " " 10,000 " " " " |
| 14 | 3116 | OSCILLATOR " | 36 | 10.3 | " " .006 " 400 " | 58 | 15.3 | MICA COND - .0001 MF. ± 10% |
| 15 | 3B79 | 1ST I.F. " | 37 | 10.4 | " " .01 " 200 " | 59 | 20.25 | TUBULAR ELECTRO. COND - 8 MF 100 W.V. FOR 25 CYCLE OPERATION ONLY |
| 16 | 3B80 | 2ND I.F. " | 38 | 10.4 | " " .01 " " " | 60 | 20.25 | " " " 8 " " " |
| 17 | 40.1 | CHOKE " 300 OHMS | 39 | 10.5 | " " .05 " " " | 61 | 10.5 | TUBULAR COND. - .05 MF. 200 W.V. |
| 18 | 20.36A | ELECTRO. COND. BLOCK - 16 MF. - 100 WV | 40 | 10.5 | " " .05 " " " | 62 | | |
| 19 | 20.36A | " " " 16 " 100 " | 41 | 10.5 | " " .05 " " " | 63 | 25.8 | TRIMMING COND. - 500 MMF. |
| 20 | 20.36A | " " " 5 " 25 " | 42 | 10.7 | " " .05 " 400 " | 64 | 5005 | WAVE TRAP COIL |
| 21 | 20.36A | " " " 5 " 25 " | 43 | 10.10 | " " .01 " 400 " | | | |
| 22 | BK42D | BALLAST TUBE - 15 - 15 - 100 OHMS | 44 | 10.6 | " " DUAL .05 " 200 " | | | |

5-11-36

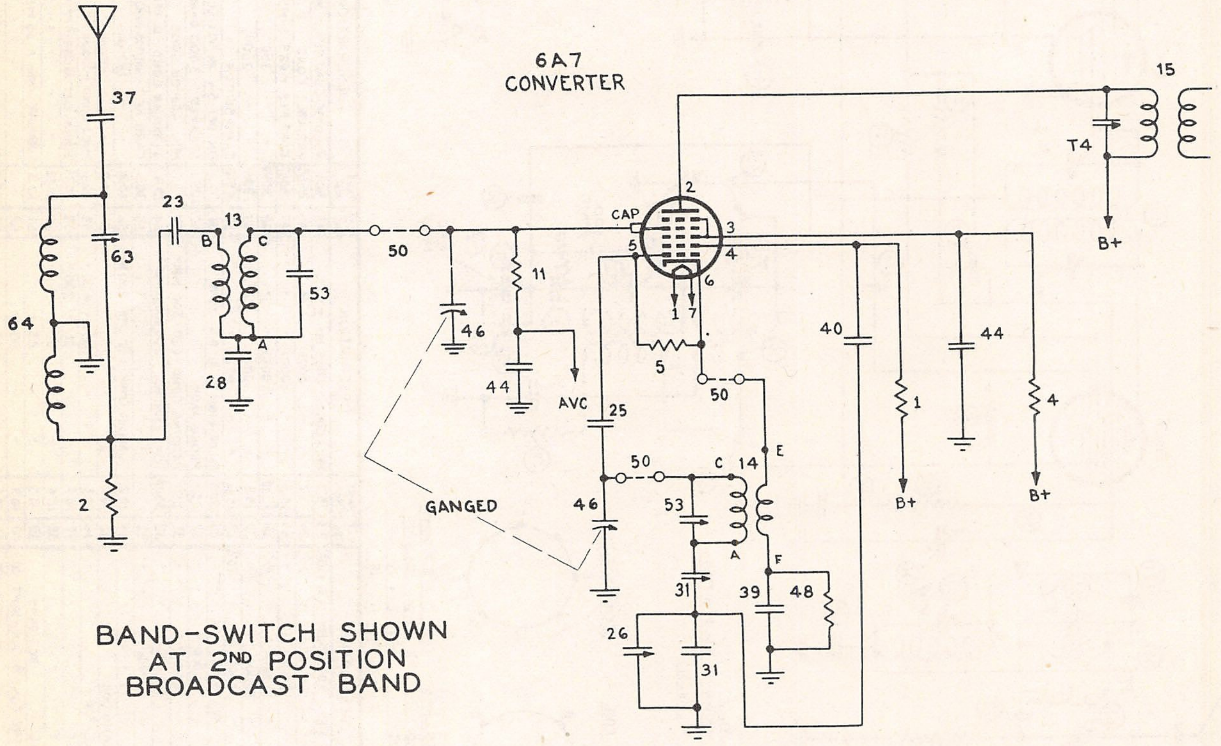
"*clarified schematics*"

**MODEL 172**

## FADA RADIO & ELEC. CO. INC.


6A7
CONVERTER
37
63
64
2
23
13
B
D
A
53
28
27
50
46
11
44
AVC
CAP
2
3
4
5
6
1
7
5
50
25
50
46
53
D
14
B
G
F
39
48
26
31
40
1
44
4
B+
B+
B+
15
T4
GANGED

BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND


6A7
CONVERTER
37
63
64
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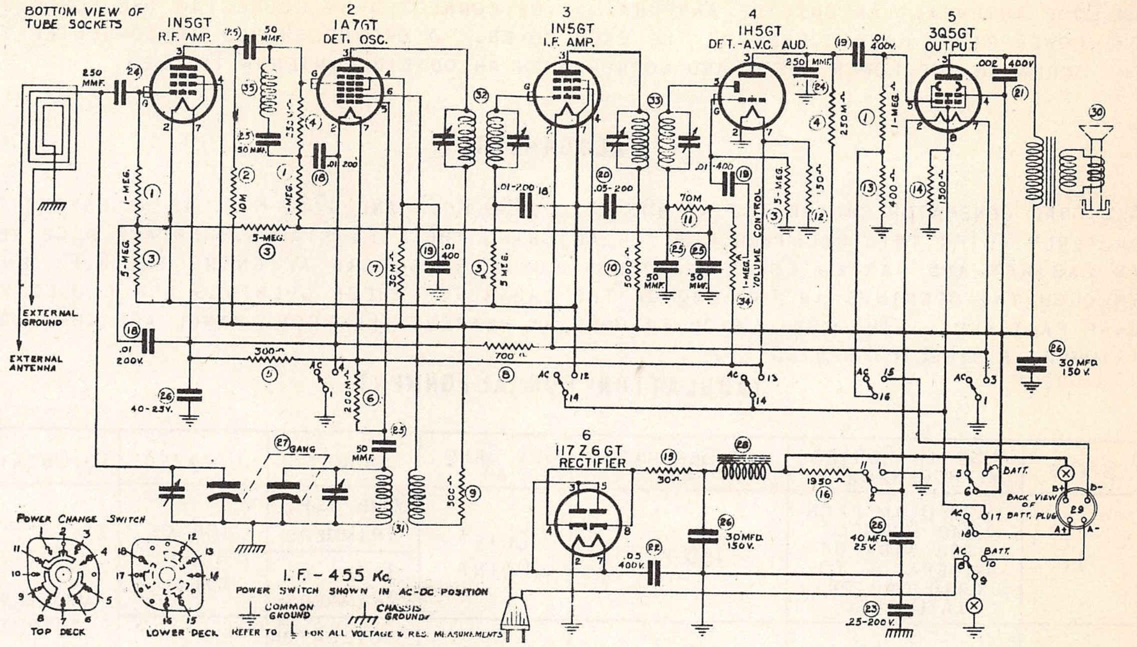
23
13
B
C
A
53
28
50
46
11
44
AVC
CAP
2
3
4
5
6
1
7
5
50
25
50
46
53
C
14
A
E
F
31
39
48
26
31
40
1
44
4
B+
B+
B+
15
T4
GANGED

BAND-SWITCH SHOWN
AT 2ND POSITION
BROADCAST BAND

# FARNSWORTH TELEV. & RADIO CORP.

**MODEL BT-68**


BOTTOM VIEW OF TUBE SOCKETS
1 1N5GT R.F. AMP.
2 1A7GT DET. OSC.
3 1N5GT I.F. AMP.
4 1H5GT DET.-A.V.C. AUD.
5 3Q5GT OUTPUT
6 117Z6GT RECTIFIER
250 MMF.
50 MMF.
EXTERNAL GROUND
EXTERNAL ANTENNA
.01 200V.
40-25V.
VOLUME CONTROL
30 MFD. 150 V.
40 MFD. 25 V.
.05 400V.
.25-200V.
BATT.
BACK VIEW OF BATT. PLUG
GANG
POWER CHANGE SWITCH
TOP DECK
LOWER DECK
I.F. - 455 Kc.
POWER SWITCH SHOWN IN AC-DC POSITION
COMMON GROUND
CHASSIS GROUND
REFER TO ⏚ FOR ALL VOLTAGE & RES. MEASUREMENTS

| | | |
|---|---|---|
| WATTS | AT 117 VOLTS A.C. | 30 |
| VOLTAGE | A.C. | 105-125 |

| Ref. No. | Old Part No. | New Part No. | DESCRIPTION | List Price |
|---|---|---|---|---|
| 1 | 771-24 | 77218 | 1 Meg ½ Watt | $ .15 |
| 2 | 771-14 | 77212 | 10 M Ohms ½ Watt | .15 |
| 3 | 773-27 | 77272 | 4.7 Megs ½ Watt | .15 |
| 4 | 773-21 | 77216 | 220 M Ohms ½ Watt | .15 |
| 5 | 77-90 | 77260 | 330 Ohms ½ Watt | .15 |
| 6 | 77-89 | 77216 | 220 M Ohms ½ Watt | .15 |
| 7 | 77-85 | 77267 | 33 M ½ Watt | .15 |
| 8 | 77-83 | 77262 | 1000 Ohms ½ Watt | .15 |
| 9 | 77-94 | 77261 | 470 Ohms ½ Watt | .15 |
| 10 | 77-93 | 77211 | 4700 Ohms ½ Watt | .15 |
| 11 | 77-88 | 77214 | 100 M Ohms ½ Watt | .15 |
| 12 | 774-1 | 77234 | 150 Ohms ½ Watt Wire Wound | .15 |
| 13 | 77-81 | 77261 | 470 Ohms ½ Watt | .15 |
| 14 | 771-10 | 77263 | 1500 Ohms ½ Watt | .15 |
| 15 | 77-79 | 77257 | 33 Ohms ½ Watt | .15 |
| 16 | 77-86 | 77086 | 1950 Ohms 5 Watt | .50 |
| 17 | 253-2 | 25215 | .1 Mfd. 600 V. | .15 |
| 18 | 25-94 | 25194 | .01 Mfd. 600 V. | .15 |
| 19 | 255-1 | 25194 | .01 Mfd. 600 V. | .15 |
| 20 | 256-1 | 25196 | .05 Mfd. 600 V. | .15 |
| 21 | 255-4 | 25185 | .002 Mfd. 600 V. | .15 |
| 22 | 255-2 | 25196 | .05 Mfd. 600 V. | .25 |
| 23 | 256-3 | 25054 | .25 Mfd. 200 V. | .25 |
| 24 | 253-2 | 25187 | 250 M. M. F. Mica | .15 |
| 25 | 253-5 | 25193 | 50 M. M. F. Mica | .15 |
| 26 | 25-61 | 25061 | Elec. Condenser 2-30 Mfd.—150 V., 2-40 Mfd. 25 V. | 1.60 |
| 27 | 26-64 | 26064 | Gang Tuning Condenser | 2.40 |
| 28 | 38-202 | 38202 | Choke | .90 |
| 29 | 80-70 | 80070 | Battery Plug | .10 |
| 30 | 81-70 | 81070 | Speaker and Output Transformer | 4.30 |
| 31 | 38-197 | 38197 | Oscillator Coil | .50 |
| 32 | 38-199 | 38199 | 1st. I. F. Transformer | 1.30 |
| 33 | 38-201 | 38201 | 2nd. I. F. Transformer | 1.60 |
| 34 | 78-27 | 78027 | Volume Control 1 Meg | 1.10 |
| 35 | 38-198 | 38198 | Wave Trap Coil | .45 |
| | 90-43 | 90043 | Power Change Switch | 1.50 |
| | 59-66 | 59066 | Knobs | .15 |
| | 31-89 | 31089 | Dial Scale | .20 |
| | 11-83 | 11083 | Dial Pointer | .15 |
| | 27-137 | 27137 | Line Cord | .35 |
| | 56-411 | 56411 | Escutcheon | 1.35 |

Prices subject to change without notice.

This six tube AC – DC or five tube battery operated portable receiver has a built in loop antenna. An outside antenna may be connected by loosening the screw in the lower right hand corner of the back cover. A ground should be connected to the screw in the lower left hand corner when an outside antenna is used.

## ALIGNMENT

A signal generator calibrated at 455 Kc., 1400 Kc., and 1730 Kc., is necessary to properly align this receiver. After aligning the I.F. stages, replace receiver in cabinet and fasten loop in normal position before aligning the R.F. end through the openings in the end of the cabinet. These openings are closed by snap fasteners. The oscillator trimmer is nearest the front panel and the loop trimmer is directly behind it.

### TABULATION FOR ALIGNMENT

| Steps | Use in Series with Generator | Set Generator at | Set Gang at | Adjust | Located | To Obtain |
|---|---|---|---|---|---|---|
| 1. | .02MFD in each lead connect high side of generator to grid cap of 1A7G tube | 455 Kc. | Quiet Point | 2nd I.F. Trimmers | Top of I.F. Trans. | Maximum Output |
| | | | | 1st I.F. Trimmers | | |
| 2. | Loop** | 1730 Kc. | Minimum | Oscillator Trimmer* | See Note Below | |
| 3. | Loop** | 1400 Kc. | 1400 Kc. & Rock Gang | Loop Trimmer* | | |

*See preceeding paragraph for location of trimmers.

**Loop to consist of five to ten turns of insulated wire wound on a three or four inch form to be closely coupled to the loop antenna in the receiver.

**SUGGESTED BATTERY** 1 General 60A-4L 1 Ray-O-Vac AB-87
1 Burgess 6FA-60

### VOLTAGE AND RESISTANCE DATA

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Cap. |
|---|---|---|---|---|---|---|---|---|---|
| 1 - 1N5GT | | | | | | | | | |
| Volts | open | 4.2 | 97 | 100 | 0 | 16 | 2.8 | open | 1.8 |
| Res. | open | 61 | 3500 | 2500 | 0 | 6 meg. | 40 | open | 1.5 meg. |
| 2 - 1A7GT | | | | | | | | | |
| Volts | open | 2.8 | 100 | 64 | 1.8 | 100 | 1.4 | 100 | 1.8 |
| Res. | open | 40 | 2500 | 2500 | 200M | 2500 | 22 | 2500 | 1.5 meg. |
| 3 - 1N5GT | | | | | | | | | |
| Volts | 0 | 5.6 | 100 | 100 | open | 0 | 4.2 | open | 0 |
| Res. | open | 80 | 2500 | 2500 | 0 | 0 | 61 | 0 | 5 meg. |
| 4 - 1H5GT | | | | | | | | | |
| Volts | open | 0 | 47 | 0 | 0 | 47 | 1.4 | open | 0 |
| Res. | open | 0 | 1 meg. | 0 | 1 meg. | 1 meg. | 22 | open | 5 meg. |
| 5 - 3Q5GT | | | | | | | | | |
| Volts | open | 8.4 | 93 | 100 | 0 | open | 5.6 | 9 | |
| Res. | open | 9.5 | 2500 | 2000 | 1 meg. | open | 80 | 75 | |
| 6 - 117Z6GT | | | | | | | | | |
| Volts | open | 117 AC | 117 AC | 123 | 117 AC | 0 | 0 | 123 | |
| Res. | open | 500 | 500 | 2500 | 500 | 0 | 0 | 2500 | |

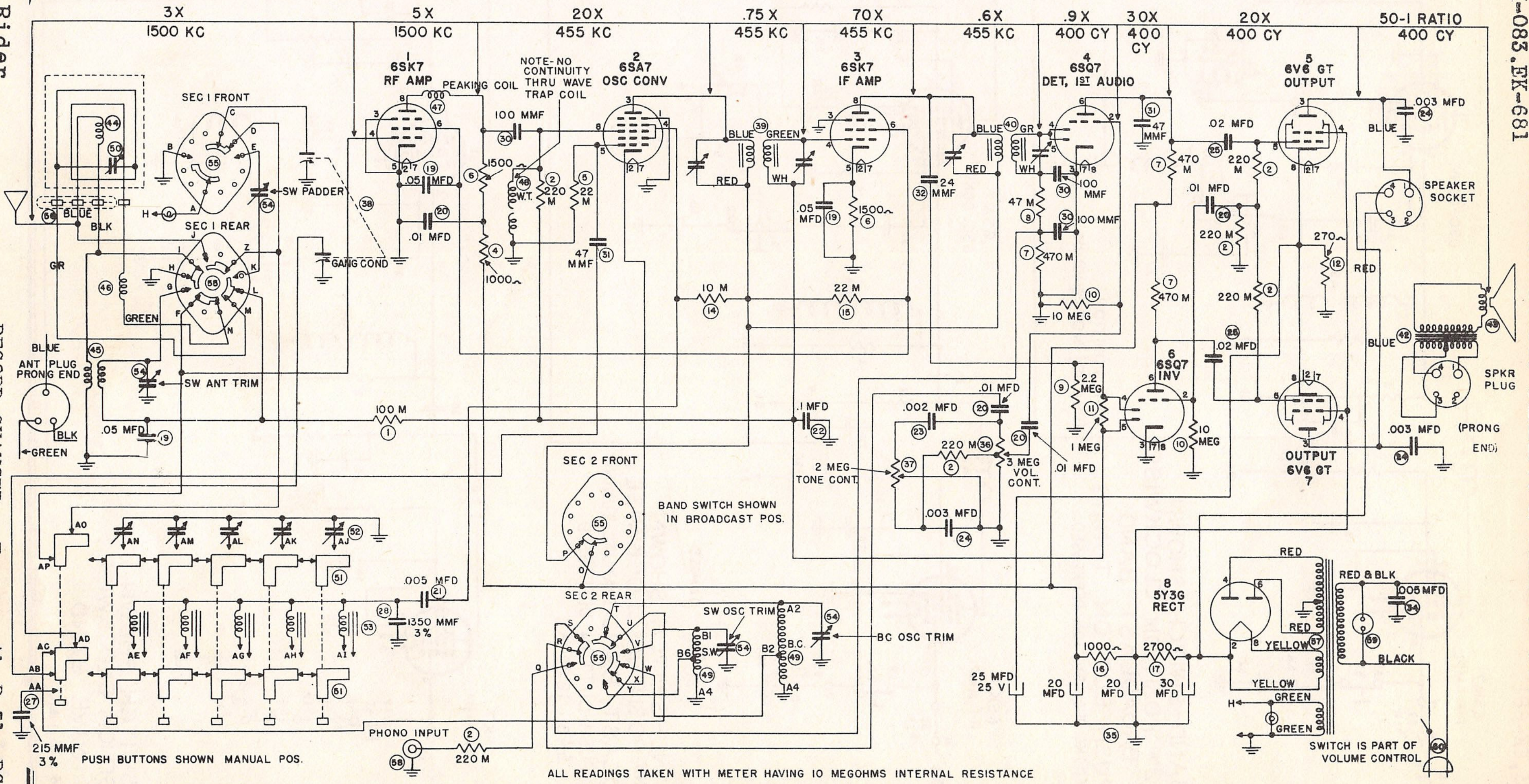
NOTES: On d-c voltage readings meter should have internal resistance of at least 10 megohms. Readings taken with no signal. Line voltage 117 V. A. C.

MODELS EK-081, EK-082, EK-083, EK-681

**FARNSWORTH TELEV. & RADIO CORP.**

Chassis C-156, C-157, C-193

| Pin | 1 Voltage | 1 Resistance | 2 Voltage | 2 Resistance | 3 Voltage | 3 Resistance | 4 Voltage | 4 Resistance | 5 Voltage | 5 Resistance | 6 Voltage | 6 Resistance | 7 Voltage | 7 Resistance | 8 Voltage | 8 Resistance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | OPEN | OPEN | 0 | 0 | OPEN | OPEN | OPEN | OPEN |
| 2 | 5.8AC | 0 | 5.8AC | 0 | 0 | 0 | -.85 | 9MEG | 5.8AC | 0 | -8 | 9 MEG | 0 | 0 | 275 | INF. |
| 3 | 0 | 0 | 165 | INF. | 0 | 0 | 0 | 0 | 265 | INF. | 0 | 0 | 265 | INF. | OPEN | OPEN |
| 4 | -.85 | 2.8 MEG | 90 | INF. | -.85 | 2.6 MEG | -.65 | 475 M | 190 | INF | -.75 | 1.9 MEG | 190 | INF. | 270AC | 120 |
| 5 | 0 | 0 | -7.8 | 24M | 5.25 | 1700 | -.65 | 475 M | 0 | 475 M | -.85 | 2.6 MEG | 0 | 425 M | OPEN | OPEN |
| 6 | 83 | INF. | 0 | .5 | 85 | INF. | 74 | INF. | 190 (NC) | INF. (NC) | 75 | INF. | OPEN(NC) | OPEN | 270 AC | 110 |
| 7 | 0 | 0 | 0 | 0 | 5.8 AC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.8 AC | 0 | OPEN | OPEN |
| 8 | 135 | INF. | -.85 | 2.8 MEG | 160 | INF. | 5.8 AC | 0 | 13 | 280 | 5.8 AC | 0 | 13 | 280 | 275 | INF. |


3X
1500 KC
5X
1500 KC
20X
455 KC
.75X
455 KC
70X
455 KC
.6X
455 KC
.9X
400 CY
30X
400 CY
20X
400 CY
50-1 RATIO
400 CY
1 6SK7 RF AMP
PEAKING COIL
NOTE-NO CONTINUITY THRU WAVE TRAP COIL
2 6SA7 OSC CONV
3 6SK7 IF AMP
4 6SQ7 DET, 1ST AUDIO
5 6V6 GT OUTPUT
6 6SQ7 INV
7 OUTPUT 6V6 GT
8 5Y3G RECT
SEC 1 FRONT
SEC 1 REAR
SEC 2 FRONT
SEC 2 REAR
SW PADDER
GANG COND
SW ANT TRIM
SW OSC TRIM
BC OSC TRIM
BAND SWITCH SHOWN IN BROADCAST POS.
ANT PLUG PRONG END
SPEAKER SOCKET
SPKR PLUG
(PRONG END)
2 MEG TONE CONT.
3 MEG VOL. CONT.
SWITCH IS PART OF VOLUME CONTROL
PHONO INPUT
215 MMF 3%
PUSH BUTTONS SHOWN MANUAL POS.
.005 MFD
1350 MMF 3%
100 MMF
.05 MFD
.01 MFD
47 MMF
24 MMF
.02 MFD
.002 MFD
.003 MFD
.1 MFD
25 MFD 25 V
20 MFD
30 MFD
.005 MFD
100 M
10 M
22 M
220 M
470 M
47 M
1500~
1000~
2700~
270~
2.2 MEG
1 MEG
10 MEG
BLUE
BLK
GR
GREEN
RED
WH
YELLOW
RED & BLK
BLACK
H

ALL READINGS TAKEN WITH METER HAVING 10 MEGOHMS INTERNAL RESISTANCE

115 V AC 60 CYCLES

| MODEL | CHASSIS |
|---|---|
| EK-081 | C-156 |
| EK-082 | C-157 |
| EK-083 | C-193 |
| EK-681 | C-156 |

## ELECTRICAL SPECIFICATIONS

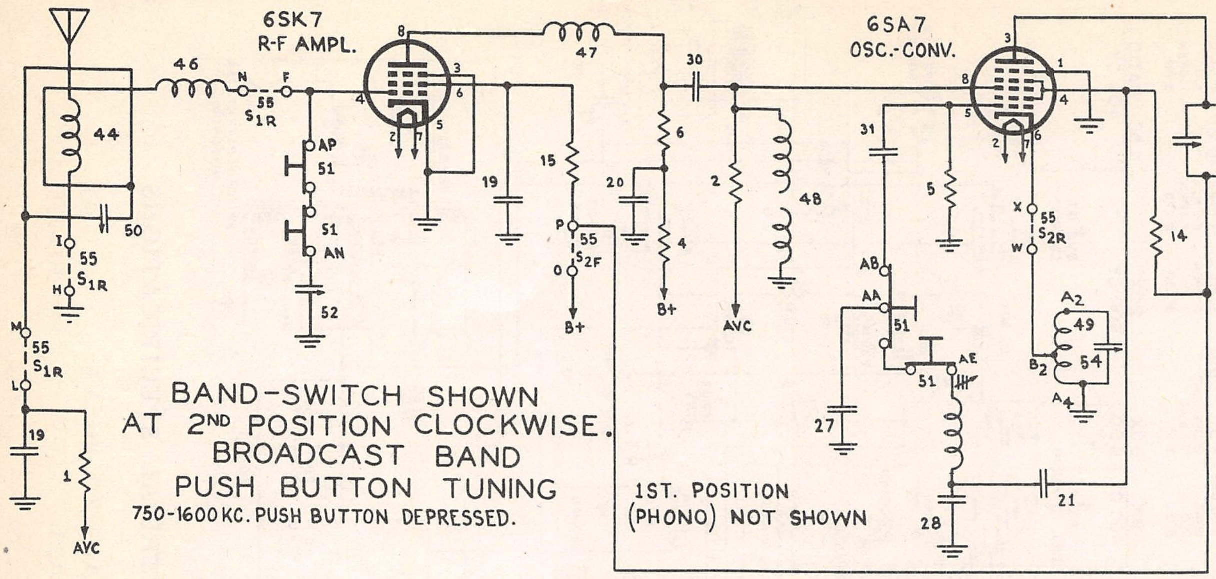
Eight Tube A. C. Two Band Superheterodyne

| | |
|---|---|
| Broadcast Band | 540 Kc.—1620 Kc. |
| Short Wave Band | 9.4 Mc.—15.4 Mc. |
| Intermediate Frequency | 455 Kc. |

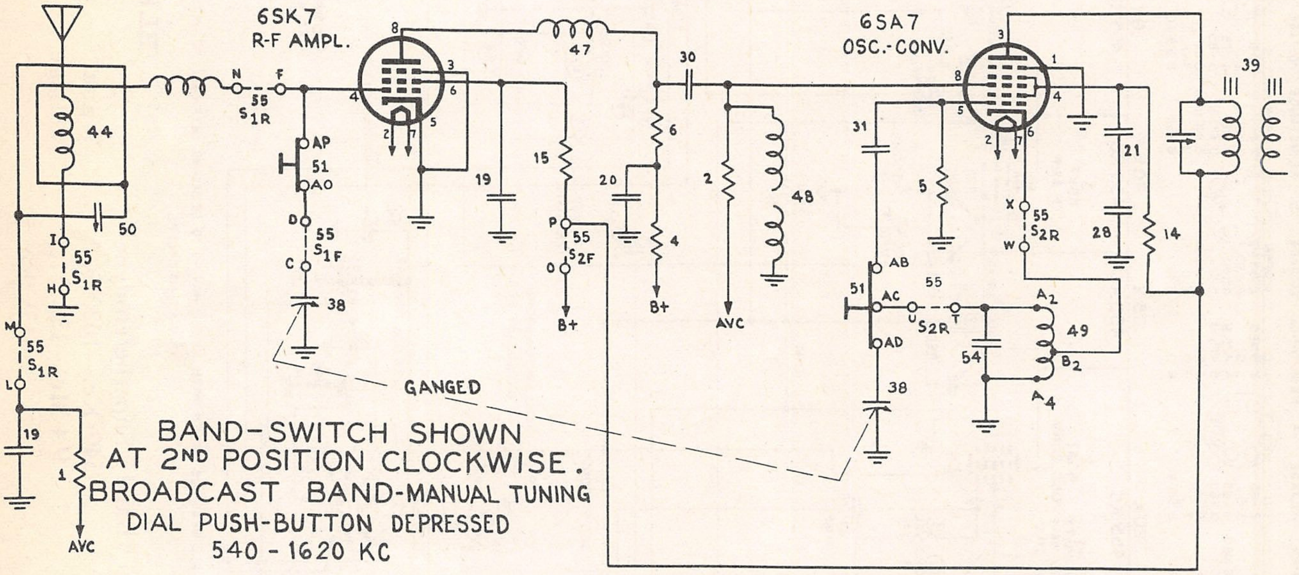
| | | |
|---|---|---|
| Watts | At 117 Volts A.C. | 90 |
| Voltage | A. C. | 105-125 |

RECORD CHANGER : Farnsworth P-51, RCD. CH. P.15-1

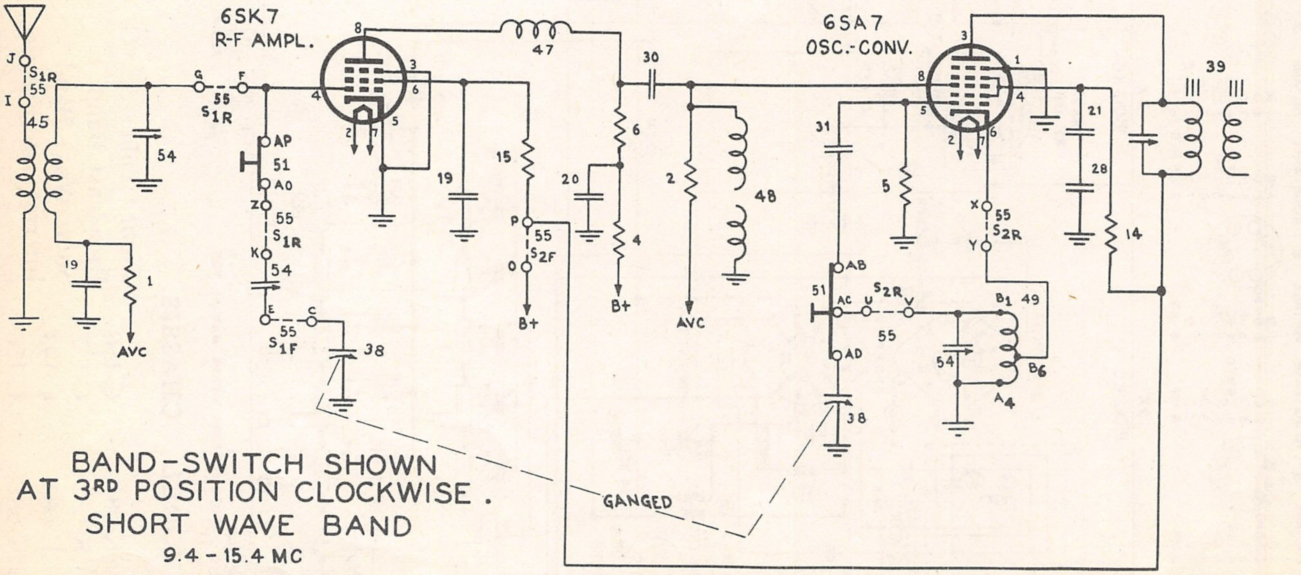
## MODELS EK-081, EK-082, EK-083, EK-681 FARNSWORTH TELEV. & RADIO CORP.


6SK7
R-F AMPL.
6SA7
OSC.-CONV.
44
46
47
30
39
N
F
55
S1R
AP
51
AN
52
50
I
H
M
L
19
1
AVC
15
P
S2F
O
B+
20
6
4
2
48
31
5
X
W
S2R
14
AB
AA
AE
27
28
21
A2
49
54
B2
A4
1ST. POSITION
(PHONO) NOT SHOWN

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
PUSH BUTTON TUNING
750-1600 KC. PUSH BUTTON DEPRESSED.


6SK7
R-F AMPL.
6SA7
OSC.-CONV.
44
47
30
39
N
F
55
S1R
AP
51
AO
D
S1F
C
38
50
I
H
M
L
19
1
AVC
15
P
S2F
O
B+
20
6
4
2
48
31
5
21
28
14
X
W
S2R
AB
AC
AD
U
T
A2
49
B2
A4
54
GANGED

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND-MANUAL TUNING
DIAL PUSH-BUTTON DEPRESSED
540 - 1620 KC


6SK7
R-F AMPL.
6SA7
OSC.-CONV.
J
S1R
55
I
45
54
G
F
AP
51
AO
Z
K
E
C
S1F
38
19
1
AVC
47
30
15
P
S2F
O
B+
20
6
4
2
48
31
5
21
28
14
39
X
Y
S2R
AB
AC
U
V
AD
B1
49
B6
A4
GANGED

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND
9.4 - 15.4 MC

# FARNSWORTH TELEV. & RADIO CORP.

## MODELS EK-081, EK-082, EK-083, EK-681

### EQUIPMENT AND PROCEDURE FOR ALIGNMENT

To properly align this receiver, a signal generator calibrated at 455 Kc., 1000 Kc., 1500 Kc., 1620 Kc., 9.7 Mc., 15 Mc., and 15.4 Mc; and also an output indicator are required. All adjustments should be made with the volume control set for maximum volume, keeping the generator output as low as possible to prevent A.V.C. action and false readings.

The loop should be placed in the approximate position relative to chassis as when the chassis is installed in the cabinet.

Connect the low side of the generator to the ground (black) wire and the high side of the generator to the antenna (red) wire.

CAUTION—Tighten S.W. oscillator trimmer screw for maximum capacity, then unscrew to second peak. Two peaks are usually found on the S.W. oscillator trimmer—one at 16.3 Mc., and one at 15.4 Mc. The lower frequency (15.4 Mc.) is used.

| STEPS | USE IN SERIES WITH ANTENNA | | SET GENERATOR AT | SET GANG AT | ADJUST | LOCATED | TO OBTAIN |
|---|---|---|---|---|---|---|---|
| 1 | SET VOLUME CONTROL AT MAXIMUM | | | | | | |
| 2 | 250 MMFD. | I. F. | 455 Kc. | MINIMUM | 2nd. I.F. TRIMMERS | TOP 2nd. I.F. TRANS. | MAXIMUM OUTPUT |
| 3 | | | | | 1st. I.F. TRIMMERS | TOP 1st. I.F. TRANS. | |
| 4 | | BROAD-CAST | 1620 Kc. | 1620 Kc. | B.C. OSC. TRIMMER | See Chassis Layout | |
| 5 | | | 1500 Kc. | 1500 KC. Rock Gang | ANT. TRIMMER | ON LOOP | |
| 6 | SET POINTER AT 1000 Kc. AND CHECK POINTER CALIBRATION | | | | | | |
| 7 | 400 Ohms | SHORT WAVE | 15.4 Mc. | MINIMUM | S.W. OSC. TRIMMER** | See Chassis Layout | |
| 8 | | | 15 Mc. | 15 Mc. Rock Gang | S.W. ANT. TRIMMER | | |
| 9 | | | 9.7 Mc. | 9.7 Mc. Rock Gang | S.W. ANT. PADDER | | |
| 10 | RECHECK 15.4 Mc. | | | | | | |

**See Caution above.

### PUSH BUTTON SET UP

A Signal Generator should be used to prevent buttons being set up on wrong stations.

1. Remove the button escutcheon, exposing five pairs of adjusting screws. The small screw adjusts the oscillator and the large screw adjusts the antenna. (See PUSH BUTTON LAYOUT.)

2. Select the pair of adjustment screws covering the frequency of a wanted station.

3. Press the "Dial" button and manually tune in the desred station frequency.

4. Press the button selected for this frequency.

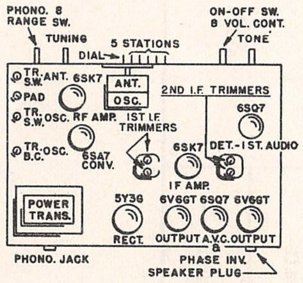
5. Adjust the lower screw of the pair selected for this frequency until the signal is heard most clearly.

6. Adjust the upper screw of the same pair until maximum volume is secured.

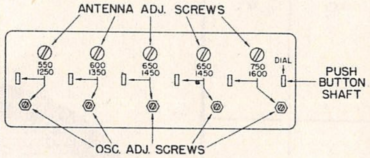
7. Press dial button, making certain original frequency is still tuned-in; check results on button just set up. If it is the same, proceed with the next button, until all are set up.

8. Recheck settings and correct any drift due to interaction between adjacent coils.

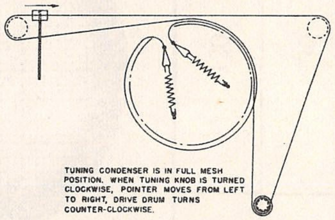
### CHASSIS LAYOUT



### PUSH BUTTON LAYOUT

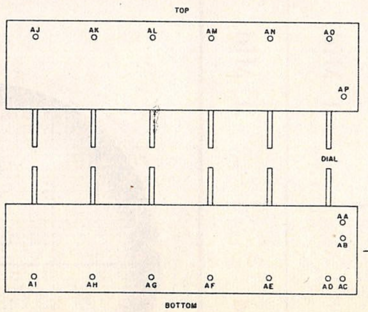


### DIAL STRINGING



TUNING CONDENSER IS IN FULL MESH POSITION. WHEN TUNING KNOB IS TURNED CLOCKWISE, POINTER MOVES FROM LEFT TO RIGHT, DRIVE DRUM TURNS COUNTER-CLOCKWISE.

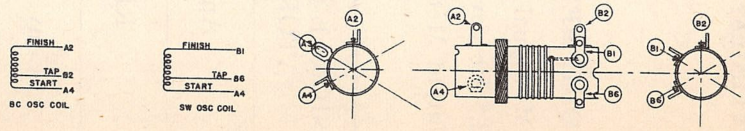
### PUSH BUTTON TUNER SWITCH



| Refer. No. | Part No. | DESCRIPTION |
|---|---|---|
| 1 | 77214 | 100 M Ohms |
| 2 | 77216 | 220 M Ohms |
| 4 | 77262 | 1000 Ohm |
| 5 | 77266 | 22 M Ohms |
| 6 | 77263 | 1500 Ohm |
| 7 | 77217 | 470 M Ohms |
| 8 | 77213 | 47 M Ohms |
| 9 | 77270 | 2.2 Megohm |
| 10 | 77274 | 10 Megohm |
| 11 | 77218 | 1 Megohm |
| 12 | 77189 | 270 Ohm 2 Watt |
| 14 | 77013 | 10 M Ohms 2 Watt |
| 15 | 77069 | 22 M Ohms 1 Watt |
| 16 | 77304 | 1000 Ohm 2 Watt |
| 17 | 77243 | 2700 Ohm 4.7 Watt Molded |
| 19 | 25196 | .05 Mfd. Tubular 600 Volts |
| 20 | 25194 | .01 Mfd. Tubular 600 Volts |
| 21 | 25183 | .005 Mfd. Tubular 600 Volts |
| 22 | 25215 | .1 Mfd. Tubular 600 Volts |
| 23 | 25185 | .002 Mfd. Tubular 600 Volts |
| 24 | 25184 | .003 Mfd. Tubular 600 Volts |
| 25 | 25195 | .02 Mfd. Tubular 600 Volts |
| 27 | 25212 | 215 Mmf. Silver Mica Capacitor |
| 28 | 25213 | 1350 Mmf. Silver Mica Capacitor |
| 30 | 25188 | 100 Mmf. Mica |
| 31 | 25193 | 47 Mmf. Mica |
| 32 | 25192 | 24 Mmf. Mica |
| 34 | 25031 | .005 Buffer 600 Volts |
| 35 | 25214 | Electrolytic Capacitor 20-20-30-450 Volts: 25-25 Volts |
| 36 | 78057 | Volume Control |
| 37 | 78072 | Tone Control |
| 38 | 26194 | Gang Capacitor |
| 39 | 38485 | 1st. I. F. Transformer |
| 40 | 38486 | 2nd. I. F. Transformer |
| 42 | 94195 | Output Transformer |
| 43 | 81126 | Speaker |
| 44 | 38546 | Loop Antenna |
| 45 | 38542 | Short Wave Antenna Coil |
| 46 | 38794 | Antenna Loading Coil |
| 47 | 38544 | Peaking Coil |
| 48 | 38484 | Wave Trap |
| 49 | 38543 | S.W. and B.C. Oscillator Coil Ass'y. |
| 50 | 26032 | Antenna Trimmer |
| 51 | 90118 | Push Button Switch |
| 52 | 26175 | P. B. Trimmer Strip |
| 53 | 38405 | P. B. Coil Strip |
| 54 | 26195 | Trimmer Strip |
| 55 | 90175 | Band Switch |
| 56 | 80252 | Antenna Plug |
| 56 | 80256 | Antenna Socket |
| 57 | 94104 | 60 Cycle Power Transformer |
| 57 | 94224 | 50 Cycle Power Transformer for 681 COY |
| 58 | 80030 | Phono Imput Socket |
| 59 | 11210 | Phono A.C. Cord and Socket |
| 60 | 27118 | Universal Line Cord |
| | 80239 | Rectifier Octal Socket |
| | 80139 | Molded Octal Socket |
| | 22147 | Phono Pickup Cable for EK-081 and EK-083 |
| | 22146 | Phono Pickup Cable for EK-082 |
| | 31273 | Glass Dial |
| | 04055 | Dial Background |
| | 561397 | Escutcheon |
| | 07373 | Dial Pointer |
| | 59134 | Knob |
| | 42185 | Dial Lamp (Mazda 44) 6 V., 250 Ma |
| | 41106 | Drive Cord (42" Long) and springs |
| | 17019 | Drive Drum |
| | 59249 | Push Button Escutcheon |
| | 59030 | Push Button |
| | 41101 | Station Call Letter Tabs |
| | 71223 | Phono Needle |
| | H-224 | Cabinet and Packing for EK-081 |
| | H-225 | Cabinet and Packing for EK-082 |
| | H-267- | Cabinet and Packing for EK-083 |

The Service Department policy is to furnish ½ watt 5% carbon resistors tubular condensers.

### BROADCAST AND S. W. OSC. COILS



## FM GAIN MEASUREMENTS

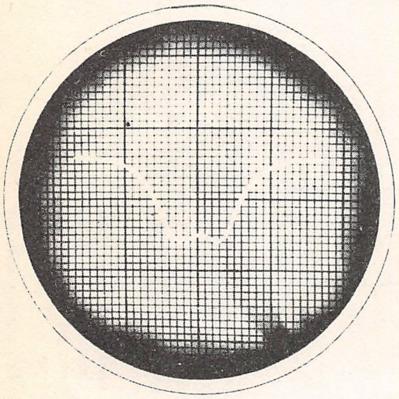
**EQUIPMENT REQUIRED**

FM Signal Generator, modulated at 400 cycles, 22.5 Kc deviation.

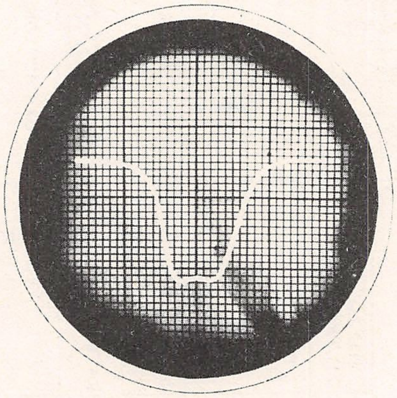
Output Meter.

Output meter connected across secondary of output transformer, 4 ohms impedance. Signal generator connected at gang capacitor. Volume control, Bass control and Treble control at maximum.

| SIGNAL GENERATOR TO | DUMMY | MICROVOLTS INPUT | OUTPUT | GAIN |
|---|---|---|---|---|
| Ant. | 330 ohms | 20 | .5 watt | 1.5X |
| RF | .1 Mfd. | 30 | .5 watt | 4.33X |
| Conv. Grid | .1 Mfd. | 130 | .5 watt | |



(1)

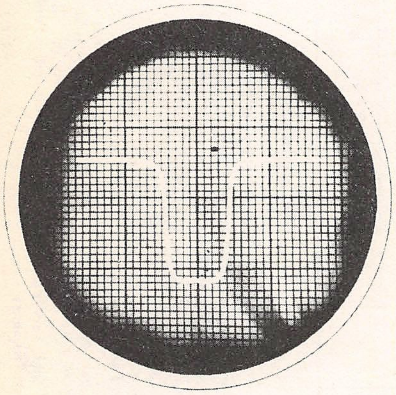


(2)

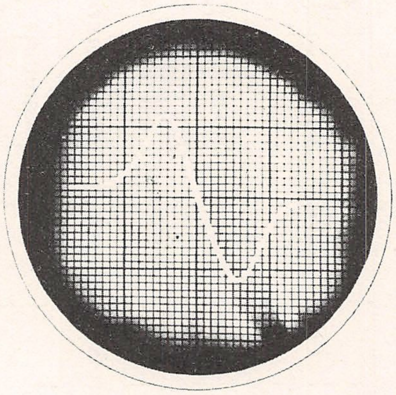
F-M

ALIGNMENT

OSCILLOGRAMS



(3)

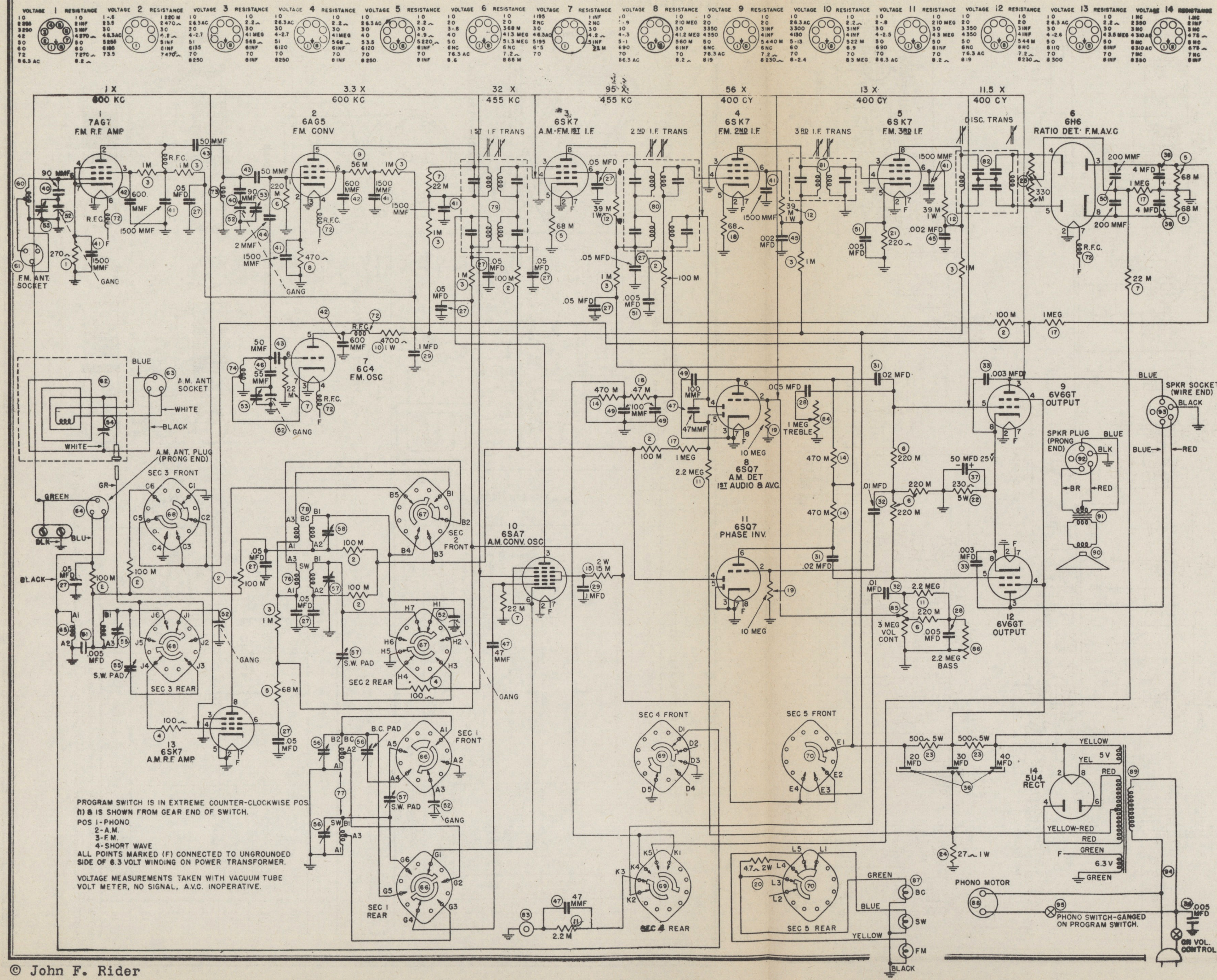


(4)

These curves were obtained under ideal conditions and show curves to be expected. They should be duplicated as nearly as practicable.

**MODELS GK-140, GK-141, GK-142, GK-143, GK-144, Preliminary**

# FARNSWORTH TELEV. & RADIO CORP.


VOLTAGE
RESISTANCE
1 X 600 KC
3.3 X 600 KC
32 X 455 KC
95 X 455 KC
56 X 400 CY
13 X 400 CY
11.5 X 400 CY
1 7AG7 F.M. R.F. AMP
2 6AG5 F.M. CONV
3 6SK7 A.M.-F.M. 1ST I.F.
4 6SK7 F.M. 2ND I.F.
5 6SK7 F.M. 3RD I.F.
6 6H6 RATIO DET. F.M.A.V.C.
1ST I.F. TRANS
2ND I.F. TRANS
3RD I.F. TRANS
DISC. TRANS
7 6C4 F.M. OSC
8 6SQ7 A.M. DET 1ST AUDIO & A.V.C.
9 6V6GT OUTPUT
10 6SA7 A.M. CONV. OSC
11 6SQ7 PHASE INV.
12 6V6GT OUTPUT
13 6SK7 A.M. R.F. AMP
14 5U4 RECT
F.M. ANT. SOCKET
A.M. ANT SOCKET
A.M. ANT. PLUG (PRONG END)
SPKR SOCKET (WIRE END)
SPKR PLUG (PRONG END)
SEC 3 FRONT
SEC 3 REAR
SEC 2 FRONT
SEC 2 REAR
SEC 1 FRONT
SEC 1 REAR
SEC 4 FRONT
SEC 4 REAR
SEC 5 FRONT
SEC 5 REAR
1 MEG TREBLE
3 MEG VOL CONT
2.2 MEG BASS
S.W. PAD
B.C. PAD
GANG
PHONO MOTOR
PHONO SWITCH-GANGED ON PROGRAM SWITCH.
ON VOL. CONTROL
BC
SW
FM

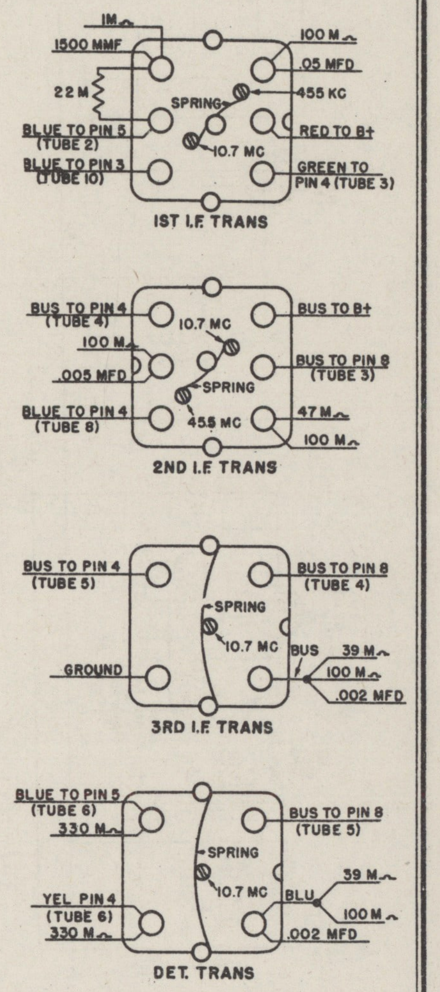
PROGRAM SWITCH IS IN EXTREME COUNTER-CLOCKWISE POS.
(1) & IS SHOWN FROM GEAR END OF SWITCH.

POS 1-PHONO
2-A.M.
3-F.M.
4-SHORT WAVE

ALL POINTS MARKED (F) CONNECTED TO UNGROUNDED SIDE OF 6.3 VOLT WINDING ON POWER TRANSFORMER.

VOLTAGE MEASUREMENTS TAKEN WITH VACUUM TUBE VOLT METER, NO SIGNAL, A.V.C. INOPERATIVE.

## BOTTOM VIEW OF I.F. CANS


1M
1500 MMF
22 M
BLUE TO PIN 5 (TUBE 2)
BLUE TO PIN 3 (TUBE 10)
SPRING
100 M
.05 MFD
455 KC
RED TO B+
10.7 MC
GREEN TO PIN 4 (TUBE 3)
1ST I.F. TRANS
BUS TO PIN 4 (TUBE 4)
100 M
.005 MFD
BLUE TO PIN 4 (TUBE 8)
10.7 MC
SPRING
455 MC
BUS TO B+
BUS TO PIN 8 (TUBE 3)
47 M
100 M
2ND I.F. TRANS
BUS TO PIN 4 (TUBE 5)
GROUND
SPRING
10.7 MC
BUS
BUS TO PIN 8 (TUBE 4)
39 M
100 M
.002 MFD
3RD I.F. TRANS
BLUE TO PIN 5 (TUBE 6)
330 M
YEL PIN 4 (TUBE 6)
330 M
SPRING
10.7 MC
BUS TO PIN 8 (TUBE 5)
BLU
39 M
100 M
.002 MFD
DET. TRANS

## FARNSWORTH TELEV & RADIO CORP.

MODELS
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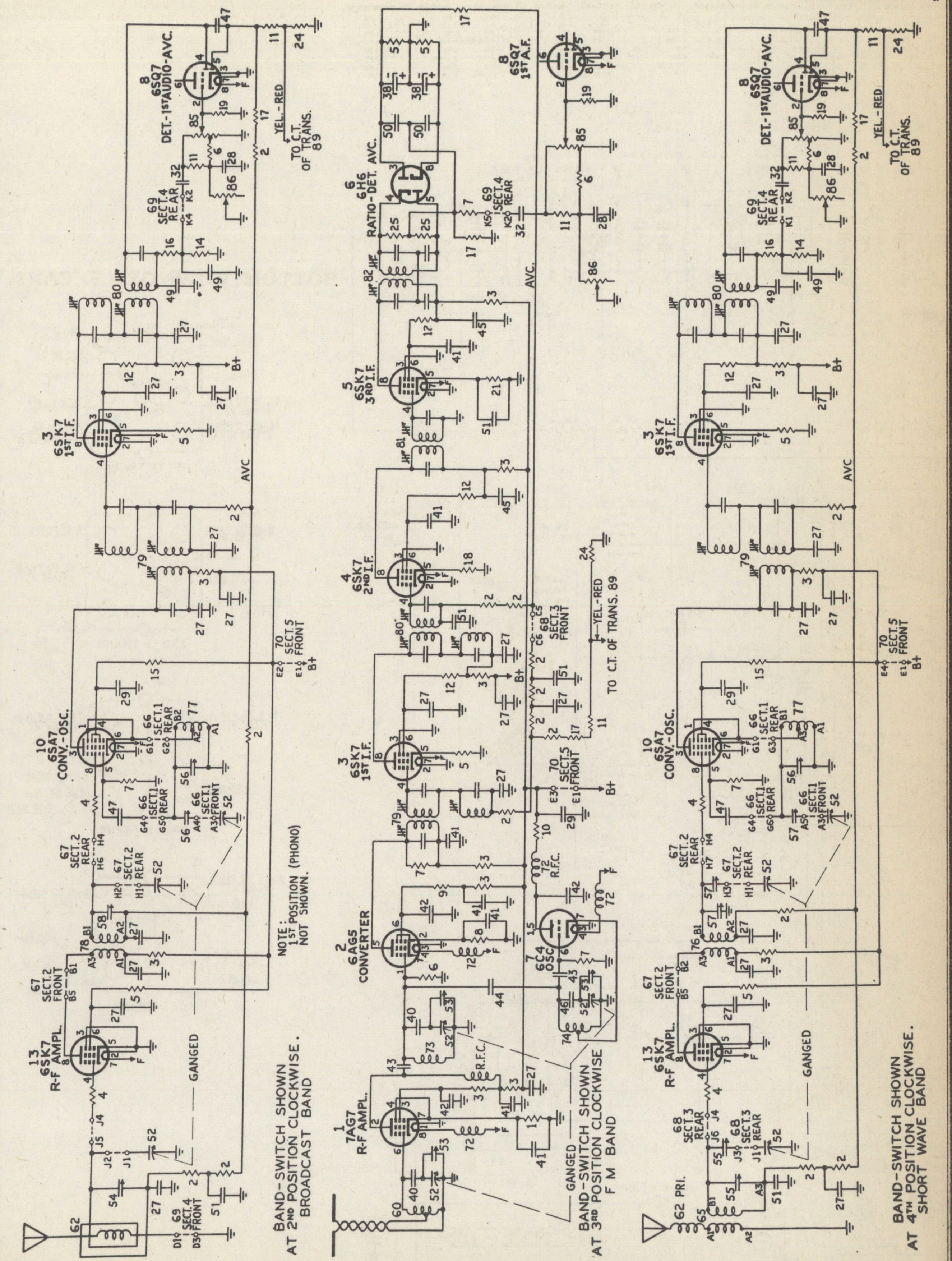

13 6SK7 R-F AMPL.
10 6SA7 CONV.-OSC.
3 6SK7 1ST I.F.
8 6SQ7 DET.-1ST AUDIO-AVC.
1 7AG7 R-F AMPL.
2 6AG5 CONVERTER
7 6C4 OSC.
3 6SK7 1ST I.F.
4 6SK7 2ND I.F.
5 6SK7 3RD I.F.
6 6H6 RATIO-DET. AVC.
8 6SQ7 1ST A.F.
GANGED
AVC
B+
YEL.-RED
TO C.T. OF TRANS. 89
R.F.C.
67 SECT.2 FRONT
67 SECT.2 REAR
66 SECT.1 FRONT
66 SECT.1 REAR
68 SECT.3 FRONT
68 SECT.3 REAR
69 SECT.4 FRONT
69 SECT.4 REAR
70 SECT.5 FRONT
62 PRI.

NOTE: 1ST POSITION (PHONO) NOT SHOWN.

BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE BROADCAST BAND

BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE F M BAND

BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE. SHORT WAVE BAND

MODELS
GK-140, GK-141,
GK-142, GK-143, GK-144,
Preliminary

# FARNSWORTH TELEV. & RADIO CORP.

## TABULATION FOR AM ALIGNMENT

| STEPS | CONNECT GENERATOR | | SET GENERATOR AT | SET GANG AT | ADJUST | TO OBTAIN |
|---|---|---|---|---|---|---|
| 1 | Set Tone and Volume Controls at Maximum | | | | | |
| 2 | Through .1 Mfd. | Grid Conv. tube | 455 Kc | Quiet Point | 2nd. I.F. Slugs | MAXIMUM OUTPUT |
| 3 | | | | | 1st. I.F. Slugs | |
| 4 | Through .1 Mfd. | RF of GANG | 1500 Kc | 1500 Kc | BC Osc. Trimmer | |
| 5 | | | | | BC Mixer Trimmer | |
| 6 | | | 600 Kc | 600 Kc | Osc. Padder * | |
| 7 | Check dial calibration at several frequencies. If not reasonably correct, adjust oscillator padder. See Note 1 | | | | | |
| 8 | # | Ext. Ant. Binding Post | 1500 Kc | 1500 Kc | Loop Trimmer | |

#Through RMA dummy antenna.

* This adjustment should be made while gang is rocked.

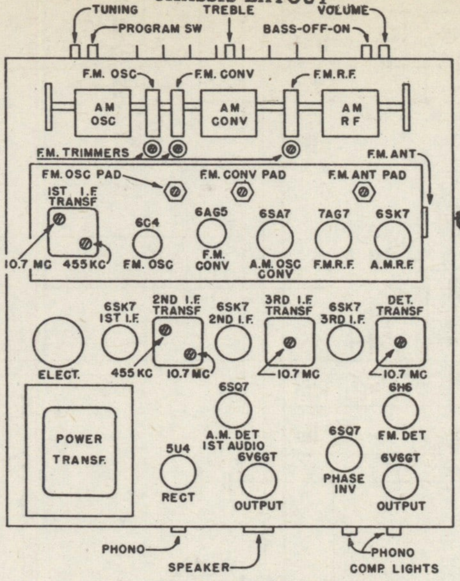
## SHORT WAVE RF

| | | | | | | |
|---|---|---|---|---|---|---|
| 9 | Place Band Switch in Short Wave position. | | | | | |
| 10 | Through 400 ohm resistor | External Antenna | 15 MC | 15 MC | SW Osc. Trimmer See Note 2 | MAXIMUM OUTPUT |
| 11 | | | | Image at 15.91 MC | SW Conv. Trimmer | |
| 12 | | | | | SW Ant. Trimmer | |
| 13 | | | 9.4 MC | 9.4 MC | SW Osc. Padder | |
| 14 | | | | Image at 10.31 MC | SW Conv. Padder | |
| 15 | | | | | SW Ant. Padder | |
| 16 | Recheck Steps 10 to 15 inclusive. | | | | | |

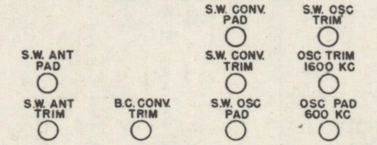
NOTE 1. After any adjustment of oscillator padder, repeat steps 4, 5 and 6.

NOTE 2. Set oscillator trimmer to maximum capacity, then slowly loosen trimmer until 2nd signal is heard.

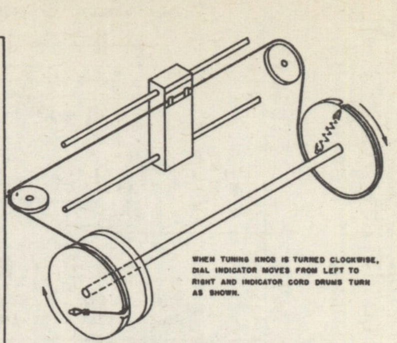
## CHASSIS LAYOUT


TUNING
PROGRAM SW
TREBLE
BASS-OFF-ON
VOLUME
F.M. OSC
F.M. CONV
F.M.R.F.
AM OSC
AM CONV
AM RF
F.M. TRIMMERS
F.M. ANT
F.M. OSC PAD
F.M. CONV PAD
F.M. ANT PAD
IST I.F. TRANSF
10.7 MC
455 KC
6C4
F.M. OSC
6AG5
F.M. CONV
6SA7
A.M. OSC CONV
7AG7
F.M.R.F.
6SK7
A.M.R.F.
ELECT.
6SK7 IST I.F.
2ND I.F. TRANSF
455 KC
10.7 MC
6SK7 2ND I.F.
3RD I.F. TRANSF
10.7 MC
6SK7 3RD I.F.
DET. TRANSF
10.7 MC
6H6
F.M. DET
6SQ7
A.M. DET 1ST AUDIO
6SQ7
PHASE INV
POWER TRANSF.
5U4
RECT
6V6GT
OUTPUT
6V6GT
OUTPUT
PHONO
SPEAKER
PHONO
COMP. LIGHTS

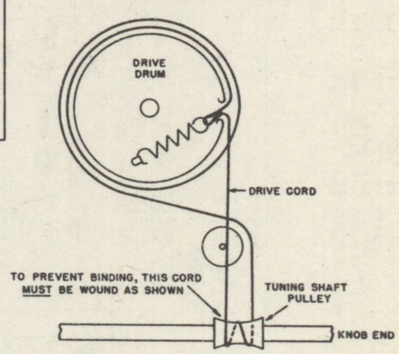
### FRONT OF CHASSIS


S.W. CONV. PAD
S.W. OSC TRIM
S.W. ANT PAD
S.W. CONV. TRIM
OSC TRIM 1600 KC
S.W. ANT TRIM
B.C. CONV. TRIM
S.W. OSC PAD
OSC PAD 600 KC

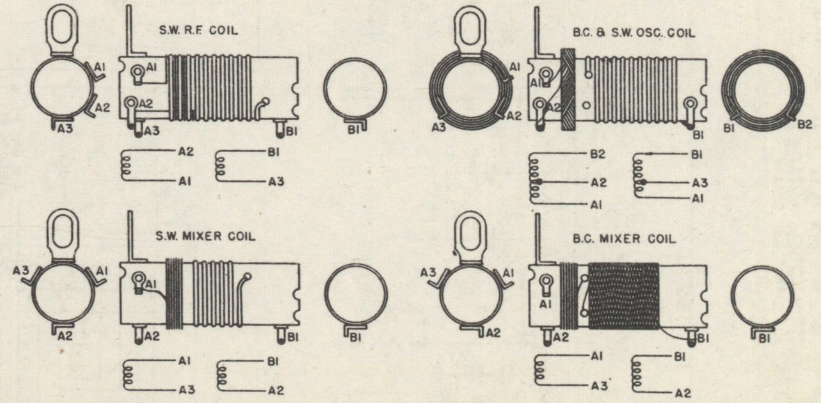
## DIAL POINTER STRINGING


WHEN TUNING KNOB IS TURNED CLOCKWISE, DIAL INDICATOR MOVES FROM LEFT TO RIGHT AND INDICATOR CORD DRUMS TURN AS SHOWN.

## DRIVE CORD STRINGING


DRIVE DRUM
DRIVE CORD
TO PREVENT BINDING, THIS CORD MUST BE WOUND AS SHOWN
TUNING SHAFT PULLEY
KNOB END

## RF, OSCILLATOR AND MIXER COILS


S.W. R.F. COIL
B.C. & S.W. OSC. COIL
S.W. MIXER COIL
B.C. MIXER COIL
A1
A2
A3
B1
B2

# FARNSWORTH TELEV. & RADIO CORP.

MODELS
GK-140, GK-141,
GK-142, GK-143, GK-144,
Preliminary

### SETTING STATION TUNING BUTTONS

Allow the set to warm up for about one-half hour before beginning to set the push buttons.

Make a list of the eight stations to be set up.

Move the program switch to proper band for the station to be set-up.

Select a push button for this station.

Remove the push button, exposing the push button lock screw.

Loosen this lock screw with a screw driver.
Tune in the desired station with the manual tuning knob.

Push the push button shaft all the way in with the screw driver engaged in the slot in the lockscrew.

Firmly tighten the push button locking screw.

CAUTION—Do not use a large handle screw driver as damage may result. We recommend type of screw driver used for knob setscrew.

Continue setting each button the same way.

After all the stations are set up, replace the push buttons and place the station call letter tab found in the call letter kit on the proper button.

### CAUTION

When setting up push buttons it is well to select a time when the stations are not carrying "Chain" programs as adjustments might be made on the wrong stations.

## Alignment of AM Bands

### EQUIPMENT REQUIRED

A calibrated signal generator having fundamental frequencies from 455 Kc to 15 MC. In addition to the signal generator a crystal calibrator is a great convenience.

The indicating device for showing correct alignment may be a high resistance A.C. voltmeter, a vacuum tube voltmeter or a Cathode Ray oscilloscope.

The A.C. voltmeter can be used either across the voice coil of the loud speaker or if the meter range is high enough, from plate to plate in the output stage (don't forget a condenser (O.1 Mfd.) to keep the D.C. out of the meter).

Special care must be employed when aligning the short wave band, for the adjustment of the shunt trimmer affects the adjustment of the series pad. At the high frequency end of the band it is possible to peak the oscillator trimmer (and the pad at the low frequency end) at the image so in the alignment instructions we have indicated the fundamental frequency and the correct oscillator setting for the image so by resetting the signal generator it is possible to see if the alignment is correctly made. In each case, the image is found at a frequency 910 Kc. higher than the fundamental.

## Oscilloscope Alignment FM Band

### FM IF ALIGNMENT

1. Equipment Required: Oscilloscope, 10.7 MC sweep generator, voltomyst, and RF signal generator.
2. Set band switch in FM position.
3. Make connection from vertical deflection amplifier of oscilloscope to pin #3 of 6H6 discriminator tube. Make certain that the 4MFD electrolytic condenser is disconnected from this same circuit. It is necessary that the lead to the oscilloscope be shielded, of low total capacity, and connection to receiver isolated by means of a 1 meg. resistor.
4. Connect sweep generator to last FM IF grid through a .1 MFD coupling capacitor.
5. Load primary of discriminator transformer with resistor of approximately 39000 ohms. Back out secondary slug (top slug) as far as it will turn. Align primary (bottom slug) to obtain curve similar to figure 1. This does not constitute a final alignment of discriminator, but is a convenient expedient to assist in I.F. alignment.
6. Shift connection of sweep signal generator to the grid of the second FM IF tube. NOTE: As alignment moves from stage to stage, reduce input instead of reducing oscilloscope gain.
7. Align third FM IF transformer for a symmetrical flat top pattern. (Fig. 2).
8. Shift signal generator to the grid of the first IF tube.
9. Align second IF transformer in same manner as described in Section 7. Note that the width of the nose of the curve is the same as before, but the sides have become steeper, as in Fig. 3.
10. Connect the signal generator to the grid of the converter tube grid in series with 10,000 ohm resistor and a .1MFD capacitor, or loosely couple by stray capacity of an insulated wire.
11. Align first FM IF transformer in the same manner as in Section 7. Note that the sides of the curve have further steepened, but that the nose of the curve has retained approximately the same width as in Fig. 3.
12. Connect 4 MFD electrolytic capacitor that was previously disconnected, and take off load resistor on discriminator primary.
13. Connect oscilloscope to audio output terminal of discriminator. There are several points where contact can be made and can be identified as the circuit connected to the terminal on the terminal board (nearest the discriminator transformer) to which the shielded lead is connected.
14. With sweep signal input to converter grid, align discriminator transformer for conventional discriminator pattern, as in Fig. 4.
15. Connect signal generator to converter tube grid through .1MFD capacitor. An unmodulated signal input of 65 microvolts at 10.7 Mc should develop .55 volt rise on the AVC line with voltohmyst connected to AVC line through 1 megohm resistor.

## Alternate FM IF Alignment Procedure

Equipment necessary: RF Signal Generator and Vacuum tube voltmeter.

1. Connect V.T.V.M. from ground to audio lead of ratio detector (discriminator). Connect generator tuned to 10.7 mc. to grid of third FM IF tube through 0.1MFD capacity. Use minimum signal necessary for good indication in all following:
2. Turn secondary slug of ratio detector transformer (top slug) out as far as it will turn.
3. Tune primary for maximum output.
4. Connect generator to grid of second FM IF tube.
5. Tune primary and secondary of third FM IF transformer for maximum output.
6. Connect generator to grid of first FM IF tube.
7. Tune primary and secondary of second FM IF transformer for maximum output.
8. Connect generator to converter grid through 10,000 ohm resistor and 0.1 MFD capacitor.
9. Tune primary and secondary of first FM IF transformer for maximum output.
10. Tune secondary of ratio detector transformer for zero or minimum output.
11. The FM IF system should now be aligned. Tuning the signal generator equal amounts on each side 10.7 mc should produce equal deflections of opposite polarity on the VTVM. Deflections unequal by more than 10 per cent or so indicate inaccurate alignment.

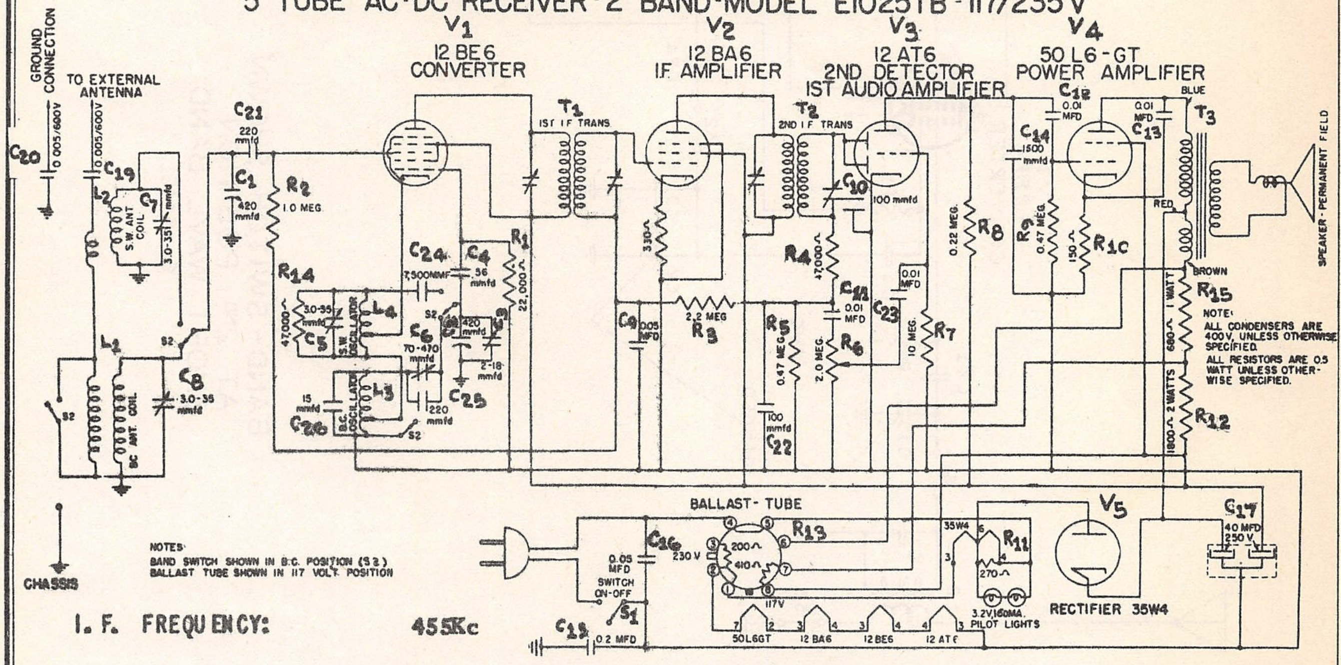
## FM RF Alignment

1. Equipment Required:
   a. RF Signal Generator. Range 88 to 108 MC.
   b. Output Meter.
   c. Insulated Screw Driver.
2. Connect RF signal generator in series with 400 ohm carbon resistor to "high" side of FM antenna socket. Connect output meter across voice coil of speaker.
3. Set tuning control for pointer to calibrate at the equivalent of half way between channels 300 and 301.
4. Apply 108 MC Signal.
5. Set converter and antenna trimmers at minimum capacity.
6. Adjust oscillator trimmer by tuning from maximum capacity to first signal that is heard, and peak for maximum output.
7. Adjust antenna and converter trimmers for maximum output.
8. Set tuning controls so dial pointer calibrates at the equivalent of half way between channels 200 and 201.
9. Apply 88 MC signal.
10. Adjust oscillator, converter, and antenna slugs to maximum output.
11. Repeat operations 3 to 10 inclusive. NOTE: The degree of adjustment required in the tuning of the oscillator slug will determine the number of times operations 3 to 10 must be repeated until no further gain in sensitivity is obtained.
12. Carefully tune across the entire FM band for the observance of the dead or weak spots that may be a resultant of improper alignment or defective components. This can be determined by carefully noting the degree of receiver noise, that is, high noise generally is accompanied by good sensitivity.

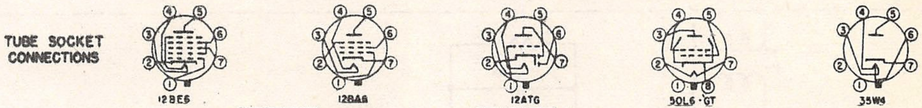
# FEDERAL TEL. & RADIO CORP.

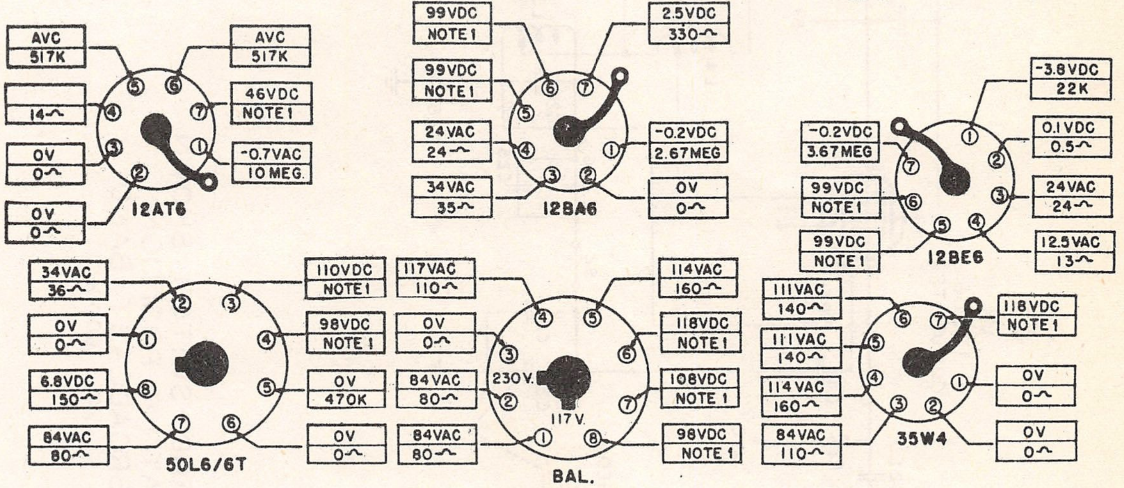
| | |
|---|---|
| POWER OUTPUT RATING: | For 105-125 v. operation: Undistorted 1.1 watts; maximum 1.5 watts. For 210-250 v. operation: undistorted 1.9 watts; maximum 2.8 watts. |
| VOICE COIL IMPEDANCE: | 3.2 ohms at 400 cycles. |
| POWER REQUIREMENTS: | 30 Watts at 105-125 volts 50-60 cycles AC, or 105-125 volts DC. 60 Watts at 210-250 volts, 50-60 cycles AC, or 210-250 volts DC. |
| TUNING RANGES: | Broadcast Band 540-1600 kilocycles (555-188 m) International Short Wave Band 6-18 megacycles (50-16.65 m). |
| ANTENNA: | External. |

## 5 TUBE AC-DC RECEIVER-2 BAND-MODEL E1025TB-117/235V


V1 12BE6 CONVERTER
V2 12BA6 I.F. AMPLIFIER
V3 12AT6 2ND DETECTOR 1ST AUDIO AMPLIFIER
V4 50L6-GT POWER AMPLIFIER
V5 RECTIFIER 35W4
GROUND CONNECTION
TO EXTERNAL ANTENNA
C20 0.005/600V
C19 0.005/600V
C21 220 mmfd
C1 420 mmfd
R2 1.0 MEG.
C7 3.0-35 mmfd
L2 S.W. ANT. COIL
L1 BC ANT. COIL
C8 3.0-35 mmfd
S2
T1 1ST I.F. TRANS
T2 2ND I.F. TRANS
T3
R14 47,000
C24 7,500MMF
C4 56 mmfd
C5 3.0-35 mmfd
L4 S.W. OSCILLATOR
L3 B.C. OSCILLATOR
C6 70-470 mmfd
420 mmfd
C3 2-18 mmfd
C25 220 mmfd
C26 15 mmfd
R1 22,000
C9 0.05 MFD
330
R3 2.2 MEG
R4 47,000
C10 100 mmfd
C11 0.01 MFD
C23 0.01 MFD
R5 0.47 MEG
R6 2.0 MEG
C22 100 mmfd
R7 10 MEG
R8 0.22 MEG
C12 0.01 MFD
C14 1500 mmfd
R9 0.47 MEG
R10 150
C13 0.01 MFD
BLUE
RED
BROWN
SPEAKER - PERMANENT FIELD
R15 680 1 WATT
R12 1800 2 WATTS
NOTE: ALL CONDENSERS ARE 400V, UNLESS OTHERWISE SPECIFIED. ALL RESISTORS ARE 0.5 WATT UNLESS OTHERWISE SPECIFIED.
BALLAST - TUBE
C16 0.05 MFD 230V
SWITCH ON-OFF S1
C18 0.2 MFD
R13 200 410
117V
35W4
R11 270
3.2V, 150MA. PILOT LIGHTS
50L6GT 12BA6 12BE6 12AT6
C17 40 MFD 250 V.
NOTES: BAND SWITCH SHOWN IN B.C. POSITION (S2). BALLAST TUBE SHOWN IN 117 VOLT POSITION
CHASSIS

**I. F. FREQUENCY:** 455Kc


TUBE SOCKET CONNECTIONS
12BE6
12BA6
12AT6
50L6-GT
35W4


12AT6
AVC 517K
14~
0V 0~
0V 0~
AVC 517K
46VDC NOTE1
-0.7VAC 10 MEG.
12BA6
99VDC NOTE1
99VDC NOTE1
24VAC 24~
34VAC 35~
2.5VDC 330~
-0.2VDC 2.67MEG
0V 0~
12BE6
-0.2VDC 3.67MEG
99VDC NOTE1
99VDC NOTE1
-3.8VDC 22K
0.1VDC 0.5~
24VAC 24~
12.5VAC 13~
50L6/6T
34VAC 36~
0V 0~
6.8VDC 150~
84VAC 80~
110VDC NOTE1
98VDC NOTE1
0V 470K
0V 0~
BAL.
117VAC 110~
0V 0~
84VAC 80~
84VAC 80~
230V.
117V.
114VAC 160~
118VDC NOTE1
108VDC NOTE1
98VDC NOTE1
35W4
111VAC 140~
111VAC 140~
114VAC 160~
84VAC 110~
118VDC NOTE1
0V 0~
0V 0~

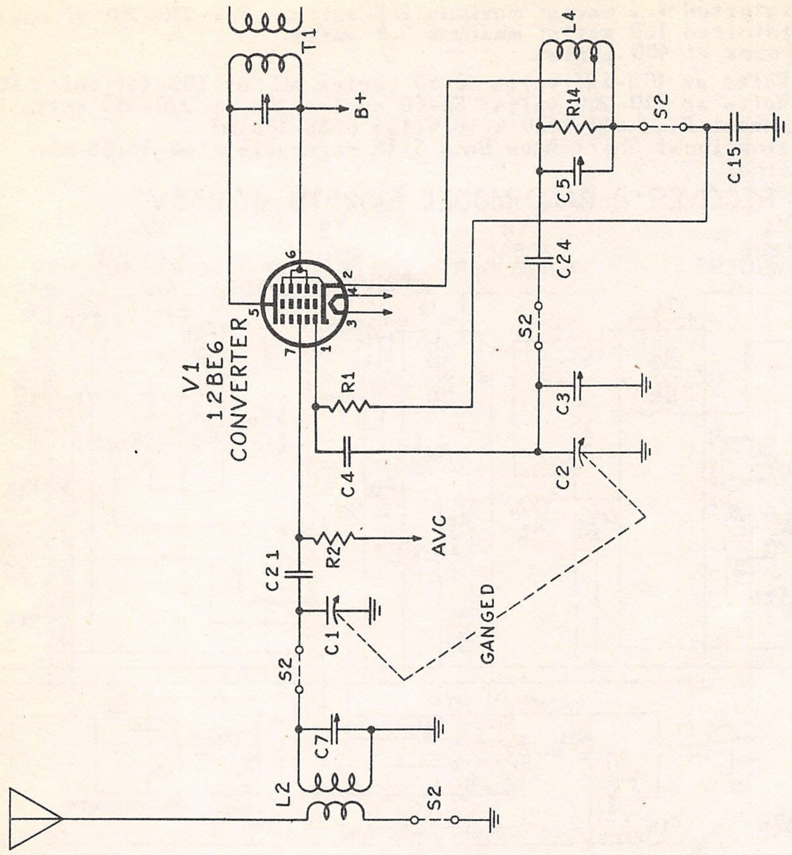
NOTE 1: RESISTANCE READINGS AT THESE POINTS WILL VARY SINCE THEY ARE IN SERIES WITH THE LEAKAGE RESISTANCE OF THE ELECTROLYTIC CONDENSERS WHICH IS SUBJECT TO CHANGE.

### Voltage and Resistance Analysis Chart

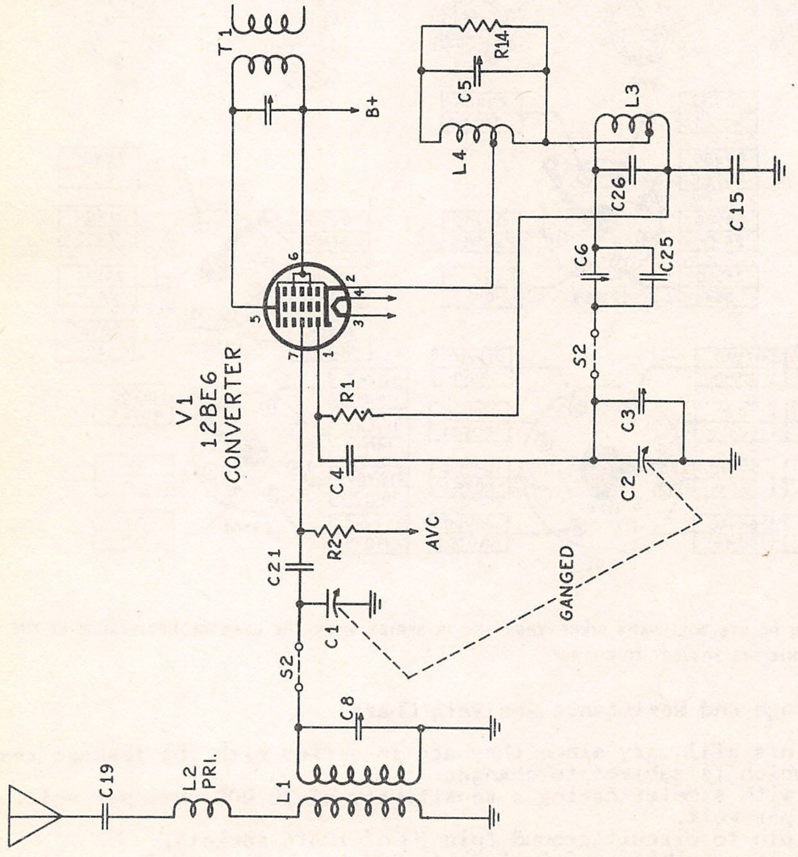
Resistance readings at these points will vary since they are in series with the leakage resistance of the electrolytic condensers which is subject to changes.
All D.C. measurements were made with a meter having a sensitivity of 20,000 ohms per volt. Ac measurements taken at 1000 ohms per volt.
Measured values are from socket pin to circuit ground (pin #3 of 12AT6 socket).
Tolerances of component values make possible a variation of 20% in readings indicated in chart.
Socket connections are shown as bottom views.

**MODEL E1025TB**

FEDERAL TEL. & RADIO CORP.


T1
B+
L4
R14
S2
C15
C5
C24
6
5
7
1
3
4
2
V1
12BE6
CONVERTER
R1
C3
C4
C2
AVC
R2
C21
C1
GANGED
S2
C7
L2
S2

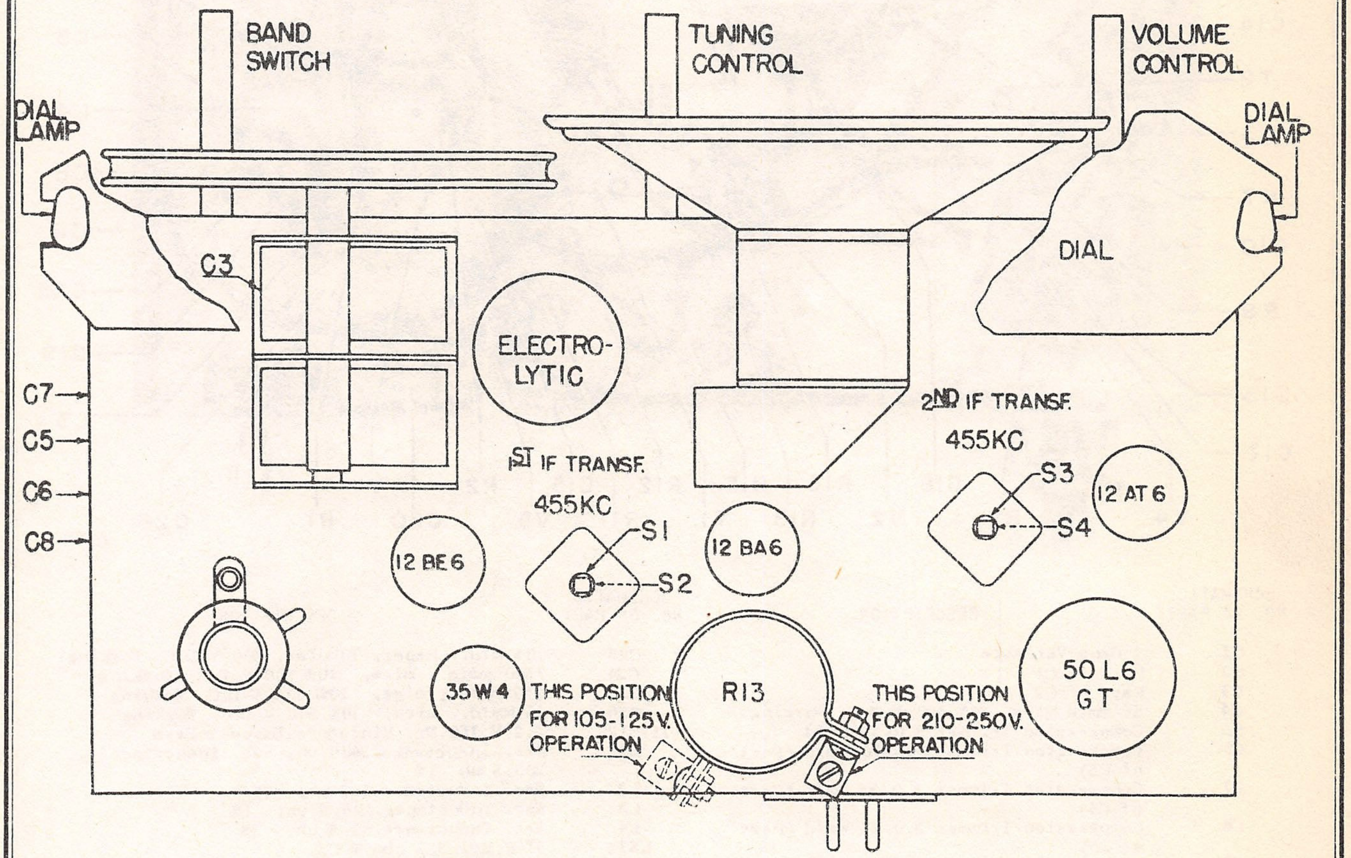
BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND
6-18 MC.


T1
R14
C5
B+
L3
L4
C26
C15
C6
C25
6
5
7
1
3
4
2
V1
12BE6
CONVERTER
S2
R1
C3
C4
C2
AVC
R2
GANGED
C21
C1
S2
C8
C19
L2
PRI.
L1

BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND
540-1600 KC.

## ALIGNMENT INSTRUCTIONS

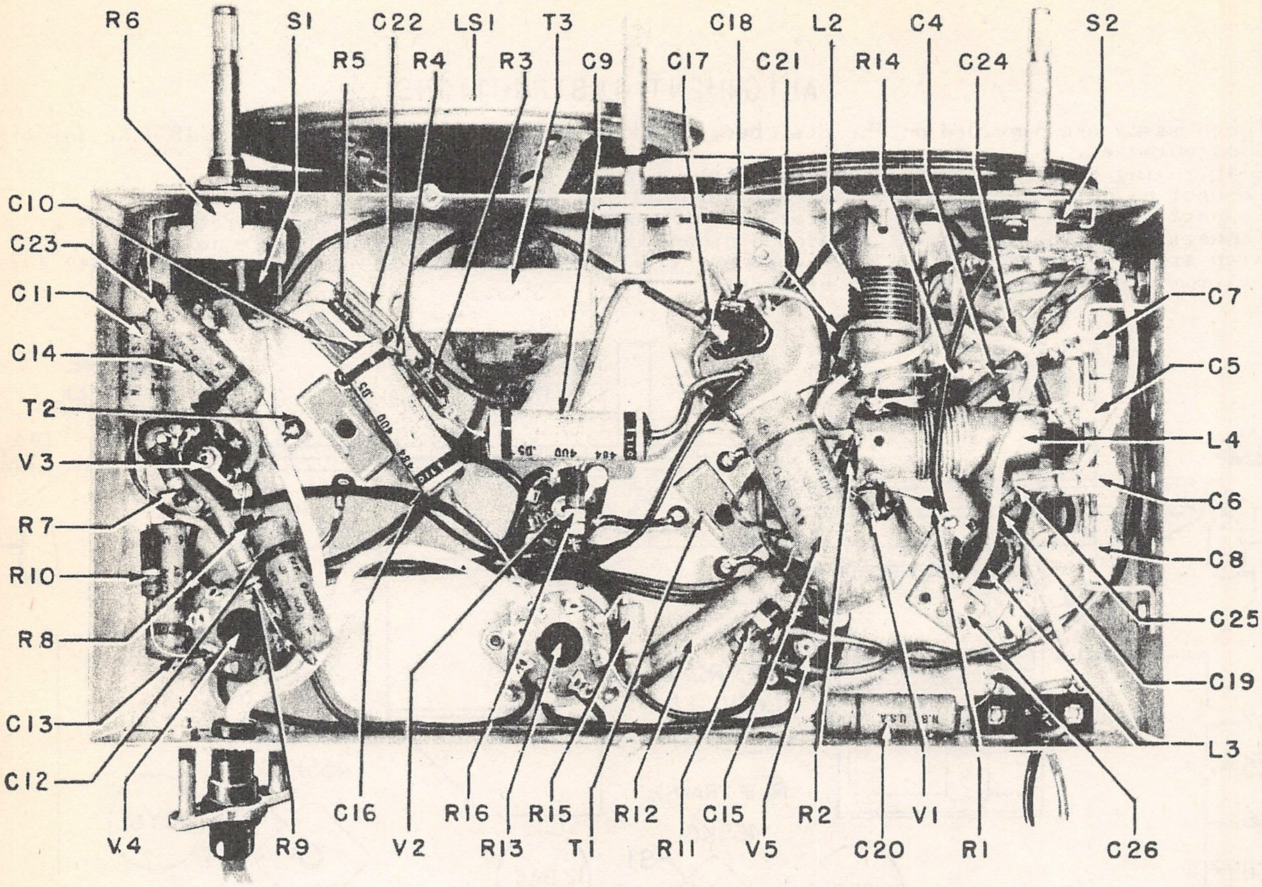
Punch marks are provided on the dial back plate at 600 Kc, 900 Kc, 1500 Kc and 1600 Kc for alignment purposes.
With tuning condenser fully open, set dial pointer to the 1600 Kc punch mark.
Connect output meter across voice coil terminals on speaker frame.
Connect low side of signal generator lead through a .1 mfd coupling condenser to chassis ground.
Connect high side of generator through proper dummy antenna to external antenna lead.
Keep signal generator output at lowest practical level and make the following adjustments for maximum output meter reading in each case.


BAND SWITCH
TUNING CONTROL
VOLUME CONTROL
DIAL LAMP
DIAL LAMP
DIAL
C3
ELECTRO-LYTIC
C7
C5
C6
C8
1ST IF TRANSF. 455KC
S1
S2
12 BE6
12 BA6
2ND IF TRANSF. 455KC
S3
S4
12 AT6
35 W 4
THIS POSITION FOR 105-125V. OPERATION
R13
THIS POSITION FOR 210-250V. OPERATION
50 L6 GT

Top View of Chassis Showing Alignment Adjustment Positions

## ALIGNMENT CHART

| DUMMY ANTENNA | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POSITION | RECEIVER DIAL SETTING | ADJUSTMENT POINTS |
|---|---|---|---|---|
| .1 MFD | 455 Kc | B.C. | Tuning Condenser Fully Open | S1, S2, S3, S4 |
| 200 MMFD | 1600 Kc | B.C. | Tuning Condenser Fully Open | C3 |
| 200 MMFD | 1500 Kc | B.C. | 1500Kc | C8 |
| 200 MMFD | 600 Kc | B.C. | Rock at 600 Kc | C6 |
| 200 MMFD | 900 Kc | B.C. | 900 Kc | Check Osc. Crossover |
| 400 OHMS | 18 Mc | S.W. | Tuning Condenser Fully Open | C5 |
| 400 OHMS | 17 Mc | S.W. | 1500 Kc | C7 |

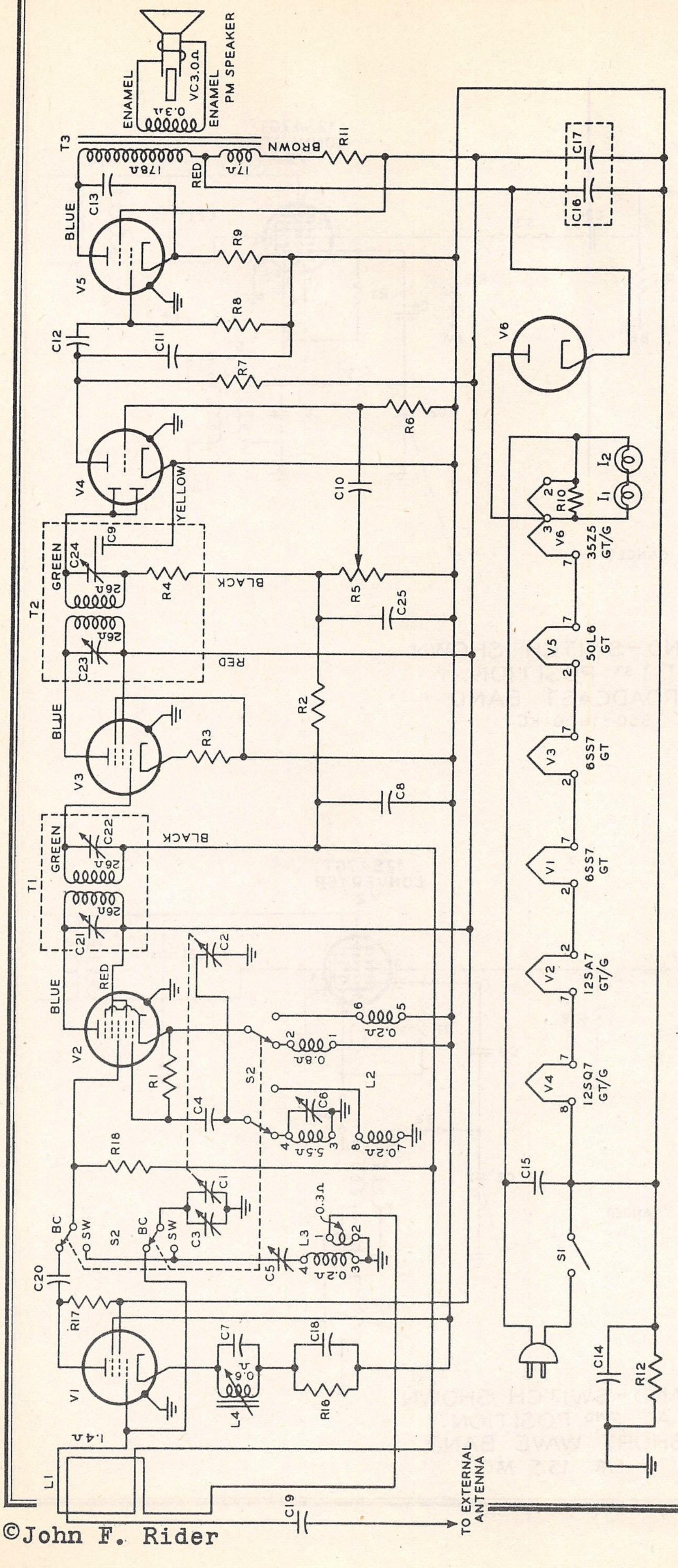


| SCHEMATIC NO. OF PART | DESCRIPTION |
|---|---|
| C1 | 2 Gang Variable |
| C2 | Part of C1 |
| C3 | Part of C2 |
| C4 | 56 mmfd Mica 10% 500 V D.C. Working |
| C5 | Compression Trimmer 3.0-35 mmfd |
| C6 | Compression Trimmer 70-470 mmfd (Part of C5) |
| C7 | Compression Trimmer 3.0-35 mmfd (Part of C5) |
| C8 | Compression Trimmer 3.0-35 mmfd (Part of C5) |
| C9 | .05 mfd., Tubular, Paper, 400 V D.C. Working |
| C10 | 100 mmfd Ceramic, 20%, (Part of T2) |
| C11 | .01 mfd., Paper, Tubular, 400 V D.C. Working |
| C12 | .01 mfd., Paper, Tubular, 400 V D.C. Working |
| C13 | .01 mfd., Paper, Tubular, 400 V D.C Working |
| C14 | .0015 mfd., Paper, Tubular, 400 V D.C. Working |
| C15 | .2 mfd., Paper, Tubular, 400 V D.C. Working |
| C16 | .05 mfd, Paper, Tubular, 400 V D.C. Working |
| C17 | Electrolytic 2 Section Common Cathode<br>40 mfd. 250 DCWV, Sect. 1<br>40 mfd. 250 DCWV, Sect. 2 |
| C18 | Part of C17 |
| C19 | .005mfd., Paper, Tubular 600 V D.C. Working |
| C20 | .005 mfd., Paper, Tubular 600 V D.C. Working |
| C21 | 220 mmfd., mica, 20% 500 V D.C. Working |
| C22 | 100 mmfd, mica, 20%, 500 V D.C. Working |

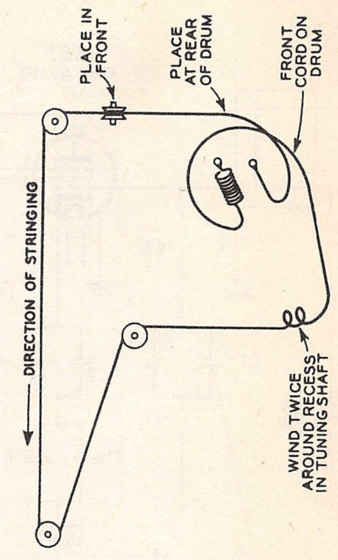
| SCHEMATIC NO. OF PART | DESCRIPTION |
|---|---|
| C23 | .01 mfd., Paper, Tubular, 400 V D.C. Working |
| C24 | 7500 mmfd., mica, 10% 500 V D.C. Working |
| C25 | 220 mmfd., mica, 10% 500 V D.C. Working |
| C26 | 15 mmfd., mica, 10% 500 V D.C. Working |
| 11, 12 | 3.2 V 160 MA. Miniature Bayonet Base |
| L1 | Pri. Inductance 3600 uh, Sec. Inducatnce 203.5 uh 1% |
| L2 | Sec. Inductance 1.5 uh, 3% |
| L3 | Sec. Inductance, 98.5 uh, 1% |
| L4 | Sec. Inductance, 1.4 uh, 3% |
| LS1 | 5" P.M., 3.2 ohm V.C. |
| R1 | 22000 ohms, 20% 1/2 watt carbon |
| R2 | 1.0 megohm, 20% 1/2 watt carbon |
| R3 | 2.2 megohm, 20% 1/2 watt carbon |
| R4 | 47000 ohms, 20% 1/2 watt carbon (Part of T2) |
| R5 | 0.47 megohm, 20% 1/2 watt carbon |
| R6 | 2.0 megohm, Taper 0.2 megohm at 1/2 rotation, with "ON-OFF" Switch |
| R7 | 10.0 megohm, 20% 1 1/2 watt carbon |
| R8 | 0.22 megohm, 20%, 1/2 watt carbon |
| R9 | 0.47 megohm, 20%, 1/2 watt carbon |
| R10 | 150 ohms, 10%, 1/2 watt carbon |
| R11 | 270ohms, 10%, 1/2 watt carbon |
| R12 | 1800ohms, 5%, 2 watt carbon |
| R13 | 410/200 ohms |
| R14 | 47000 ohms, 20%, 1/2 watt carbon |
| R15 | 680 ohms, 5%, 1 watt carbon |
| R16 | 330 ohms, 10%, 1/2 watt carbon |
| S1 | Part of R6 |
| S2 | Wafer Switch |
| T1 | Double Tuned, 455 Kc |
| T2 | Double Tuned, 455 Kc |
| T3 | Pri. Imp. 2500 ohms, Sec. Imp. 3.2 ohms, Humbucking Winding |
| V1 | 12BE6 |
| V2 | 12BA6 |
| V3 | 12AT6 |
| V4 | 50L6-GT |
| V5 | 35W4 |

# FEDERAL TEL. & RADIO CORP.

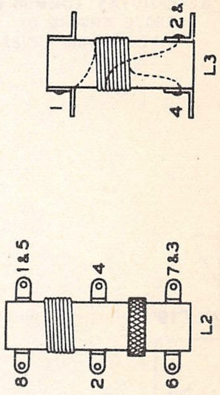
## MODELS 1030T,1540T


PM SPEAKER
VC3.0Ω
ENAMEL
0.3Ω
ENAMEL
T3
178Ω
RED
17Ω
BROWN
R11
C17
C16
C13
BLUE
V5
R9
R8
C12
C11
V6
R7
R6
V4
YELLOW
C9
C10
GREEN
C24
26Ω
R4
BLACK
R5
I2
I1
R10
2
3
V6
35Z5 GT/G
7
T2
C25
26Ω
C23
RED
V5
50L6 GT
BLUE
R2
R3
V3
V3
6SS7 GT
C8
GREEN
C22
26Ω
BLACK
T1
26Ω
C21
V1
6SS7 GT
RED
C2
BLUE
V2
V2
12SA7 GT/G
0.2Ω
0.8Ω
R1
S2
L2
V4
12SQ7 GT/G
C4
C6
5.5Ω
0.2Ω
R18
C15
BC
SW
S2
C1
C3
0.3Ω
L3
C5
0.2Ω
S1
C20
R17
C7
C18
V1
L4
0.6
R16
C14
R12
1.4Ω
L1
C19
TO EXTERNAL ANTENNA

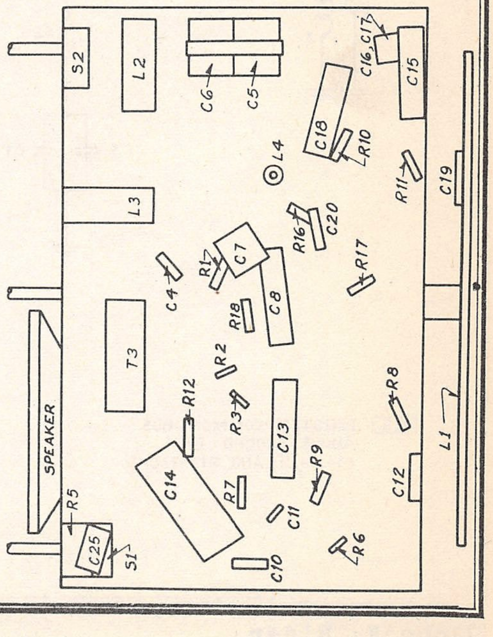
IF PEAK 455 KC


PLACE IN FRONT
PLACE AT REAR OF DRUM
FRONT CORD ON DRUM
DIRECTION OF STRINGING
WIND TWICE AROUND RECESS IN TUNING SHAFT

Dial Cord Stringing

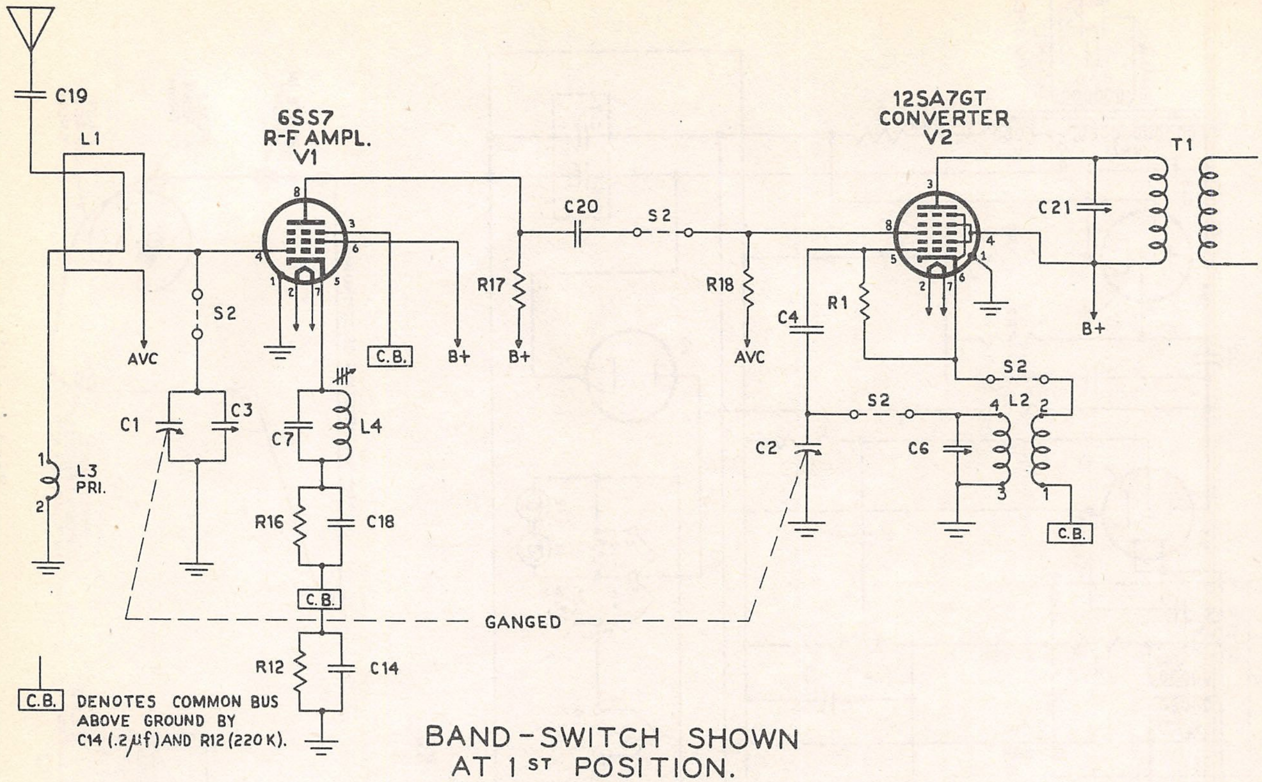

1
2&3
4
L3
1&5
4
7&3
8
2
6
L2

Coil Details


S2
L2
C6
C5
C16, C17
C15
L4
C18
R10
L3
R11
C19
R16
C20
C4
R1
C7
R17
R18
C8
T3
R2
R8
L1
SPEAKER
R12
R3
C13
R9
C12
C14
R7
C11
R5
C25
S1
C10
R6

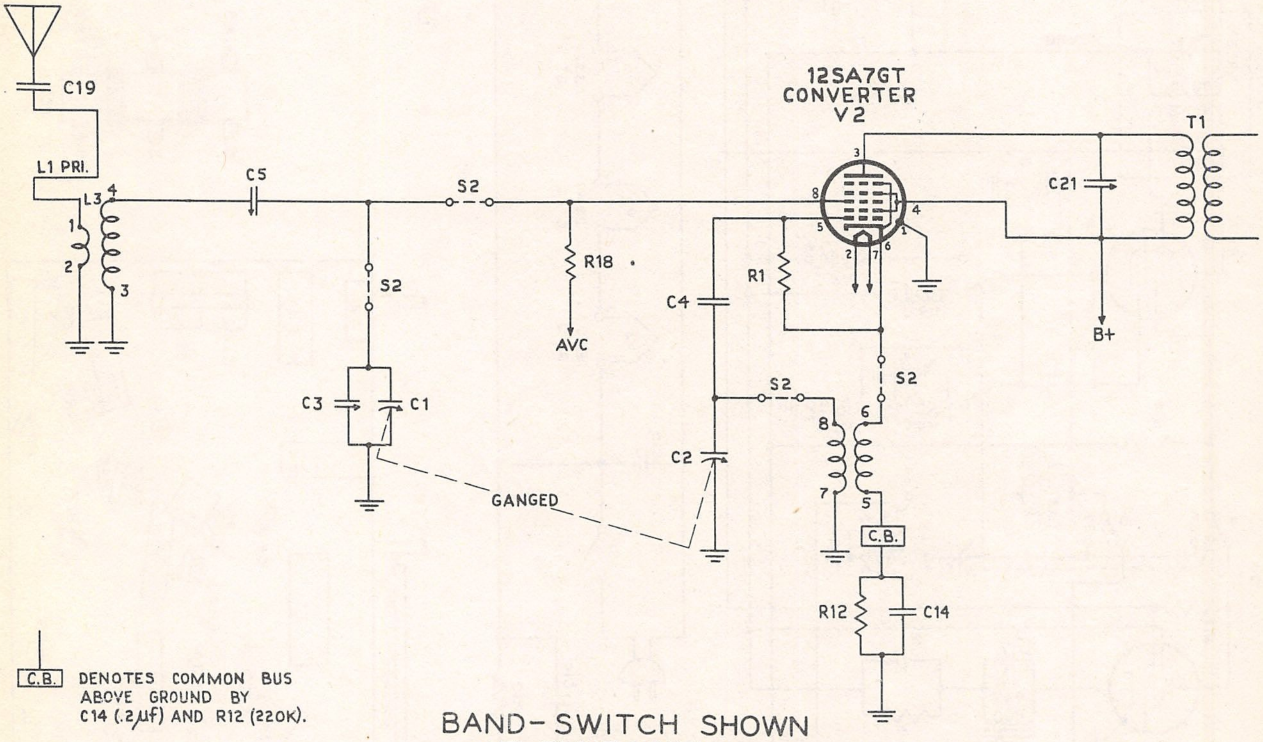
MODELS 1030T, 1540T

## FEDERAL TEL. & RADIO CORP.


C19
L1
6SS7
R-F AMPL.
V1
12SA7GT
CONVERTER
V2
T1
C20
S2
C21
R17
R18
R1
C4
AVC
B+
C.B.
C1
C3
C7
L4
L3
PRI.
R16
C18
C2
C6
L2
GANGED
R12
C14

C.B. DENOTES COMMON BUS ABOVE GROUND BY C14 (.2µf) AND R12 (220K).

BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND
550-1600 KC


C19
L1 PRI.
L3
C5
S2
12SA7GT
CONVERTER
V2
T1
C21
R18
AVC
R1
C4
B+
C3
C1
C2
GANGED
C.B.
R12
C14

C.B. DENOTES COMMON BUS ABOVE GROUND BY C14 (.2µf) AND R12 (220K).

BAND-SWITCH SHOWN AT 2ND POSITION. SHORT WAVE BAND
5.6 - 15.5 MC

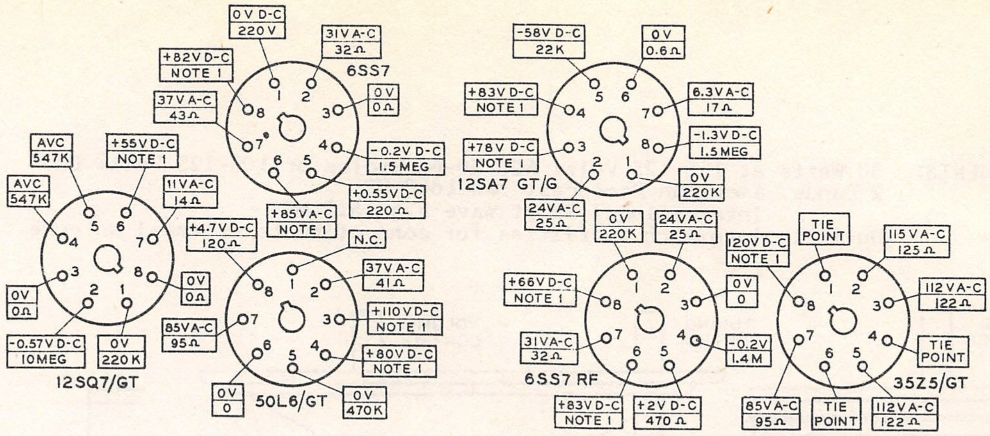

0V D-C
220V
31V A-C
32Ω
6SS7
+82V D-C
NOTE 1
0V
0Ω
37V A-C
43Ω
-0.2V D-C
1.5 MEG
+0.55V D-C
220Ω
+85V A-C
NOTE 1
AVC
547K
+55V D-C
NOTE 1
AVC
547K
11V A-C
14Ω
0V
0Ω
0V
0Ω
-0.57V D-C
10MEG
0V
220K
12SQ7/GT
+4.7V D-C
120Ω
N.C.
37V A-C
41Ω
+110V D-C
NOTE 1
85V A-C
95Ω
+80V D-C
NOTE 1
0V
0
0V
470K
50L6/GT
-58V D-C
22K
0V
0.6Ω
+83V D-C
NOTE 1
6.3V A-C
17Ω
+78V D-C
NOTE 1
-1.3V D-C
1.5MEG
12SA7 GT/G
0V
220K
24V A-C
25Ω
0V
220K
24V A-C
25Ω
120V D-C
NOTE 1
TIE POINT
115V A-C
125Ω
+66V D-C
NOTE 1
0V
0
112V A-C
122Ω
31V A-C
32Ω
-0.2V
1.4M
TIE POINT
6SS7 RF
35Z5/GT
+83V D-C
NOTE 1
+2V D-C
470Ω
85V A-C
95Ω
TIE POINT
112V A-C
122Ω

Fig. 4. Voltage and Resistance Analysis Chart

1. Resistance readings at these points will vary since they are in series with the leakage resistance of the electrolytic condensers which is subject to change.
2. All D.C. measurements were made with a meter having a sensitivity of 20,000 ohms per volt. A.C. measurements were made with a 1000 ohms per voltmeter.
3. Measured values are from socket pin to circuit ground. (pin 8 of 12SQ7 socket).
4. Tolerances of component values make possible a variation of ± 20% in readings indicated in chart.
5. Socket connections are shown as bottom views.

| SCHEMATIC NO. OF PART | NAME OF PART | DESCRIPTION | FUNCTION |
|---|---|---|---|
| C 1 | Capacitor | 2 Gang variable | Ant. Tuning |
| C 2 | " | Part of C 1 | OSC: Tuning |
| C 3 | " | Part of C 1 | Ant. Trimmer |
| C 4 | " | 100 mmfd mica ± 10% 500 v D.C. working | osc Grid coupling |
| C 5 | " | Compression trimmer 70-470 mmf | S. W. Padder |
| C 6 | " | Compression trimmer 1.6-18 mmf(part of C 5) | B.C. trimmer |
| C 7 | " | 3000 mmfd mica ± 10% 500 v D.C. working | I.F. trap |
| C 8 | " | .05 mfd, tubular,paper,400 v D.C. working | AVC bypass |
| C 9 | " | 125 mmfd mica, ± 25% part of T2 | Diode load bypass |
| C 10 | " | .01 mfd,paper,tubular 400 v D.C. working | 1st audio coupling |
| C 11 | " | .0015 mfd, mica± 20% 500 V C.C. working | 1st audio plate bypass |
| C 12 | " | .01 mfd, paper tubular 400 v D.C. working | 2nd audio coupling |
| C 13 | " | .01 mfd, paper tubular 400 v D.C. working | Output tube Plate bypass |
| C 14 | " | .2 mfd paper tubular 400 v D.C. working | Line bypass |
| C 15 | " | .05 mfd paper dielectric 400 v D.C. working | Line bypass |
| C 16 | " | Electrolytic, 2 section Common cathode<br>40 mfd 150 DCWV Sect. 1<br>40 mfd 150 DCWV Sect. 2 | Filter |
| C 17 | " | Part of C 16 | Filter |
| C 18 | " | .1 mfd, paper, tubular 400 v D.C. working | Cathode bypass,rf tube |
| C 19 | " | .002 mfd. paper, tubular, 600 v D.C. working | External Ant. Coupling |
| C 20 | " | 470 mmf.mica ± 20% 500 v D.C. working | Coupling,Grid of convertor tube |
| C 21 | " | Part of T1 | I.F. Trimmer |
| C 22 | " | Part of T1 | " " " |
| C 23 | " | Part of T2 | " " " |
| C 24 | " | Part of T2 | " " " |
| C 25 | " | 100 mmf.mica ± 10% 500 v D.C. working | Volume Control bypass |
| I1, I2 | Lamp | 3.2 v, 160 ma.miniature bayonet base | Dial light |
| L1 | Inductor | 200.5 uh ± 1 uh;dist.cap.12mmf max. | Loop Antenna |
| L2 | " | 2 band osc coil assy. | Oscillator Coil |
| L3 | " | SW. RF Coil | Antenna Coil |
| L4 | " | Slug tuned, variation 30-55 uh ± 10% | I.F. Trap |
| LS1 | Speaker | 5" p.m., 3.2 ohm v.c. | Speaker |
| R1 | Resistor | 22000 ohms ± 20% 1/2 watt carbon | Oscillator grid |
| R2 | " | 1.0 megohm ± 20%, 1/2 watt carbon | AVC Coupling |
| R3 | " | 220 ohms ± 20%, 1/2 watt carbon | I.F. Cathode |
| R4 | " | 47000 ohms, ± 20%, 1/2 watt carbon Part of T2 | Volume control decoupling |
| R5 | Potentiometer | 500,000 ohms taper 50,000 ohms at 1/2 rotation, with "on-off" switch | Volume control |
| R6 | Resistor | 10.0 megohm ± 20%, 1/2 watt carbon | 1st audio grid |
| R7 | Resistor | 0.22 megohm ± 20%, 1/2 watt carbon | 1st Audio plate |
| R8 | " | 0.47 megohm ± 20%, 1/2 watt carbon | Output tube grid |
| R9 | " | 120 ohms ± 10%, 1/2 watt carbon | Output tube cathode |
| R10 | " | 270 ohms ± 10%, 1/2 watt carbon | Pilot light shunt |
| R11 | " | 1500 ohms ± 5%, 1 watt carbon | Filter |
| R12 | " | 220,000 ohms ±20%, 1/2 watt carbon | Chassis return |
| R16 | " | 470 ohms ± 20%, 1/2 watt carbon | Cathode R.F. tube |
| R17 | " | 4700 ohms ± 20%, 1/2 watt carbon | Plate R.F. tube |
| R18 | " | 0.1 megohm ± 20%, 1/2 watt carbon | Grid of Mixer tube |
| S1 | Switch | Part of R5 | "On-Off" |
| S2 | " | 4 pole, 2 position | Band-Switch |
| T1 | Transformer | Double tuned, 455 kc. | I.F. input |
| T2 | " | " " " " | I.F. output |
| T3 | " | Primary Impedance 2500 ohms, secondary 3.2 ohms, with humbucking winding | Audio output |
| V1 | Tube | 6SS7 or 6SS7/GT | R.F. amplifier |
| V2 | " | 12SA7/GTG | Converter |
| V3 | " | 6SS7 or 6SS7/GT | I.F. amplifier |
| V4 | " | 12SQ7/GT | 2nd Det.1st audio |
| V5 | " | 50L6/GT | Power output |
| V6 | " | 35Z5/GT | Rectifier |

| | |
|---|---|
| POWER REQUIREMENTS: | 30 Watts at 105-125 Volts AC, 50-60 Cycles or 105-125 Volts DC. |
| TUNING RANGE: | 2 Bands. American Broadcast 550-1600 KC.<br>International Short Wave 5.6-15.5 MC. |
| ANTENNA: | Built in loop with facilities for connection to external antenna. |

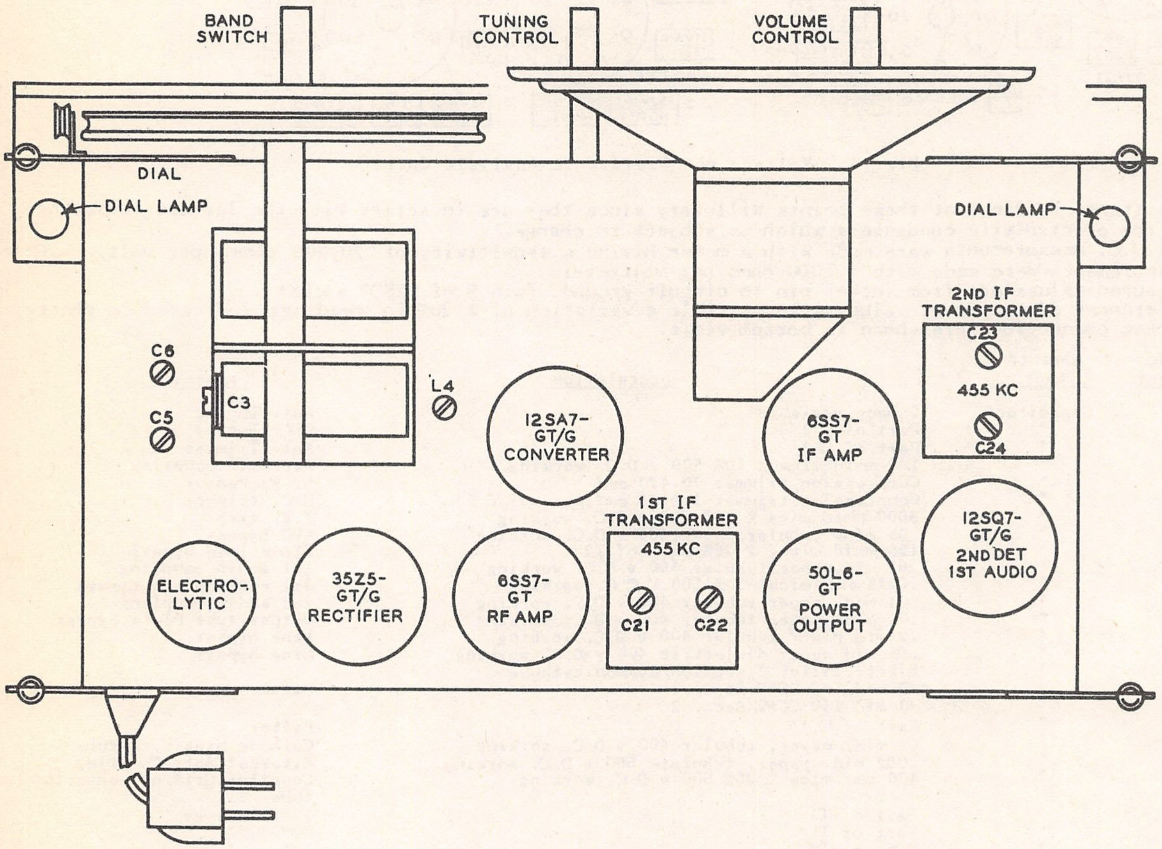

BAND SWITCH
TUNING CONTROL
VOLUME CONTROL
DIAL
DIAL LAMP
DIAL LAMP
2ND IF TRANSFORMER
C23
455 KC
C24
C6
C5
C3
L4
12SA7-GT/G CONVERTER
6SS7-GT IF AMP
1ST IF TRANSFORMER
455KC
C21
C22
12SQ7-GT/G 2ND DET 1ST AUDIO
ELECTRO-LYTIC
35Z5-GT/G RECTIFIER
6SS7-GT RF AMP
50L6-GT POWER OUTPUT

Fig. 1. Top View of Chassis showing Alignment Adjustment Positions.

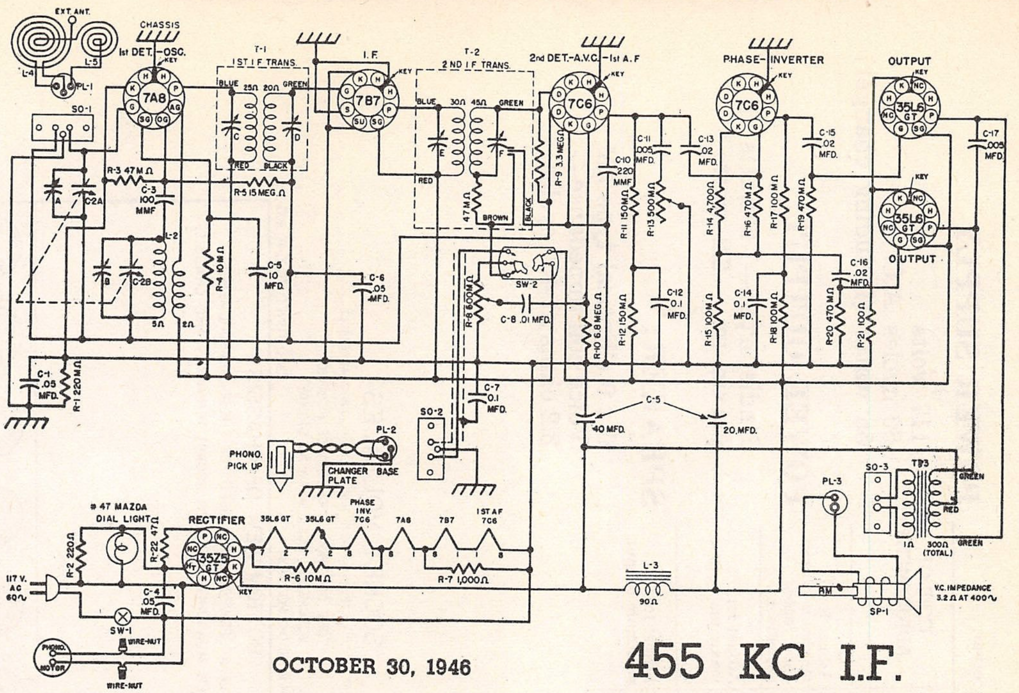
## ALIGNMENT INSTRUCTIONS

Punch marks are provided on the dial back plate at 600 kc, 1000 kc, 1400 Kc and 1600 Kc for alignment purposes.
With tuning condenser completely open, set dial pointer to 1600 Kc punch mark.
Connect output meter across voice coil terminals on speaker frame.
Connect low side of signal generator lead thru a 0.1 mfd coupling condenser to chassis ground.
Connect high side of generator thru proper dummy antenna to the receiver external antenna connection.
Keep signal generator output at lowest practical level and proceed according to table below.

## ALIGNMENT CHART

| DUMMY ANTENNA | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POSITION | RECEIVER DIAL SETTING | ADJUSTMENT POINTS | OUTPUT METER READING |
|---|---|---|---|---|---|
| 0.1 MFD. | 455 Kc | B.C. | Tuning Condenser Open | C24,C23,C22,C21 | Max. |
| 0.1 MFD. | 455 Kc | B.C. | Tuning Condenser Open | L4 | Min. |
| 200 MMFD. | 1600 Kc | B.C. | Tuning Condenser Open | C6 | Max. |
| 200 MMFD. | 1400 Kc | B.C. | 1400 Kc | C3 | Max. |
| 200 MMFD. | 600 Kc | B.C. | 600 Kc | L1<br>(Check, adjust if necessary) | Max. |
| 400 ohms | 6 Mc | S.W. | 6 Mc | C5 | Max. |

# THE FIRESTONE TIRE & RUBBER CO.


EXT. ANT.
CHASSIS
1st DET.-OSC.
KEY
L-4
L-5
PL-1
SO-1
7A8
T-1
1ST I F TRANS.
BLUE
25Ω
20Ω
GREEN
RED
BLACK
I.F.
7B7
T-2
2 ND I F TRANS.
30Ω
45Ω
47MΩ
BROWN
2nd DET.-A.V.C.-1st A.F
7C6
PHASE-INVERTER
OUTPUT
35L6 GT
C-2A
C-2B
R-3 47MΩ
C-3 100 MMF
R-5 15 MEG.Ω
L-2
5Ω
2Ω
R-4 10MΩ
C-5 10 MFD.
C-6 .05 MFD.
C-1 .05 MFD.
R-1 220MΩ
R-9 3.3 MEGΩ
C-10 220 MMF
C-11 .005 MFD.
C-13 .02 MFD.
R-11 150MΩ
R-13 500MΩ
R-14 4,700Ω
R-16 470MΩ
R-17 100MΩ
R-19 470MΩ
C-15 .02 MFD.
C-17 .005 MFD.
SW-2
R-8 500MΩ
C-8 .01 MFD.
R-10 6.8 MEG.Ω
R-12 150MΩ
C-12 0.1 MFD.
R-15 100MΩ
C-14 0.1 MFD.
R-18 100MΩ
R-20 470MΩ
R-21 100Ω
C-16 .02 MFD.
C-7 0.1 MFD.
C-5
40 MFD.
20 MFD.
SO-2
PL-2
PHONO. PICK UP
CHANGER BASE PLATE
SO-3
T-3
GREEN
RED
1Ω
300Ω (TOTAL)
PL-3
# 47 MAZDA DIAL LIGHT
RECTIFIER
35Z5 GT
35L6 GT
35L6 GT
PHASE INV. 7C6
7A8
7B7
1ST AF 7C6
R-2 220Ω
R-22 47Ω
R-6 10MΩ
R-7 1,000Ω
117 V. AC 60∿
C-4 .05 MFD.
SW-1
L-3
90Ω
PM
SP-1
V.C. IMPEDANCE 3.2Ω AT 400∿
PHONO. MOTOR
WIRE-NUT
WIRE-NUT

OCTOBER 30, 1946

## 455 KC I.F.

ALL SOCKETS AND PLUGS SHOWN FROM PIN END VIEW
ALL SWITCHES SHOWN IN COUNTERCLOCKWISE POSITION, SHAFT END VIEW

| SYMBOL | PART NO. | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| | | **CAPACITORS** | |
| C-1 | BD410503 | Capacitor—.05 Mfd., 400 volt | $ .35 |
| C-2A, B | C-57243-1 | Capacitor—Variable gang | 4.50 |
| C-3 | BM74A101 | Capacitor—Mica 100 Mmfd. ± 20% | .35 |
| C-4 | BD410503 | Capacitor—.05 Mfd., 400 volt | .35 |
| C-5 | A-56154 | **Capacitor—Electrolytic. 40-20-10 Mfd., 150 volt.** | 1.60 |
| C-6 | BD210503 | Capacitor—.05 Mfd., 200 volt | .30 |
| C-7 | BD410104 | Capacitor—0.1 Mfd., 400 volt | .40 |
| C-8 | BD410103 | Capacitor—.01 Mfd., 400 volt | .30 |
| C-10 | BM74A221 | Capacitor—Mica 220 Mmfd. ± 20% | .40 |
| C-11 | BD610502 | Capacitor—.005 Mfd., 600 volt | .30 |
| C-12 | BD410104 | Capacitor—0-1 Mfd., 400 volt | .40 |
| C-13 | BD410203 | Capacitor—.02 Mfd., 400 volt | .30 |
| C-14 | BD410104 | Capacitor—0.1 Mfd., 400 volt | .40 |
| C-15 | BD410203 | Capacitor—.02 Mfd., 400 volt | .30 |
| C-16 | BD410203 | Capacitor—.02 Mfd., 400 volt | .30 |
| C-17 | BD610502 | Capacitor—.005 Mfd., 600 volt | .30 |
| | | **RESISTORS** | |
| R-1 | BR17B224 | Resistor—Carbon, 220,000 Ohms, 1/3 watt | .15 |
| R-2 | BR17C221 | Resistor—Carbon, 220 Ohms, 1/2 watt | .15 |
| R-3 | BR17B473 | Resistor—Carbon, 47,000 Ohms, 1/3 watt | .15 |
| R-4 | BR17B103 | Resistor—Carbon, 10,000 Ohms, 1/3 watt | .15 |
| R-5 | BR17B156 | Resistor—Carbon, 15 Meg., 1/3 watt | .15 |
| R-6 | BR17E103 | Resistor—Carbon, 10,000 Ohms, 1 watt | .15 |
| R-7 | BR17B102 | Resistor—Carbon, 1,000 Ohms, 1/3 watt | .15 |
| R-8 | B-56142-1 | **Control—Dual Potentiometer, with switch 500,000 Ohms, (V. C.)** | 2.25 |
| R-9 | BR17B335 | Resistor—Carbon, 3.3 Meg., 1/3 watt | .15 |
| R-10 | BR17B685 | Resistor—Carbon, 6.8 Meg., 1/3 watt | .15 |
| R-11 | BR17B154 | Resistor—Carbon, 150,000 Ohms, 1/3 watt | .15 |
| R-12 | BR17B154 | Resistor—Carbon, 150,000 Ohms, 1/3 watt | .15 |
| R-13 | B-56142-1 | **Control—500,000 Ohms, (T. C.) part of R-8** | * |
| R-14 | BR17B472 | Resistor—Carbon, 4,700 Ohms, 1/3 watt | .15 |
| R-15 | BR17B104 | Resistor—Carbon, 100,000 Ohms, 1/3 watt | .15 |
| R-16 | BR17B474 | Resistor—Carbon 470,000 Ohms, 1/3 watt | .15 |
| R-17 | BR17B104 | Resistor—Carbon, 100,000 Ohms, 1/3 watt | .15 |
| R-18 | BR17B104 | Resistor—Carbon, 100,000 Ohms 1/3 watt | .15 |
| R-19 | BR17B474 | Resistor—Carbon, 470,000 Ohms, 1/3 watt | .15 |
| R-20 | BR17B474 | Resistor—Carbon, 470,000 Ohms, 1/3 watt | .15 |
| R-21 | BR16C101 | Resistor—Carbon, 100 Ohms, ± 10% 1/2 watt | .15 |
| R-22 | BR17G470 | Resistor—Carbon, 47 Ohms ± 20% 2 watt | .30 |

| SYMBOL | PART NO. | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| | | **COILS AND TRANSFORMERS** | |
| L-4, 5 | D-57259 | Loop Antenna assembly | $1.00 |
| L-2 | B-56143 | Coil—Oscillator assembly | * |
| L-3 | B-51726-1 | Filter Choke, 80 ma. | 2.00 |
| T-1 | B-51010-3 | Transformer—1st I.F. | 2.00 |
| T-2 | B-51011-3 | Transformer—2nd I.F. | 2.50 |
| T-3 | B-57253-1 | Transformer—Output | 1.50 |
| | | **OTHER ELECTRICAL PARTS** | |
| SW-1 | | Switch—power part of R-8 and R-13 | |
| SW-2 | B-56156-1 | Switch—Radio-Phono | 1.00 |
| SP-1 | C-57272 | Speaker—6" x 9" Permanent Magnet | * |
| | A-6158 | Lamp—Dial Mazda No. 47 | .15 |
| | | **MISCELLANEOUS PARTS** | |
| | B-57275-1 | Background for dial | * |
| | A-54848 | Bushing—Strain relief (power cord) | .20 |
| | A-56155 | Bushing—Tuning control shaft | * |
| | E-57270-1 | Cabinet | * |
| | B-51330-1 | Channel rubber—mtg. for Dial scale | .04 |
| | B-55402-1 | Dial Cable assembly (includes clips at end of cable) | .25 |
| | B-57269-1 | Dial scale—plastic | * |
| | B-51427-2 | Grommet—rubber; mtg., for variable gang | .05 |
| | B-51124-1 | Knob—Volume & switch, tuning or radio-phono | .15 |
| | B-56138-1 | Knob—Tone Control | .15 |
| | BN751V02 | Palnut—No. 3/8-32; for mtg., controls | .02 |
| | BN770S02 | Palnut—No. 10-24; for mtg., record changer | .01 |
| | A-57271 | Plug—3 Prong—Phono pick-up connection | * |
| | B-55130-9 | Pointer | .15 |
| | B-58069-1 | Power Cord | .75 |
| | BP934G02 | Screw—No. 4 x 1/2"; for mtg., loop & back | .03 |
| | BP928N02 | Screw—No. 8 x 1 1/8"; for mtg., chassis | .03 |
| | BS016S09 | Screw—No. 10-24 x 1"; for mtg., record changer | .04 |
| | A-56136 | Shaft—tuning control | * |
| | A-54726 | Socket—octal base | .20 |
| | A-54900 | Socket—loctal base | .25 |
| | A-57273 | Socket—3 Prong; Phono pick-up & loop antenna | .20 |
| | A-57258 | Socket—2 Prong; speaker connection | .20 |
| | A-6182-5 | Socket—dial lamp (with leads) | .15 |
| | A-51331 | Spring—Mtg., for channel rubbers | .10 |
| | A-51787 | Spring—dial cable tension | .07 |
| | A-50147 | Spring—conical; for mtg., record changer | .10 |
| | BF13NT05 | Washer—flat; for mtg., record changer | .02 |
| | B-50156-1 | Washer—rubber; for mtg., record changer | .04 |
| | A-54492 | Washer—"C"; tuning shaft | .02 |
| | A-1089 | Washer—cup; variable gang mtg. | .05 |
| | B-50964-3 | Wirenut—phono motor power connection | .03 |

RECORD CHANGER: Detrola 550, RCD.CH. P.15-1

## MODEL 4-A-17

# THE FIRESTONE TIRE & RUBBER CO.

1. The chassis, record changer and loop should remain in their normal position in the cabinet when making loop adjustment.
2. With the gang condenser fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, slide pointer along dial cord to correct position.
3. Connect output meter across speaker voice coil.
4. Connect the ground of signal generator to B–.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.
6. Radio-Phono switch in Radio position.

NOTE: For best results, it is advisable to use an isolation transformer between the 117 V. AC line and AC input to receiver.

| DUMMY ANT. | CONNECT HIGH SIDE OF SIGNAL GENERATOR TO | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER LETTER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|
| 0.1 Mfd. Condenser | 7A8 Grid | 455 KC | Any point where it does not affect the signal | F-E<br>D-C | 2nd IF<br>1st IF | Adjust for maximum output. Then repeat adjustment. |
| 0.1 Mfd. Condenser | 7A8 Grid | 1620 KC | Gang condenser completely out of mesh. | B | Oscillator | Adjust for maximum output. |
| RMA Loop | | 1400 KC | Tuned to 1400 kc Generator signal | A | Loop Antenna | Adjust for maximum output. |

## FREQUENCY RANGE:

540-1600 KC.

## POWER SUPPLY

117 volts
60 cycles A.C.
55 watts (including changer)

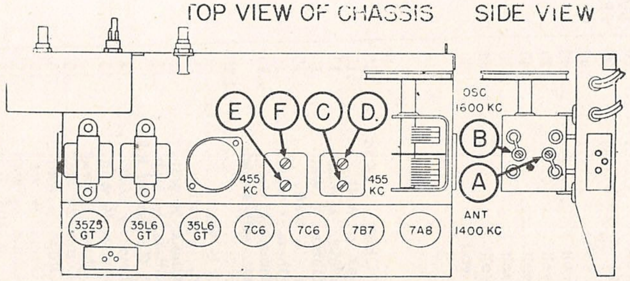
## POWER OUTPUT:

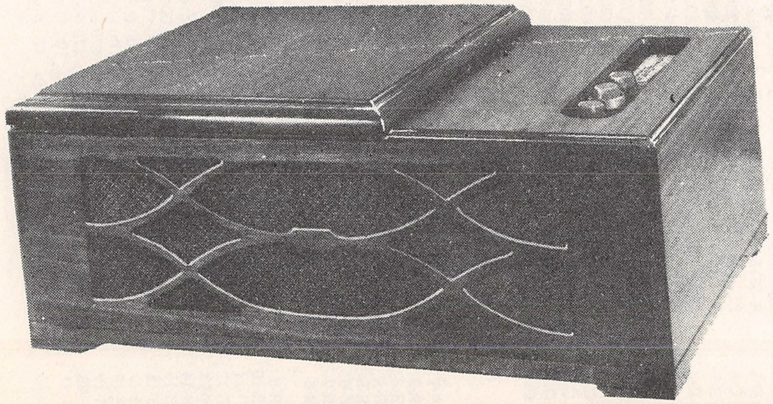
Undistorted—1.6 watts
Maximum —2.2 watts

## SPEAKER:

6 x 9 elliptical type PM
Voice coil impedance—
3.2 ohms at 400 cycles

TOP VIEW OF CHASSIS SIDE VIEW

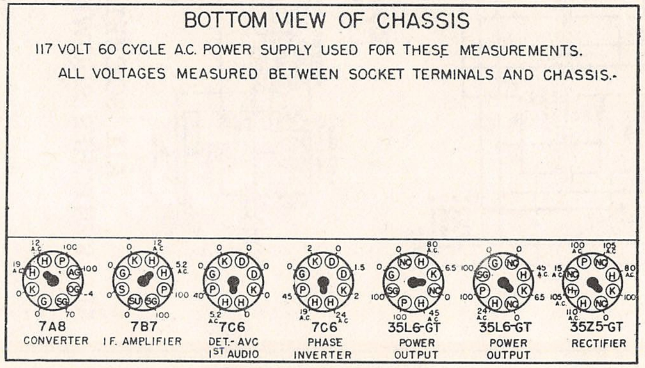

E
F
C
D
455 KC
455 KC
OSC 1600 KC
B
A
ANT 1400 KC
35Z5 GT
35L6 GT
35L6 GT
7C6
7C6
7B7
7A8



SOCKET VOLTAGES

MEASURED WITH VOLTMETER HAVING SENSITIVITY OF 1000 OHMS PER VOLT

TONE CONTROL IN CLOCKWISE POSITION
VOLUME ON FULL WITH NO SIGNAL
RADIO-PHONO SWITCH IN RADIO POSITION
DIAL TUNED TO 540 KC



BOTTOM VIEW OF CHASSIS

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.
ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

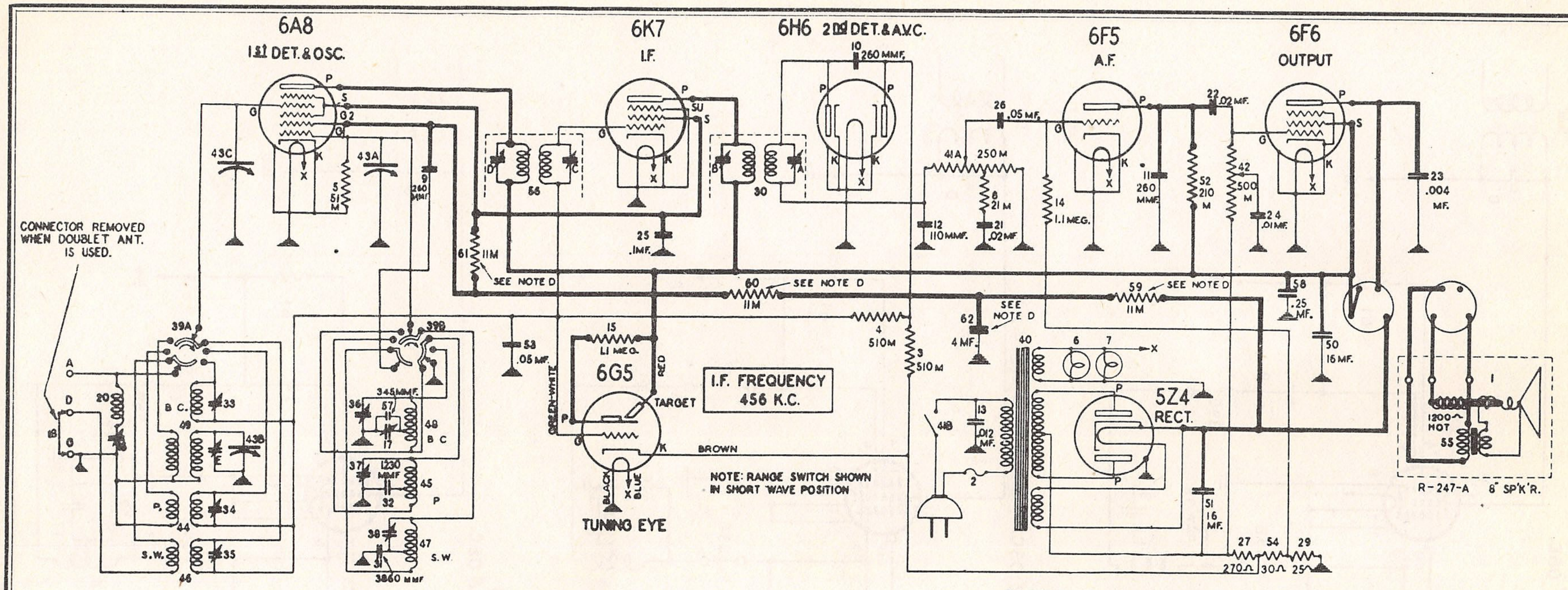
12 A.C.
100
19 A.C.
100
0
-4
0
70
H
P
H
AG
K
OG
G
SG
7A8
CONVERTER
0
12 A.C.
0
5.2 A.C.
0
100
0
100
K
H
G
H
S
P
SU
SG
7B7
I.F. AMPLIFIER
0
0
0
0
40
0
5.2 A.C.
0
K
D
G
D
P
K
H
H
7C6
DET.-AVC
1ST AUDIO
2
0
0
1.5
45
2
19 A.C.
24 A.C.
K
D
G
D
P
K
H
H
7C6
PHASE
INVERTER
0
80 A.C.
0
65
100
0
100
45 A.C.
NC
H
G
K
SG
NC
P
H
35L6-GT
POWER
OUTPUT
0
0
100
45 A.C.
100
65
24 A.C.
0
G
NC
SG
H
P
K
H
NC
35L6-GT
POWER
OUTPUT
100 A.C.
105 A.C.
15 A.C.
80 A.C.
105 A.C.
100
110 A.C.
0
P
NC
NC
H
HT
K
H
NC
35Z5-GT
RECTIFIER

REAR OF CHASSIS

For gain and dial data, see P.16-9

# THE FIRESTONE TIRE & RUBBER CO.

MODELS 7379-1, 7405-3,
7406-1


6A8
1st DET. & OSC.
6K7
I.F.
6H6 2nd DET. & A.V.C.
6F5
A.F.
6F6
OUTPUT
6G5
TUNING EYE
5Z4
RECT.
CONNECTOR REMOVED WHEN DOUBLET ANT. IS USED.
I.F. FREQUENCY 456 K.C.
NOTE: RANGE SWITCH SHOWN IN SHORT WAVE POSITION
SEE NOTE D
R-247-A 6" SP'K'R.
1200~ HOT
RED
BROWN
GREEN-WHITE
BLACK
BLUE
TARGET
270Ω 30Ω 25Ω

## SOCKET VOLTAGES

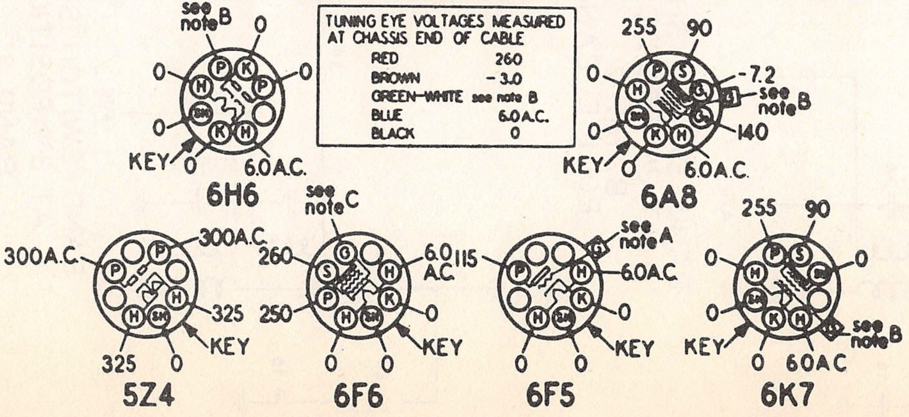
VOLUME CONTROL ON FULL
RANGE SWITCH SET ON BROADCAST POSITION

ANTENNA GROUNDED
DIAL TUNED TO 530 KC.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

A.C. LINE VOLTAGE 115 VOLTS


see note B
see note C
see note A
KEY
6H6
6A8
5Z4
6F6
6F5
6K7
300 A.C.
325
260
250
6.0 A.C.
115
255
90
-7.2
140
60 AC

| TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE | |
|---|---|
| RED | 260 |
| BROWN | -3.0 |
| GREEN-WHITE | see note B |
| BLUE | 6.0 A.C. |
| BLACK | 0 |

REAR OF CHASSIS

NOTE D: In receivers having serial numbers below 453,400 resistors 59, 60, and 61 are omitted and the screen grids of the 6K7 and 6A8 receive their current through a 26,000 ohm ¼ watt resistor which is connected to the screen grid of the 6F6. The anode grid of the 6A8 is connected in series with a 21,000 ohm ¼ watt resistor to the screen grid of the 6F6. Condenser 62 (4 mfd. 250 V.) is also omitted.

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

★

NOTE A: The grid bias for the 6F5 is —1.3 volts measured across resistor 29.

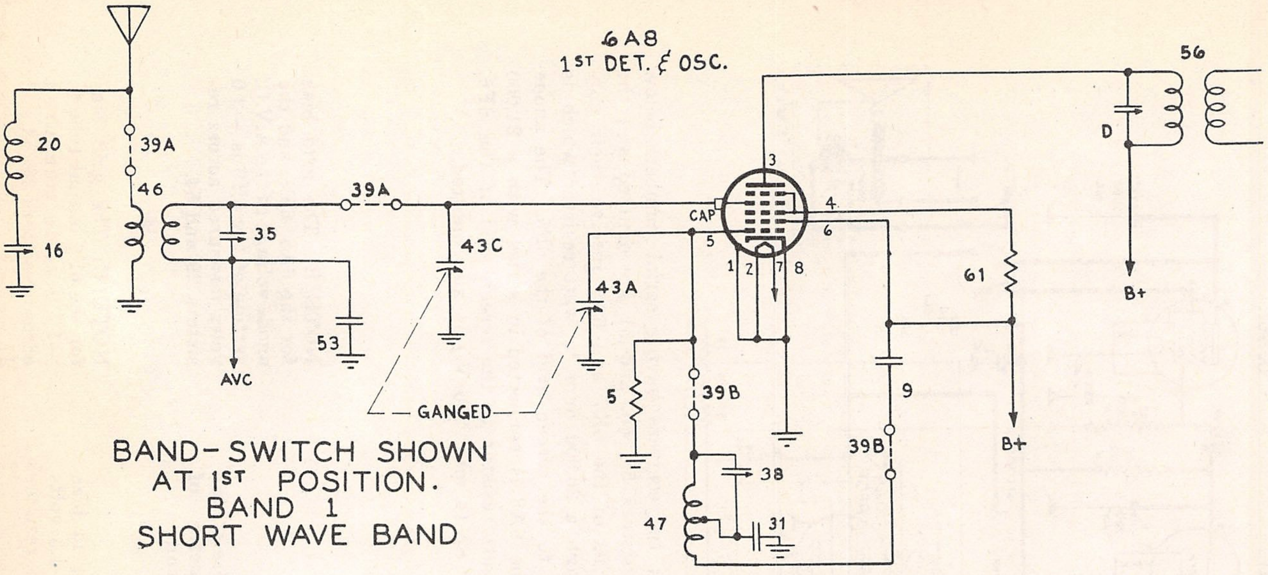
NOTE B: The grid bias for the 6A8, 6K7, and the anode voltage of the A.V.C. section of the 6H6 is —3.0 volts measured across resistors 29 and 54.

★

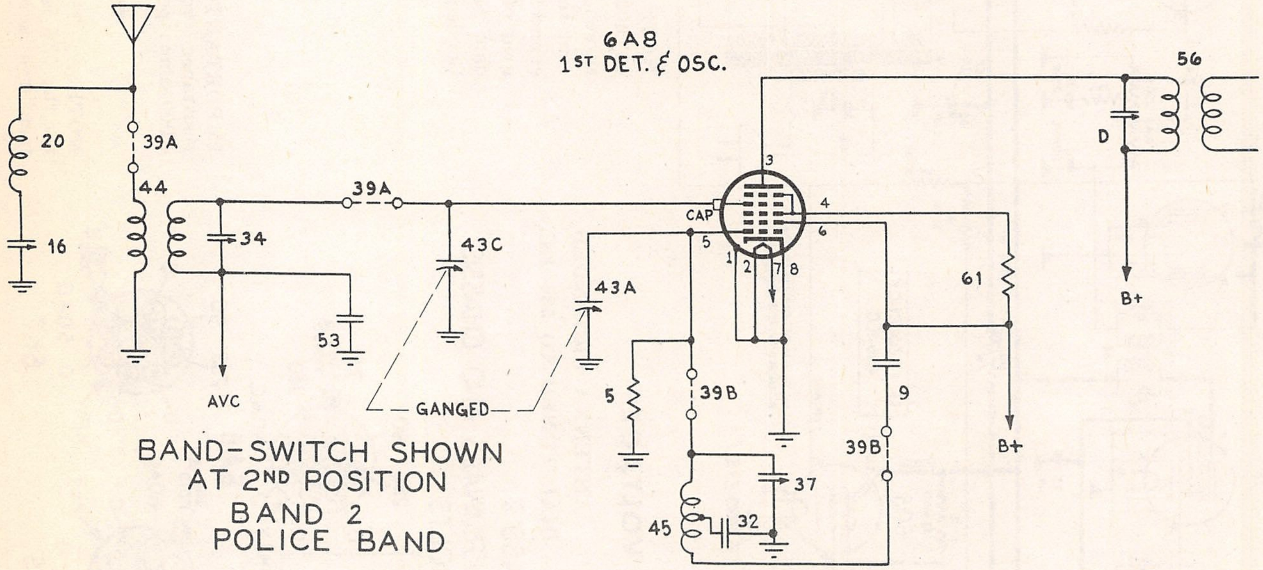
NOTE C: The grid bias for the 6F6 output tube is —17.0 volts measured across resistors 29, 54 and 27.

**MODELS 7379-1, 7405-3, 7406-1**

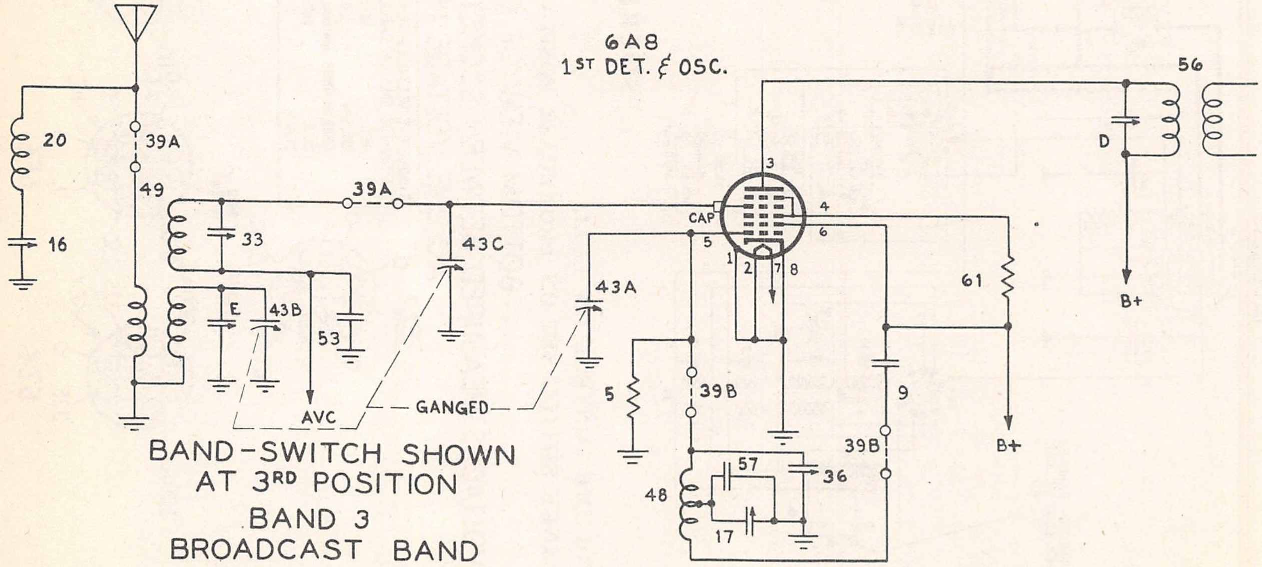
## THE FIRESTONE TIRE & RUBBER CO.


6A8
1ST DET. & OSC.
56
D
B+
20
16
39A
46
39A
35
43C
43A
53
AVC
GANGED
CAP
3
4
6
5
1
2
7
8
61
5
39B
9
39B
B+
38
47
31

BAND-SWITCH SHOWN AT 1ST POSITION.
BAND 1
SHORT WAVE BAND


6A8
1ST DET. & OSC.
56
D
B+
20
16
39A
44
39A
34
43C
43A
53
AVC
GANGED
CAP
3
4
6
5
1
2
7
8
61
5
39B
9
39B
B+
37
45
32

BAND-SWITCH SHOWN AT 2ND POSITION
BAND 2
POLICE BAND


6A8
1ST DET. & OSC.
56
D
B+
20
16
39A
49
39A
33
E
43B
43C
43A
53
AVC
GANGED
CAP
3
4
6
5
1
2
7
8
61
5
39B
9
39B
B+
57
36
48
17

BAND-SWITCH SHOWN AT 3RD POSITION
BAND 3
BROADCAST BAND

# THE FIRESTONE TIRE & RUBBER CO.

MODELS 7379-1, 7405-3, 7406-1

## CALIBRATION AND ALIGNMENT

### Aligning Equipment

For proper alignment, an output meter and an accurately calibrated oscillator with a tuning range from 456 KC. to 16 MC. are required.

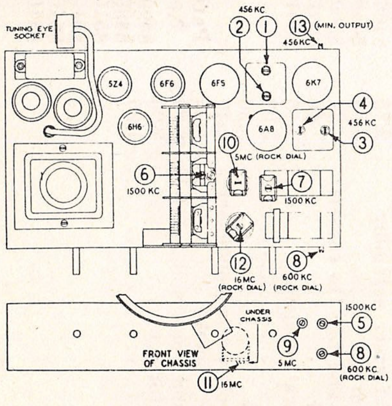
Connect the output meter from the plate of the output tube to chassis. A convenient point to make the plate connection is to the yellow wire on the speaker socket.

### Aligning the I. F. Amplifier

Turn the volume control to maximum volume position and keep it in this position throughout the entire alignment procedure. Turn the range switch to the broadcast position (fully clockwise).

Connect the test oscillator output leads to the 6A8 control grid and chassis with a .1 mfd. **condenser in series with the oscillator output.** Set the oscillator to exactly 456 KC. Set the receiver dial at any point where it has no tuning effect on the oscillator signal.

Adjust the four I.F. trimmers Nos. 1, 2, 3 and 4, for maximum output meter deflection, then repeat the trimmer adjustment.



### TRIMMER LOCATIONS

| Trimmer Number | | Alignment Frequency |
|---|---|---|
| 1. | 2nd I.F. transformer trimmer | 456 KC. |
| 2. | 2nd I.F. transformer trimmer | 456 KC. |
| 3. | 1st I.F. transformer trimmer | 456 KC. |
| 4. | 1st I.F. transformer trimmer | 456 KC. |
| 5. | Broadcast oscillator shunt trimmer | 1500 KC. |
| 6. | Broadcast antenna shunt trimmer | 1500 KC. |
| 7. | Broadcast detector shunt trimmer | 1500 KC. |
| 8. | Broadcast oscillator series padder | 600 KC. |
| 9. | Police oscillator shunt trimmer | 5 MC. |
| 10. | Police antenna shunt trimmer | 5 MC. |
| 11. | Short wave oscillator shunt trimmer | 16 MC. |
| 12. | Short wave antenna shunt trimmer | 16 MC. |
| 13. | Wave-trap trimmer | 456 KC. |

### Broadcast Band Calibration and Alignment

With the gang condenser in full mesh, the dial pointer should be on the white horizontal line below 530 KC. on the dial scale.

Turn the range switch to the extreme clockwise position and connect the test oscillator output to the A and G terminals of the receiver with a 400 ohm carbon resistor in series with the A terminal and the oscillator output.

Adjust the test oscillator to exactly 1,500 KC. and turn the receiver dial pointer to 1,500 KC. on the tuning dial. To calibrate the dial, adjust trimmer No. 5 for maximum output.

Carefully tune the receiver to the signal and adjust trimmers Nos. 6 and 7 for maximum output.

Adjust the test oscillator to 600 KC. and tune the receiver to the signal. Adjust trimmer No. 8 for maximum output. Then try to increase the output meter reading by detuning No. 8 slightly and retuning the receiver dial. If the output goes down, detune the trimmer in the opposite direction. Continue detuning the trimmer and retuning the receiver dial until maximum output meter deflection is secured. This operation is commonly known as "rocking" and when performed as described will give maximum selectivity and sensitivity even though dial may be slightly off calibration at 600 KC.

### Wave-Trap Adjustment

The wave-trap adjusting trimmer, No. 13, is located on the back of the chassis. Leave the test oscillator connected to the A and G terminals through a 400 ohm resistor and set the oscillator at 456 KC. Then adjust the wave-trap trimmer No. 13 for **minimum** output. If some particular station with a frequency near 456 KC. causes code interference, it may be desirable to adjust the wave-trap on the actual frequency of the interfering station.

Check the adjustment of trimmers 5, 6, and 7 at 1,500 KC.

### Band No. 2 Calibration and Alignment

Turn the range switch to the center position.

Adjust the test oscillator to exactly 5.0 MC. and turn the receiver dial pointer to exactly 5.0 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 9 for maximum output. If two peaks are found, the proper one is that with the trimmer screw farthest **out.**

Carefully tune the receiver to the signal and adjust trimmer No. 10 for maximum output. Then try to increase the output by detuning No. 10 slightly and retuning the receiver dial. Continue detuning No. 10 and retuning the dial until the output meter deflection is a maximum.

### Band No. 3 Calibration and Alignment

Turn the range switch to the extreme counterclockwise position. Be sure the D and G terminals on the antenna terminal strip are connected together.

Set the test oscillator to 16 MC. and turn the receiver dial pointer to exactly 16 MC. on the tuning dial.

To calibrate the dial, adjust trimmer No. 11 for maximum output. Check to see that it has been adjusted to the proper peak by tuning the receiver to approximately 15.1 MC. A repeat signal should be heard at this point. If none is present, even with greatly increased oscillator output, retune the receiver to 16 MC. and adjust trimmer No. 11 to the proper peak with the trimmer screw farther **out.**

Carefully tune the receiver to the signal and adjust trimmer No. 12 to a peak. Then try to increase the output by detuning the trimmer slightly and retuning the dial until a maximum output meter deflection is secured. Check the adjustment by tuning the receiver to the image at about 15.1 MC. The image should be much weaker than the 16 MC. signal. If the signal at 15.1 MC. dial setting is equal to or stronger than the 16 MC. signal, trimmer No. 12 is not set to the proper peak. Turn the trimmer in a turn or so, then readjust as above.

### MISCELLANEOUS PARTS NOT SHOWN ON CIRCUIT DIAGRAM

| Part Number | Description | List Price |
|---|---|---|
| 67590 | Flat steel mtg. washer | $0.01 |
| 84428 | Rubber chassis mtg. bushing | .03 |
| 84493 | No. 10 x 1¼ chassis mtg. screw | .03 |
| 84805 | Felt washer (for knobs) | .01 |
| 85066 | G.D.A. terminal strip | .20 |
| 85321 | Ground connector for G.D.A. strip | .01 |
| 88056 | Fuse mounting | .16 |
| 88057 | Fuse cover | .06 |
| 88675 | Speaker socket | .12 |
| 89119 | Tuning eye cable & plug | 1.50 |
| 89424 | Knob; tuning and tone control | .20 |
| 89425 | Knob; range switch | .22 |
| 89426 | Knob; volume control | .20 |

### TUNING DRIVE AND DIAL PARTS

| Part Number | Description | List Price |
|---|---|---|
| 83278 | Dial lamp | $0.15 |
| 88564 | Pointer and stud assembly | .12 |
| 88743 | Dial drive shaft | .15 |
| 88744 | Dial drive shaft retainer spring | .05 |
| 88745 | Dial ring and bracket assembly (for edge lighting) | .90 |
| 88748 | Dial disc and bushing assembly | .30 |
| 88956 | Escutcheon with glass | 1.65 |
| 88958 | No. 2 x ⅜ R.H. wood screw for escutcheon (each) | .01 |
| 89283 | Pilot lamp socket | .10 |
| 89284 | Pilot lamp shield | .02 |
| 89285 | Dial background | .12 |
| 89423 | Dial scale | 1.80 |
| 89432 | Escutcheon for tuning eye | .60 |

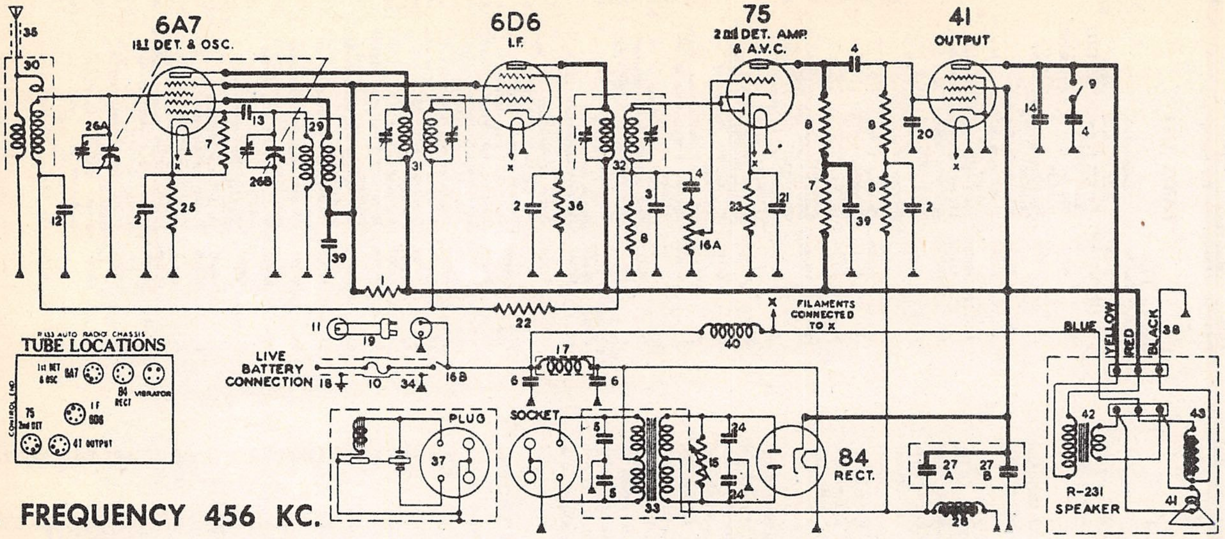
### PARTS LIST

| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 1 | R-247-A | 8-inch Dynamic Speaker | $9.00 |
| 2 | IMPORTANT | Fuse, 1 ampere (USE THIS SIZE ONLY) | |
| 3-4 | 83072 | 510,000 ohm ¼ watt carbon resistor | .15 |
| 5 | 83080 | 51,000 ohm ¼ watt carbon resistor | .20 |
| 6-7 | 83278 | Pilot lamp, 6-8 volt | .15 |
| 8 | 83286 | 21,000 ohm ¼ watt carbon resistor | $0.20 |
| 9-10-11 | 83539 | 260 mmfd. mica condenser | .15 |
| 12 | 83783 | 110 mmfd. mica condenser | .16 |
| 13 | 83976 | .012 mfd. 1,000 V. shielded condenser | .35 |
| 14-15 | 84235 | 1.1 meg. ¼ watt carbon resistor | .20 |
| 16 | 85285 | Wave trap trimmer | .40 |
| 17 | 85285 | Padding trimmer | .40 |
| 18 | 85321 | Ground connector | .01 |
| 20 | 88014 | Wave trap coil | .50 |
| 21-22 | 88026 | .02 mfd. 400 volt paper condenser | .30 |
| 23 | 89826 | .004 mfd. 750 volt paper condenser | .24 |
| 24 | 88030 | .01 mfd. 400 V. paper condenser | .30 |
| 25 | 88046 | .1 mfd. 150 V. paper condenser | .30 |
| 26 | 88189 | .05 mfd. 200 volt paper condenser | .35 |
| 27 | 88463 | 270 ohm 1 watt carbon resist. | .15 |
| 29 | 88465 | 25 ohm ½ watt wire wound resistor | .15 |
| 30 | 88468 | 2nd I.F. transformer | 2.40 |
| 31 | 88472 | 3860 mmfd. mica condenser. | .35 |
| 32 | 88473 | 1230 mmfd. mica condenser. | .25 |
| 33-34-35<br>36-37-38 | 88477 | Trimmer condenser | .12 |
| 39A-39B | 88480 | Range switch | 1.90 |
| 40 | 88481 | Power transformer, 115 V. 60 cycle | 5.00 |
| 40 | 89216 | Power transformer, 100 to 240 V.—25 to 133 cycles | 11.50 |
| 41A<br>41B | 88487 | Volume control (250,000 ohm) A.C. line switch | $1.25 |
| 42 | 88488 | Tone control (500,000 ohm) | .80 |
| 43A to C | 88493 | Three-gang condenser | 5.40 |
| 44 | 88499 | Antenna coil (police) | .85 |
| 45 | 88501 | Oscillator coil (police) | .65 |
| 46 | 88502 | Antenna coil (S.W.) | .80 |
| 47 | 88504 | Oscillator coil (S.W.) | .80 |
| 48 | 88506 | Oscillator coil (B.C.) | .55 |
| 49 | 88507 | Antenna coil (B.C.) | 1.60 |
| 50 | 88511 | 16 mfd. 300 volt electrolytic condenser | 1.10 |
| 51 | 88512 | 16 mfd. 400 volt electrolytic condenser | 1.10 |
| 52 | 88532 | 210,000 ohm ¼ watt carbon resistor | .12 |
| 53 | 88534 | .05 mfd. 150 volt condenser (low loss) | .25 |
| 54 | 88613 | 30 ohm ½ watt wire wound resistor | .15 |
| 55 | 88529 | Output transformer (on R-247-A speaker) | 2.00 |
| 56 | 88466 | 1st I.F. transformer | 2.40 |
| 40 | 89216 | Power transformer, 100 to 240 V.—25 to 133 cycles | 11.50 |
| 57 | 89564 | 345 mmfd. mica condenser | .25 |
| 58 | 89643 | 25 mfd. 300 V paper condens. | 50 |
| 59-60 | 89751 | 11,000 ohm 1 watt carbon resistor | .12 |
| 61 | 89753 | 11,000 ohm ½ watt carbon resistor | .15 |
| 62 | 89755 | 4 mfd. 250 volt electrolytic condenser | 1.00 |

**Prices Subject To Change Without Notice**

MODEL 7383-4

# THE FIRESTONE TIRE & RUBBER CO.



## I.F. FREQUENCY 456 KC.

| Diag. No. | Part No. | DESCRIPTION | List Price |
|---|---|---|---|
| 1 | 66875 | 16,000 ohm 1 watt carbon resistor | $0.50 |
| 2 | 81630 | .1 mfd. 100 volt paper condenser | .30 |
| 3 | 81812 | .00051 mfd. mica condenser | .25 |
| 4 | 83007 | .02 mfd. 600 volt paper condenser | .35 |
| 5 | 83058 | .25 mfd. 100 volt paper condenser | .35 |
| 6 | 83063 | .5 mfd. 100 volt paper condenser | .45 |
| 7 | 83080 | 51,000 ohm ¼ watt resistor | .20 |
| 8 | 83082 | 260,000 ohm ¼ watt resistor | .20 |
| 9 | 83179 | Tone Control switch | .30 |
| 10 | 83207 | Fuse | .05 |

| Diag. No. | Part No. | DESCRIPTION | List Price |
|---|---|---|---|
| 11 | 83278 | Pilot lamp | $0.15 |
| 12 | 83353 | .05 mfd. 100 volt paper condenser | .30 |
| 13 | 83539 | .00026 mfd. mica condenser | .25 |
| 14 | 83706 | .006 mfd. 600 volt condenser | .35 |
| 15 | 83725 | 0-500,000 globar resistor | .45 |
| 16A<br>16B | 83728 | Volume control<br>On-Off Switch | 1.20 |
| 17 | 83730 | R. F. Choke | .25 |
| 18 | 83777 | Battery lead and fuse housing | .50 |
| 19 | 83778 | Light cable and plug assembly | .50 |

| Diag. No. | Part No. | DESCRIPTION | List Price |
|---|---|---|---|
| 20 | 83783 | .00011 mfd. mica condenser | $0.16 |
| 21 | 83803 | 12 mfd. 15 volt electrolytic condenser | .80 |
| 22 | 84235 | 1.1 meg. ¼ watt resistor | .20 |
| 23 | 84240 | 4000 ohm ¼ watt resistor | .20 |
| 24 | 84850 | .03 mfd. 750 volt paper condenser | .25 |
| 25 | 84888 | 300 ohm ½ watt resistor | .20 |
| 26A<br>26B | 84958 | Two-gang variable condenser with shaft coupling | 4.50 |
| 27A<br>27B | 84961 | 4 mfd. 400 volt electrolytic condenser<br>8 mfd. 400 volt electrolytic condenser | 2.50 |
| 28 | 84962 | Filter choke | 1.25 |
| 29 | 84963 | Oscillator coil assembly | 1.00 |
| 30 | 84969 | Antenna coil and shield assembly | 1.25 |
| 31 | 84972 | 1st I.F. transformer assembly | 2.75 |
| 32 | 84974 | 2nd I.F. transformer assembly | 2.75 |
| 33 | 84975 | Power transformer | 3.50 |
| 34 | 84977 | Battery lead and cap (to chassis) | .34 |
| 35 | 84978 | Antenna lead | .40 |
| 36 | 84979 | 250 ohm ½ watt resistor | .15 |
| 37 | 84995 | Vibrator | 5.00 |
| 38 | 85027 | Speaker cable | .30 |
| 39 | 85029 | .1 mfd. 300 volt paper condenser | .40 |
| 40 | 85048 | Filament R.F. Choke | .25 |
| 41 | 85376 | Diaphragm and voice coil assembly | 2.00 |
| 42 | 85378 | Output transformer | 2.00 |
| 43 | 85379 | Field coil | 1.25 |

| Part No. | DESCRIPTION | List Price |
|---|---|---|
| 17166 | Mounting nut | $0.05 |
| 83144 | 15,000 ohm spark plug suppressor | .35 |
| 83145 | 10,000 ohm distributor suppressor | .35 |
| 83319 | Fuse insulator tube | .02 |
| 83737 | Top cover knurled nuts | .06 |
| 84981 | Tube shield section | .08 |
| 84982 | Tube shield section (slotted) | .08 |
| 84983 | Spring ring | .02 |
| 84984 | Case assembly (less covers) | 3.50 |
| 84987 | Speaker grille cloth | .12 |
| 84990 | Single hole mounting plate | .80 |
| 84991 | Bottom cover | 1.00 |
| 84992 | Top cover | 1.00 |
| 85012 | Mounting bolt | .06 |
| 85026 | Dash support washer | .05 |
| 15214 | Long mtg. strap screw No. 10-32x1¼" | $0.01 |
| 81214 | Flexible casing set screw | .02 |
| 83919 | Bezel and glass assembly | .50 |
| 83920 | Pilot light button assembly | .25 |
| 84067 | Steering column mtg. bracket | .25 |
| 84484 | Knob (volume and tuning) | .14 |
| 85000 | Remote control head (less shafts) | 6.00 |
| 85011 | Complete accessories for installation | 5.00 |
| 85016 | Dial face | .25 |

## FLEXIBLE SHAFTS

| Part No. | DESCRIPTION | List Price |
|---|---|---|
| 84996 | Tuning shaft, 24 inches long | $1.50 |
| 84998 | Volume control shaft, 24 inches long | 1.50 |
| 85104 | Tuning shaft, 36 inches long | 2.00 |
| 85105 | Volume control shaft, 36 inches long | 2.00 |
| 85107 | Tuning shaft, 30 inches long | 2.00 |
| 85108 | Volume control shaft, 30 inches long | 2.00 |

## POWER SUPPLY PROTECTIVE RESISTOR

The filter system and the rectifier tube are protected against breakdown during the warming-up period by the Globar resistor (No. 15 in the circuit diagram) which is connected across the high voltage secondary of the power transformer. This resistor drops rapidly in resistance as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage below the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, the Globar resistor cannot be tested with an ordinary ohmmeter, since it will show a resistance of several megohms.

## CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for the proper calibration and alignment of this receiver. The output of the oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter should be connected from the 41 plate to ground through a .25 mfd. condenser or across the voice coil, depending upon its sensitivity. A convenient point at which to connect to the 41 plate is the yellow lead terminal on the speaker terminal strip.

During all calibration and alignment adjustments, keep the volume control full on.

## I. F. ALIGNMENT

The I.F. trimmers are located on the top of the I.F. transformers and may be reached by removing the top cover. The modulated oscillator should be set to exactly 456 K.C. and connected from the 6A7 control grid to ground. Adjust the oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station or signal is tuned in since this would affect the output meter reading. Adjust all four I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

## R. F. ALIGNMENT

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output. Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the trimmer nearest to the shaft end of the gang condenser to give maximum output meter reading.

## DIAL CALIBRATION

The dial of the Auto Radio is calibrated in kilocycles except that the last two zeros have been omitted. Inasmuch as changes in the position of the flexible shafts may cause the calibration to vary, the set should be calibrated when the arrangement of the shafts has been completed. Calibration is accomplished as follows:

Tune in a station of known frequency between 800 and 1100 KC. Insert a screw driver in the slotted end of the dial shaft projecting through the back of the control head. Hold the tuning control knob so that the station remains tuned in properly and by turning the screw driver adjust the dial pointer so that it indicates the exact station frequency.

If the set is badly out of calibration, such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer as explained below. In order to reach this trimmer the chassis will have to be removed from the case as follows.

(1) Remove the flexible shafts and dismount the receiver.

(2) Remove the four terminals of the speaker cable from the speaker.

(3) Remove the black antenna lead from the coil and unsolder the coil shield grounding braid.

(4) Remove the blue dial light lead from the socket terminal.

(5) Remove the yellow tone control lead from the tone control switch.

(6) Remove the six slotted chassis fastening screws and slide the chassis out of the case.

Connect a .00025 mfd. condenser in series with the output lead of the test oscillator and the antenna lead lug on the antenna coil and connect the ground lead of the test oscillator to the chassis. Set the test oscillator to exactly 600 KC. Tune the radio set to maximum volume and set the dial to read exactly 6.0 (600 KC.). Then set the test oscillator to exactly 1400 KC. Turn the tuning knob until the dial pointer indicates 14.0 (1400 KC.). Adjust the oscillator shunt trimmer (on the gang condenser second from the control end) until the meter indicates maximum output. Then adjust the other gang condenser trimmer as directed under the R.F. alignment.

**MODEL 7402-6**
**MODEL 7383-4**

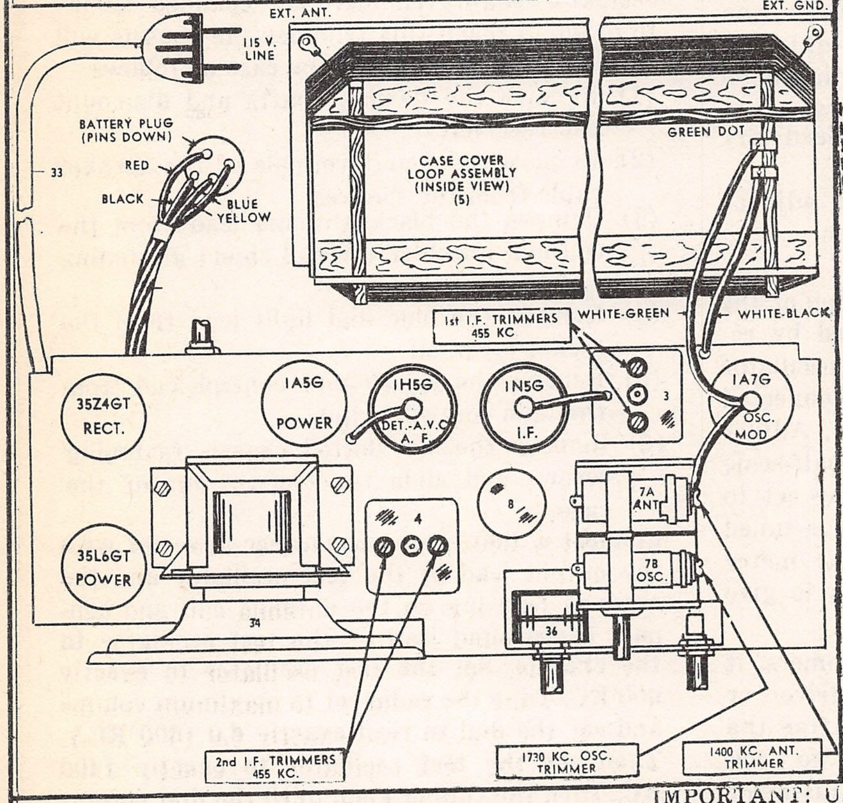
# THE FIRESTONE TIRE & RUBBER CO.

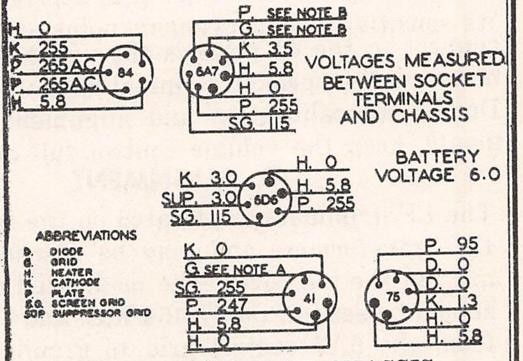
## MODEL 7402-6

| Illus. No. | Part No. | Part Name | Description | List Price |
|---|---|---|---|---|
| 1 | 11824 | Cable | Battery with four prong plug | $0.35 |
| 2 | 10832 | Choke | Filter | .85 |
| 3 | 10768 | Coil | 1st I.F. Transformer | 1.05 |
| 4 | 10769 | Coil | 2nd I.F. Transformer | 1.10 |
| 5 | 11830 | Loop | Antenna Assembly complete with frame | 1.75 |
| 6 | 11813 | Coil | Oscillator | .65 |
| 7 | 11814 | Condenser | Tuning Two Gang | 1.65 |
| 8 | 11822 | Condenser | Tubular Dry Electrolytic (40-40) Mfd. 150 Volt & 20 Mfd. 25-Volt) | 1.15 |
| 9 | 9981 | Condenser | Tubular .2 Mfd. 200 Volt | .29 |
| 10 | 1151 | Condenser | Tubular .1 Mfd. 200 Volt | .20 |
| 11 | 1151 | Condenser | Tubular .1 Mfd. 200 Volt | .20 |
| 12 | 1147 | Condenser | Tubular .05 Mfd. 200 Volt | .19 |
| 13 | 1147 | Condenser | Tubular .05 Mfd. 200 Volt | .19 |
| 14 | 1147 | Condenser | Tubular .05 Mfd. 200 Volt | .19 |
| 15 | 1368 | Condenser | Tubular .003 Mfd. 400 Volt | .17 |
| 16 | 1368 | Condenser | Tubular .003 Mfd. 400 Volt | .17 |
| 17 | 10762 | Condenser | Tubular .002 Mfd. 400 Volt | .19 |
| 18 | 9457 | Condenser | Tubular .05 Mfd. 400 Volt | .18 |
| 19 | 9458 | Condenser | Mica .00025 Mfd. | .21 |
| 20 | 9458 | Condenser | Mica .00025 Mfd. | .21 |
| 21 | 7934 | Condenser | Mica .0001 Mfd. | .21 |
| 22 | 2705 | Resistor | Carbon 2 Megohm ⅓ Watt | .19 |
| 23 | 7998 | Resistor | Carbon 1 Megohm ⅓ Watt | .19 |
| 24 | 2673 | Resistor | Carbon 750,000 Ohm ⅓ Watt | .19 |
| 25 | 6984 | Resistor | Carbon 500,000 Ohm ⅓ Watt | .19 |
| 26 | 3534 | Resistor | Carbon 75,000 Ohm ⅓ Watt | .19 |
| 27 | 9693 | Resistor | Carbon 5,000 Ohm ⅓ Watt | .19 |
| 28 | 6875 | Resistor | Carbon 250 Ohm ⅓ Watt | .19 |
| 29 | 9018 | Resistor | Carbon 150 Ohm ⅓ Watt | $0.19 |
| 30 | 1408 | Resistor | Wire Wound, Flexible 25 Ohm 1½ Watt | .19 |
| 31 | 10858 | Resistor | Wire Wound, Flexible 200 Ohm 2 Watt | .22 |
| 32 | 11823 | Resistor | Wire Wound 1700 and 20 Ohm | .45 |
| 33 | 11825 | Resistor | Line Cord | .90 |
| 34 | 11821 | Speaker | P.M. Dynamic 5" | 4.00 |
| 35 | 11815 | Switch | Voltage Selector | .90 |
| 36 | 11112 | Vol. Control | With D.P.S.T. Switch | .90 |

### MISCELLANEOUS PARTS

| Part No. | Part Name | Description | List Price |
|---|---|---|---|
| 11304 | Bulb | 6-8 Volt .150 Amp. Type No. 47 | $0.10 |
| 11816 | Dial Scale | Calibrated Scale | .40 |
| 8184 | Dial Cord | 9" of 18 Lb. Drive Cord | .10 |
| 10679 | Dial Pointer | For Dial | .15 |
| 11084 | Dial Shaft | Drive Shaft | .15 |
| 8117 | Dial Shaft "C" Washer | Retainer Washer | .02 |
| 11818 | Dial Crystal | For Dial | .25 |
| 11819 | Dial Plate | Metal Front Plate over Dial | .40 |
| 10884 | Indicator Plate | Marked "AC-DC"—"OFF"—"BATT" | .10 |
| 10787 | Knob | For Tuning and Volume Controls | .08 |
| 10907 | Knob | For Voltage Selector Control | .10 |
| 10850 | Plug | 4 Prong for Battery | .10 |


EXT. ANT.
EXT. GND.
115 V. LINE
BATTERY PLUG (PINS DOWN)
RED
BLACK
BLUE
YELLOW
33
CASE COVER LOOP ASSEMBLY (INSIDE VIEW) (5)
GREEN DOT
1st I.F. TRIMMERS 455 KC
WHITE-GREEN
WHITE-BLACK
35Z4GT RECT.
1A5G POWER
1H5G DET.-A.V.C. A.F.
1N5G I.F.
3
1A7G OSC. MOD
4
8
7A ANT.
7B OSC.
35L6GT POWER
34
36
2nd I.F. TRIMMERS 455 KC.
1730 KC. OSC. TRIMMER
1400 KC. ANT. TRIMMER


H. 0
K. 255
P. 265AC.
P. 265AC.
H. 5.8
84
P. SEE NOTE B
G. SEE NOTE B
K. 3.5
H. 5.8
H. 0
P. 255
SG. 115
6A7
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
BATTERY VOLTAGE 6.0
H. 0
K. 3.0
H. 5.8
SUP. 3.0
P. 255
SG. 115
6D6
ABBREVIATIONS
D. DIODE
G. GRID
H. HEATER
K. CATHODE
P. PLATE
S.G. SCREEN GRID
SUP. SUPPRESSOR GRID
K. 0
G. SEE NOTE A
SG. 255
P. 247
H. 5.8
H. 0
41
P. 95
D. 0
D. 0
K. 1.3
H. 0
H. 5.8
75

**BOTTOM VIEW OF CHASSIS**

**MODEL 7383-4**

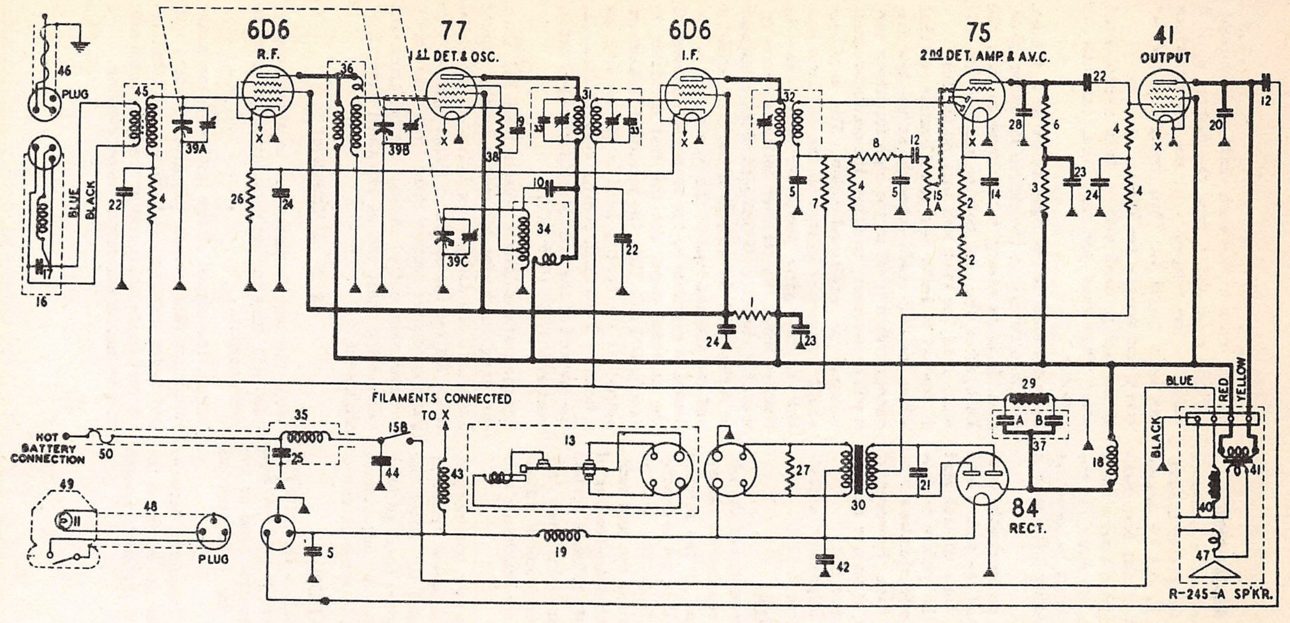
NOTE A: The actual bias on the grid of the 41 tube is —23 volts which must be measured from chassis to the ungrounded filter choke terminal. Due to the high resistance of the grid leak, the voltmeter will show only about —1 volt at the grid.

IMPORTANT: Use high resistance voltmeter of 1000 ohms per volt. Readings will vary depending upon range of meter. Make allowance for battery voltage variations.

NOTE B: The oscillator grid voltage varies from about —3 at 1500 KC. to —5.0 at 530 KC. The oscillator anode voltage may vary from 115 at 1500 KC. to 120 at 530 KC.

MODEL 7396-1
MODEL 4-A-17

# THE FIRESTONE TIRE & RUBBER CO.


6D6
R.F.
77
1st DET. & OSC.
6D6
I.F.
75
2nd DET. AMP. & A.V.C.
41
OUTPUT
46
PLUG
BLUE
BLACK
16
17
45
39A
39B
39C
36
38
31
33
34
10
32
22
26
24
4
9
8
12
15
15A
5
7
2
14
28
6
3
23
24
20
1
FILAMENTS CONNECTED TO X
HOT BATTERY CONNECTION
50
35
25
15B
44
43
13
27
30
21
29
A
B
37
18
84
RECT.
42
19
49
48
PLUG
BLUE
BLACK
RED
YELLOW
40
47
R-245-A SP'KR.

**I. F. FREQUENCY 177.5 KC.**

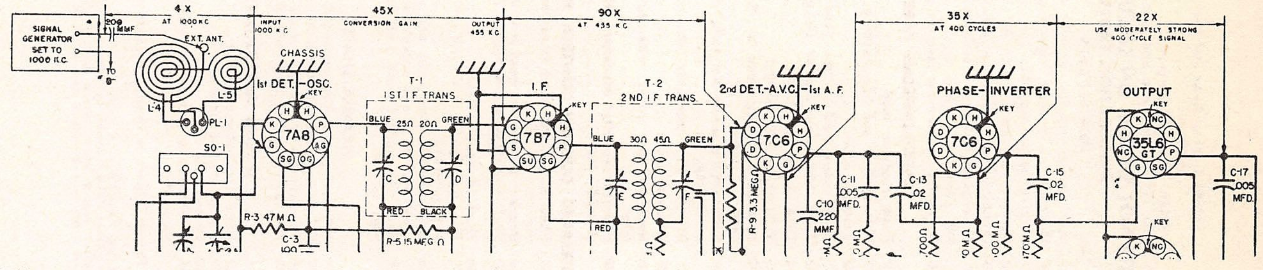
MODEL 7396-1

MODEL 4-A-17

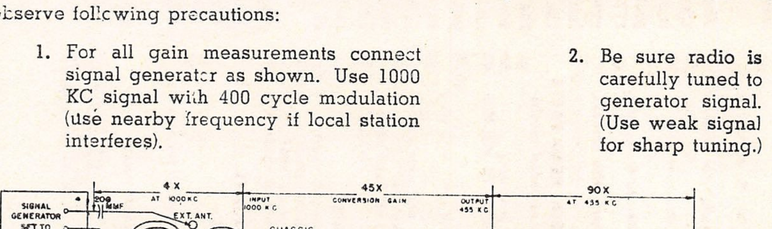
## APPROXIMATE STAGE GAIN

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 1000 KC signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. Be sure radio is carefully tuned to generator signal. (Use weak signal for sharp tuning.)
3. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.


SIGNAL GENERATOR SET TO 1000 K.C.
200 MMF
4 X AT 1000 KC
INPUT 1000 K C
45X CONVERSION GAIN
OUTPUT 455 KC
90 X AT 455 KC
35X AT 400 CYCLES
22X USE MODERATELY STRONG 400 CYCLE SIGNAL
EXT. ANT.
L-4
L-5
PL-1
SO-1
CHASSIS
1st DET.-OSC.
7A8
T-1 1ST I.F. TRANS
BLUE
25Ω
20Ω
GREEN
RED
BLACK
C
D
R-3 47M Ω
C-3
R-5 15 MEG Ω
I.F.
7B7
T-2 2ND I.F. TRANS
BLUE
30Ω
45Ω
GREEN
RED
E
F
2nd DET.-A.V.C.-1st A.F.
7C6
R-9 3.3 MEG Ω
C-10 220 MMF
C-11 .005 MFD
C-13 .02 MFD
PHASE-INVERTER
7C6
C-15 .02 MFD
OUTPUT
35L6 GT
C-17 .005 MFD
KEY

Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



## DIAL AND POINTER DRIVE CABLE ARRANGEMENT

To string dial cable, set gang condenser to fully meshed position, using the following parts:

| | |
|---|---|
| A-51726-1 | Spring, cable |
| B-55402-1 | Cable assembly |

# THE FIRESTONE TIRE & RUBBER CO.

## PARTS LIST

| Diag. No. | Part No. | DESCRIPTION | List Price |
|---|---|---|---|
| 1 | 66023 | 60,000 ohm 1 watt carbon resistor | $0.25 |
| 2 | 67303 | 2,000 ohm ¼ watt carbon resistor | .25 |
| 3 | 83080 | 51,000 ohm ¼ watt carbon resistor | .20 |
| 4 | 83082 | 260,000 ohm ¼ watt carbon resistor | .20 |
| 5 | 83539 | 260 mmfd. mica condenser | .25 |
| 6 | 84198 | 110,000 ohm ¼ watt carbon resistor | .30 |
| 7 | 84235 | 1.1 megohm ¼ watt carbon resistor | .20 |
| 8 | 84238 | 11,000 ohm ¼ watt carbon resistor | .20 |
| 9 | 84282 | .001 mfd. mica condenser | .25 |
| 10 | 84833 | 70 mmfd. mica condenser | .20 |
| 11 | 85296 | Pilot lamp 6-8 volt (bayonet base) | .18 |
| 12 | 88026 | .02 mfd. 400 volt paper condenser | .30 |
| 13 | 88156 | Vibrator | 3.50 |
| 14 | 88170 | 10 mfd. 25 volt electrolytic condenser | .80 |
| 15A<br>15B | 88171 | Volume control 500,000 ohm<br>Line switch | 1.20 |
| 16 | 88172 | Antenna Filter | 1.20 |
| 17 | 88173 | 50 mmfd. mica condenser | .20 |
| 18 | 88181 | R. F. choke coil | .40 |
| 19 | 88183 | R. F. choke coil (to vibrator) | .25 |
| 20 | 88185 | .006 mfd. 600 volt paper condenser | .35 |
| 21 | 88187 | .01 mfd. 1500 volt paper condenser | .40 |
| 22 | 88189 | .05 mfd. 200 volt paper condenser | .35 |
| 23 | 88191 | .1 mfd. 300 volt paper condenser | .35 |
| 24 | 88193 | .25 mfd. 150 volt paper condenser | .35 |
| 25 | 88195 | .5 mfd. 150 volt paper condenser | .50 |
| 26 | 88203 | 600 ohm ¼ watt carbon resistor | .15 |
| 27 | 88204 | 210 ohm ½ watt carbon resistor | .15 |
| 28 | 88205 | .0021 mfd. mica condenser | $0.35 |
| 29 | 88210 | Filter choke | 1.25 |
| 30 | 88213 | Power transformer | 3.50 |
| 31 | 88222 | 1st I.F. transformer | 2.75 |
| 32 | 88223 | 2nd I.F. transformer | 2.60 |
| 33 | 88233 | 110 mmfd. mica condenser | .25 |
| 34 | 88234 | Oscillator coil and shield assembly | 1.50 |
| 35 | 88239 | "A" filter | 1.00 |
| 36 | 88250 | R.F. coil and shield assembly | 1.50 |
| 37A<br>37B | 88256 | Electrolytic condenser 4 mfd. 350 volt<br>Electrolytic condenser 8 mfd. 350 volt | 2.40 |
| 38 | 88257 | 9,500 ohm ¼ watt carbon resistor | .15 |
| 39 A to C | 88258 | Three gang variable condenser | 6.00 |
| 40 | 88274 | Field coil and housing (for R-245-A spkr.) | 2.50 |
| 41 | 88276 | Output transformer | 2.00 |
| 42 | 88285 | 1.25 mfd. 150 volt paper condenser | .80 |
| 43 | 88289 | R.F. choke (to filaments) | .20 |
| 44 | 88298 | .25 mfd. 150 volt paper condenser (low reactance) | .40 |
| 45 | 88312 | Antenna coil and shield assem. (iron core) | 2.00 |
| 46 | 88327 | Antenna cable and plug | 1.10 |
| 47 | 88328 | Diaphragm and shell assem. (R-245-A spkr.) | 2.10 |
| 48 | 88339 | Pilot light and tone control cable with plug | .90 |
| 49 | 88364 | Control head less shell, knobs and shafts | 3.50 |
| 50 | 88365 | Fuse, 10 amperes | .05 |
|  | 83777 | Battery lead and fuse housing | .50 |

## PARTS NOT SHOWN ON CIRCUIT DIAGRAM

### INSTALLATION PARTS

| Part No. | DESCRIPTION | List Price |
|---|---|---|
| 12412 | Split lockwasher for receiver mounting | $0.02 |
| 17166 | Hex nut for receiver mounting ½" - 13 | .05 |
| 84990 | Receiver mounting plate | .60 |
| 85012 | Receiver mounting bolt, ½" - 13x2" | .06 |
| 88326 | Complete accessories for installation | 3.28 |
| 88335 | Shakeproof lockwasher for receiver mounting | .04 |
| 88336 | Large flat washer for receiver mounting | .04 |

### MISCELLANEOUS PARTS

| Part No. | DESCRIPTION | List Price |
|---|---|---|
| 83319 | Fuse insulator tube | .02 |
| 83777 | Battery lead and fuse housing | .50 |
| 88159 | Vibrator shield | .35 |
| 88161 | Tube shield half section (short) | .08 |
| 88162 | Tube shield half section (long) | .08 |
| 88164 | Tube shield cap (long) | .06 |
| 88165 | Tube shield cap (short) | .06 |
| 88297 | Speaker mounting screw No. 8 - 32 special head | .02 |
| 88319 | Self tapping screw No. 8x¼" for receiver cover mtg. | .02 |
| 88321 | Receiver case assembly (less covers) | 5.00 |
| 88327 | Antenna cable | 1.10 |
| 88330 | Receiver case cover with tube location label | 1.00 |
| 88350 | Interference filter condenser with bracket, .5 mfd., 150 V. | .70 |

### STEERING COLUMN CONTROL HEAD PARTS

| Part No. | DESCRIPTION | List Price |
|---|---|---|
| 88333 | Shell for control head (right-hand mounting) | .50 |
| 88334 | Bracket for control head mounting | .50 |
| 88337 | Shell mounting screw No. 1 - 72 R.H.M.S. | .01 |
| 88338 | Knob for control head | $0.25 |
| 88339 | Pilot light and tone control cable with plug and socket | .90 |
| 88385 | Extra length pilot light and tone control cable with plug and socket (43") | 1.00 |
| 88410 | Shell for control head (left-hand mounting) | .50 |

### FLEXIBLE SHAFTS

| Part No. | DESCRIPTION | List Price |
|---|---|---|
| 88406 | 18" tuning and volume control shaft | 2.00 |
| 88407 | 24" tuning and volume control shaft | 1.50 |
| 88408 | 30" tuning and volume control shaft | 2.00 |
| 88409 | 36" tuning and volume control shaft | 2.00 |

### SPECIAL ACCESSORIES

| Part No. | DESCRIPTION | List Price |
|---|---|---|
| 88422 | Ford distributor condenser | .70 |
| 88429 | Distributor suppressor | .35 |
| 88430 | Dome light filter | 1.00 |
| 88431 | Shielded loom with connector tip for antenna lead-in | .40 |

**Prices subject to change without notice.**

CEILING PRICES — A retail outlet must not sell at prices higher than those allowed by OPA Price Regulations. The suggested selling prices herein may not be charged by any retailer if his ceiling on any item is below the prices herein.

## CALIBRATION AND ALIGNMENT

A good modulated oscillator and a sensitive output meter are necessary for proper calibration and alignment of the R.F. and I.F. stages of this receiver. The output of the test oscillator must be adjustable to give a very weak signal which will not actuate the A.V.C. of the receiver. The output meter must be sensitive enough to give sufficient reading with such a weak signal.

The output meter may be conveniently connected between the chassis and the yellow lead terminal on pilot light and tone control lead socket. You will find that the yellow lead is connected through an .02 mfd. condenser to the plate of the 41 output tube. However, if the output meter is suitable, it should be connected across the speaker voice coil.

During all calibration and alignment adjustments, keep the volume control full on.

## I. F. ALIGNMENT

The I.F. trimmers are located on top of the I.F. transformers which may be reached by removing the receiver top cover. Pull out the antenna plug. The test oscillator should be set to exactly 177.5 KC. and connected from the control grid of the 77 to ground. Adjust the test oscillator output to give about half-scale reading of the output meter. Tune the set to make certain that no station signal is tuned in, since this would affect the output meter reading. Adjust all three I.F. trimmers to give maximum output reading.

In adjusting the I.F. transformer trimmers, it is desirable to use a bakelite screw driver or one having only a small metal tip. After the I.F. trimmers have been aligned once, go back and repeat the procedure, since any adjustment of one will affect the others to some extent.

## DIAL CALIBRATION

The dial of the control head is calibrated in kilocycles except that one zero is omitted. Sets using the steering column control head or the Ford dash control head are calibrated as follows:

Tune in a station of known frequency between 800 and 1100 KC. Loosen the set screw in the right hand knob and remove the knob. Loosen the set screw in the knob shaft, and by rotating the knob shaft, turn the pointer until it indicates the frequency of the station which has been tuned in. Then re-tighten the set screw and replace the knob.

If the set is used with a dash control head other than that for the Ford, calibrate as follows:

Turn the knob to the right as far as it will go, and then turn it to the end in the other direction. It is necessary to continue to turn the knob after the dial pointer reaches the end stop, until the knob will turn no farther.

If the set is badly out of calibration, so that when the dial reads correctly at the low frequency end, it is off at the high frequency end, it will be necessary to adjust the oscillator shunt trimmer as explained below. The oscillator shunt trimmer is located on the oscillator section of the gang condenser which can be reached when the receiver bottom cover is removed. Connect a .00025 mfd. mica condenser in series with the output of the test oscillator and the antenna lead of the receiver. This condenser is essential to the proper adjustment of the antenna stage. Set the test oscillator to exactly 600 KC. Tune the receiver to maximum output. If the control head is of the steering column or Ford dash control type, calibrate at the low end of the dial by setting the pointer to read exactly 60 (600 KC.).

Set the test oscillator to exactly 1400 KC. Turn the gang condenser by means of the tuning knob until the dial pointer indicates 140 (1400 KC.). Adjust the oscillator shunt trimmer (on gang condenser section third from shaft end) for maximum output. Adjust the two trimmers nearest the shaft end as explained under R.F. alignment.

## R. F. ALIGNMENT

With the test oscillator set to approximately 1400 KC., tune the set very carefully for maximum output.

Adjust the output of the test oscillator to the minimum value which will give sufficient output meter deflection. Adjust the two trimmers nearest to the shaft end of the gang condenser to give maximum output meter reading.

# THE FIRESTONE TIRE & RUBBER CO.

MODEL 7403-1
MODEL 7396-1

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

**NOTE:** IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT, THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

## ALIGNMENT PROCEDURE

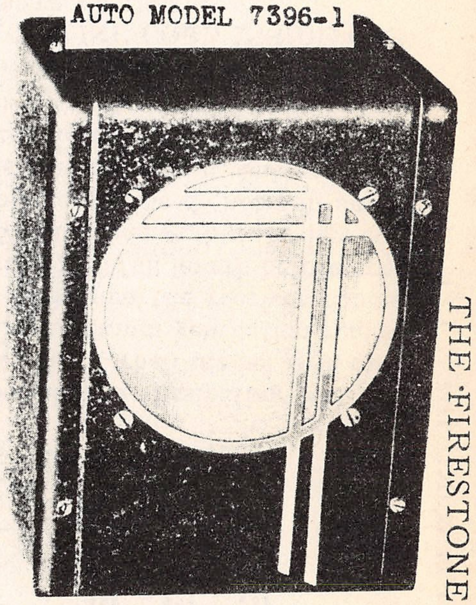
**GENERAL DATA.** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

**I. F. ALIGNMENT.** With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated in circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT.** Remove the chassis from the cabinet and set on a bench, taking care that no metal is near the loop. Do not make this setup on a metal bench.

Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.



| Diag No. | Part No. | Description | | List Price |
|---|---|---|---|---|
| C-9 | N-1376 | .02 mfd. 400 V. | 20% | $ 0.35 |
| C-10<br>C-11 | N-3658 | 40 mfd. 150 W. V.<br>40 mfd. 150 W. V. | Electrolytic | 1.10 |
| C-12 | N-1346 | .05 mfd. 400 V. | 20% | .40 |
| C-13 | N-3080 | .22 mfd. 200 V. | 10% | .70 |
| C-14 | N-1345 | .05 mfd. 200 V. | 20% | .40 |
| R-1 | N-3814 | 15,000 Ohm .5 W. | 20% | .20 |
| R-2 | N-3964 | 2,000 Ohm .5 W. | 10% | .20 |
| R-3 | N-1260 | 50,000 Ohm .5 W. | 20% | .20 |
| R-4 | N-1627 | 20,000 Ohm .5 W. | 20% | .20 |
| R-5 | N-1263 | 10 Megohm .5 W. | 20% | .20 |
| R-6 | N-1682 | 3 Megohm .5 W. | 20% | 0.20 |
| R-7 | N-1460 | 30,000 Ohm .5 W. | 20% | .20 |
| R-8 | N-4076 | 0.5 Megohm Volume Control | | 2.25 |
| R-9 | N-2189 | 4 Megohm .5 W. | 20% | .20 |

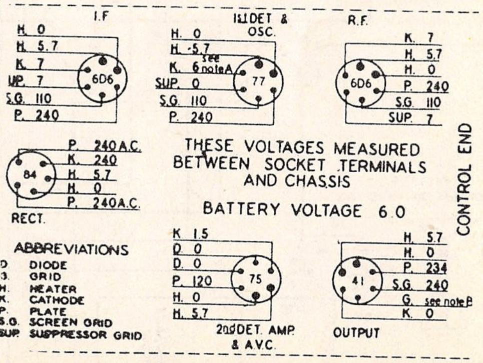
| Diag No. | Part No. | Description | | List Price |
|---|---|---|---|---|
| R-10 | N-1264 | 500,000 Ohm .5 W. | 20% | $ 0.20 |
| R-11 | N-3663 | 150 Ohm .5 W. | 10% | .20 |
| R-12 | N-1377 | 200,000 Ohm .5 W. | 20% | .20 |
| R-13 | N-3819 | 1,200 Ohm 1 W. | 10% | .30 |
| R-14 | N-1742 | 25 Ohm .5 W. | 20% | .20 |
| R-15 | N-3869 | 30 Ohm 1 W. | 10% | .30 |
| R-16 | N-1377 | 200,000 Ohm .5 W. | 20% | .20 |
| R-17 | N-1262 | 1 Megohm .5 W. | 20% | .20 |
| 1 | N-3784 | Antenna Loop Coil | | .90 |
| 2 | N-3298 | Oscillator Coil | | .70 |
| 3 | N-3816 | 1st I.F. Transformer | | 1.20 |
| 4 | N-3804 | 2nd I.F. Transformer | | 1.20 |
| 5 | N-3782 | Output Transformer | | 1.00 |
| 6 | N-3781 | 5" P. M. Speaker | | 3.75 |
| | N-4025 | 2 Gang Condenser | | 3.00 |

| | | |
|---|---|---|
| N-1958 | Rubber line cord | $ 0.45 |
| N-3812 | Wood dowel spacers—loop mounting | .10 |
| N-3795 | Screw—6-32x2¼" round head | .12 |
| N-3642 | Washer—fibre—chassis mounting | .10 |
| N-4687 | Cabinet back | .65 |
| N-4749 | Knobs | .20 |
| N-4386 | Clips—dial scale fastening | .10 |
| N-4696 | Speaker baffle | .16 |
| N-4697 | Grille cloth | .22 |
| N-4054 | Dial scale (glass) | $ 0.80 |
| N-4055 | Dial background plate | .80 |
| N-4053 | Dial pointer | .50 |
| N-3787 | Dial driv shaft | .50 |
| N-3238 | Dial drive shaft bushing | .40 |
| N-3243 | "C" Washer—dial drive shaft retainer | .07 |
| N-2655 | Dial drive string | .10 |
| N-3925 | Dial drive spring | .10 |
| N-4075 | Dial lamp socket | .50 |

MODEL 7403-1

## SOCKET VOLTAGES

BOTTOM VIEW



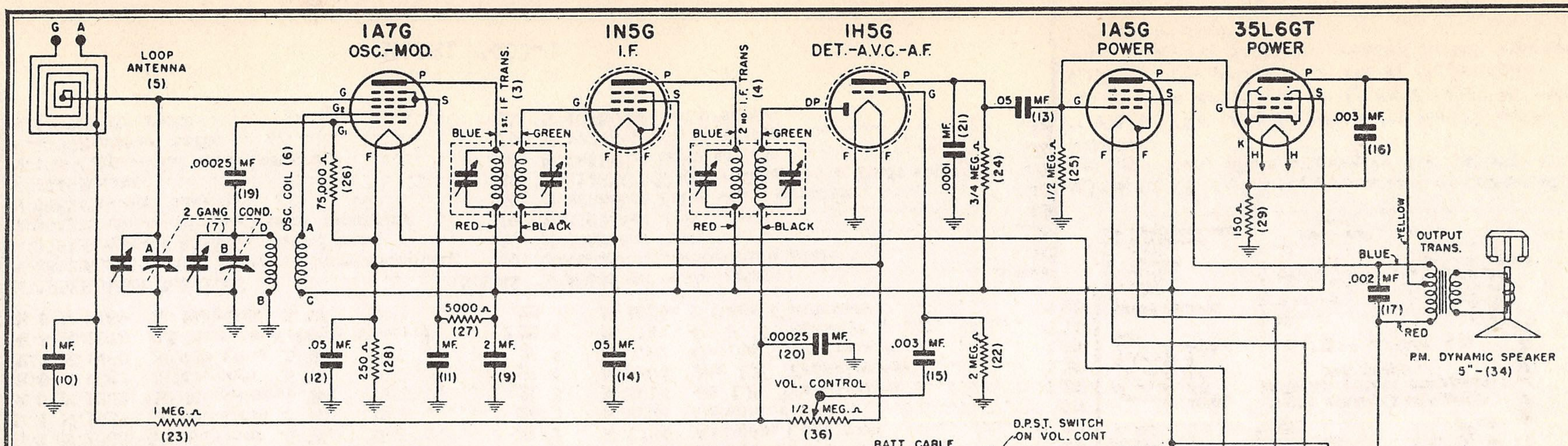
IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt. Make allowances for battery voltage variation.

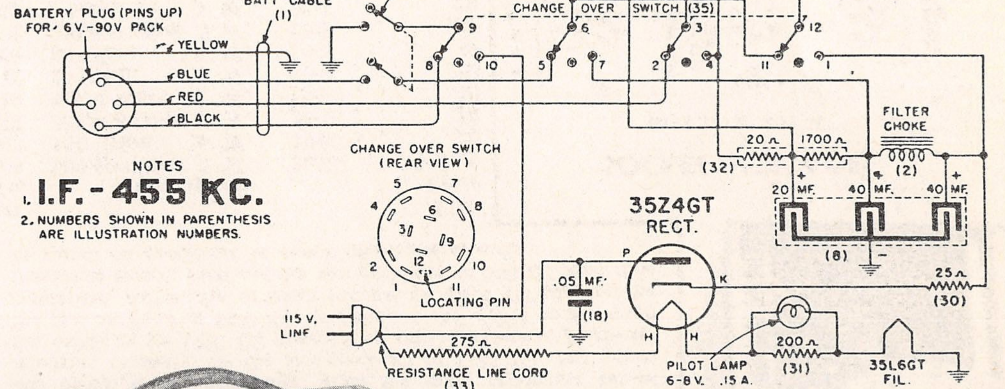
NOTE A: The cathode voltage of the 77 varies from 6 to 10 volts, depending on the gang condenser setting.

NOTE B: The grid bias on the 41 output tube is —18 volts, measured from the chassis to the ungrounded filter choke terminal.

MODEL 7402-6, Roamer

# THE FIRESTONE TIRE & RUBBER CO.

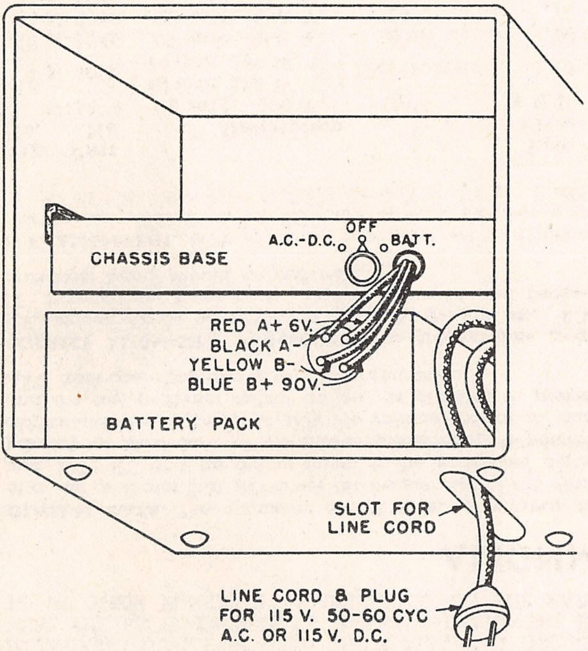

G A
LOOP ANTENNA (5)
1A7G OSC.-MOD.
1N5G I.F.
1H5G DET.-A.V.C.-A.F.
1A5G POWER
35L6GT POWER
1st. I.F. TRANS. (3)
2 nd. I.F. TRANS (4)
BLUE
GREEN
RED
BLACK
.00025 MF (19)
2 GANG COND. (7)
A
B
D
OSC. COIL (6)
C
75,000 Ω (26)
5000 Ω (27)
MF. (11)
2 MF. (9)
.05 MF. (12)
250 Ω (28)
.05 MF. (14)
1 MF. (10)
1 MEG. Ω (23)
.00025 MF. (20)
VOL. CONTROL
1/2 MEG. Ω (36)
.0001 MF. (21)
3/4 MEG. Ω (24)
.003 MF. (15)
2 MEG. Ω (22)
.05 MF (13)
1/2 MEG. Ω (25)
150 Ω (29)
.003 MF. (16)
YELLOW
BLUE
.002 MF (17)
RED
OUTPUT TRANS.
P.M. DYNAMIC SPEAKER 5"-(34)
P
S
G
G1
G2
F
K
H
DP


D.P.S.T. SWITCH ON VOL. CONT
BATTERY PLUG (PINS UP) FOR 6 V.-90V PACK
BATT CABLE (1)
YELLOW
BLUE
RED
BLACK
CHANGE OVER SWITCH (35)
1 2 3 4 5 6 7 8 9 10 11 12
FILTER CHOKE (2)
20 Ω
1700 Ω
(32)
20 MF.
40 MF.
40 MF.
(8)
CHANGE OVER SWITCH (REAR VIEW)
LOCATING PIN
35Z4GT RECT.
.05 MF. (18)
25 Ω (30)
115 V. LINE
275 Ω
RESISTANCE LINE CORD (33)
PILOT LAMP 6-8 V. .15 A.
200 Ω (31)
35L6GT FIL.

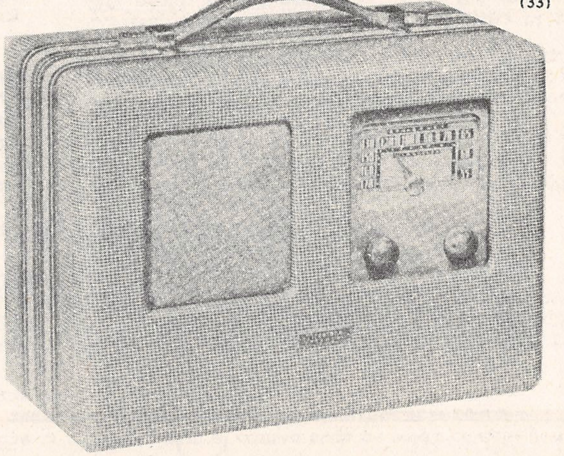
NOTES

1. I.F.-455 KC.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

## BATTERY INSTALLATION AND OPERATION


CHASSIS BASE
A.C.-D.C.
OFF
BATT.
RED A+ 6V.
BLACK A-
YELLOW B-
BLUE B+ 90V.
BATTERY PACK
SLOT FOR LINE CORD
LINE CORD & PLUG FOR 115 V. 50-60 CYC A.C. OR 115 V. D.C.

WHEN USING AN EXTERNAL AERIAL A GROUND MUST BE PLACED UNDERNEATH THE SCREW IN THE UPPER LEFT HAND CORNER OF CABINET BACK.



**NOTE:** The special heat dissipating line cord used will become warm when the set is in operation. To provide maximum ventilation remove all of the line cord from the receiver cabinet and stretch it out to its full length before operating the set. When disconnecting the line cord from light supply receptacle do not pull on the line cord as this may damage it, but grasp the plug attached to the end of the cord and pull outward on this.

**Do not lengthen or shorten line cord.**

ALWAYS PLACE LINE CORD INSIDE CABINET WHEN NOT IN USE.

For sockets and trimmers, see P.16-8

## THE FIRESTONE TIRE & RUBBER CO.

**MODEL 7402-6, Roamer**

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment, check tuning dial adjustment by: turn gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

Use an accurately calibrated test oscillator with some type of output measuring device.

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE BATTERY IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

**When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.**

Couple test oscillator to receiver loop by:

(a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three-inch form and attach across output of test oscillator.

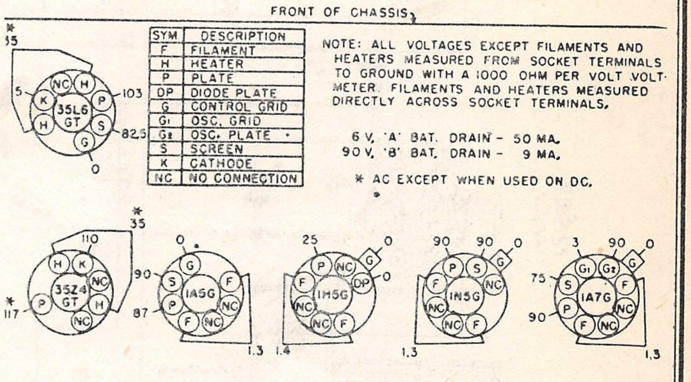
(b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

| | TEST OSCILLATOR | | | |
|---|---|---|---|---|
| **Set receiver dial to:** | **Adjust test oscillator frequency to:** | **Use dummy antenna in series with output of test oscillator consisting of:** | **Attach output of test oscillator to:** | **Refer to parts layout diagram for location of trimmers mentioned below—and:** |
| (1) Exactly 1730 K.C. | Exactly 1730 K. C. | None | Use small loop to couple test oscillator to receiver loop | Adjust 1730 K. C. oscillator trimmer for maximum output. |
| (2) Approx. 1400 K. C. | Exactly 1400 K. C. | None | Use small loop to couple test oscillator to receiver loop | Adjust 1400 K. C. antenna trimmer for maximum output. |
| I. F. Any point where no interfering signal is received | 455 K. C. | .02 MFD condenser | High side to grid terminal of 1A7G tube Low side to chassis DO NOT REMOVE CAP. | Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. |

SHOULD THE RECEIVER FAIL TO OPERATE CHECK FOR:

1. Weak battery.
2. A defective tube.
3. Tubes not properly inserted in tube sockets.
4. Grid caps not properly inserted on grid terminals on top of tubes.
5. Set may not be in correct position—rotate radio to point of greatest volume.
6. If set is being operated in an isolated district, an external aerial may be required.

A NOTICEABLE REDUCTION IN RECEIVER VOLUME, assuming that all tubes are in good condition, can generally be attributed to a low battery that should be replaced.



| SYM | DESCRIPTION |
|---|---|
| F | FILAMENT |
| H | HEATER |
| P | PLATE |
| DP | DIODE PLATE |
| G | CONTROL GRID |
| G1 | OSC. GRID |
| G2 | OSC. PLATE |
| S | SCREEN |
| K | CATHODE |
| NC | NO CONNECTION |

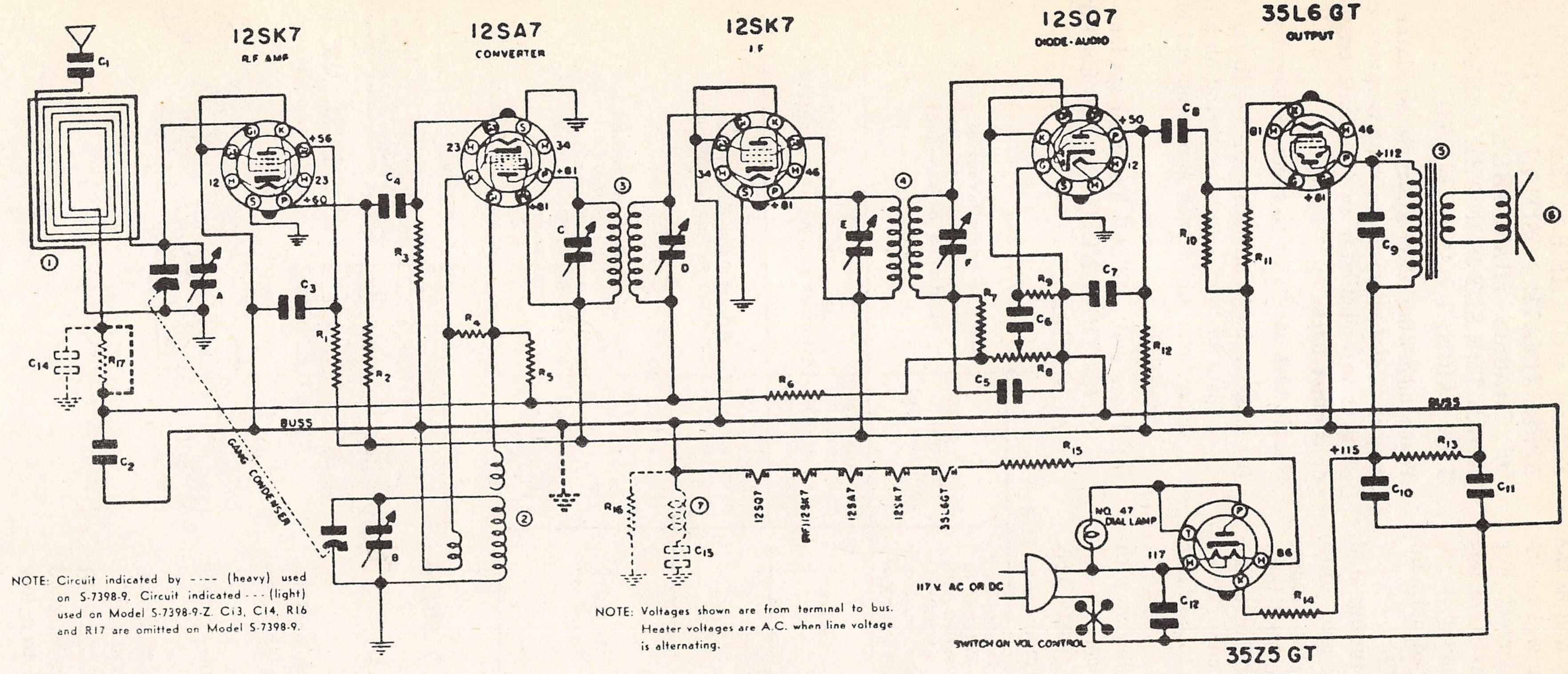
NOTE: ALL VOLTAGES EXCEPT FILAMENTS AND HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. FILAMENTS AND HEATERS MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

6 V. 'A' BAT. DRAIN - 50 MA.
90 V. 'B' BAT. DRAIN - 9 MA.

* AC EXCEPT WHEN USED ON DC.

MODEL 7403-1, Brilliantone

# THE FIRESTONE TIRE & RUBBER CO.


12SK7
R.F. AMP.
12SA7
CONVERTER
12SK7
I.F.
12SQ7
DIODE-AUDIO
35L6 GT
OUTPUT
35Z5 GT
RECTIFIER
BUSS
GANG CONDENSER
NO. 47 DIAL LAMP
117 V. AC OR DC
SWITCH ON VOL CONTROL
+56
+60
+81
+50
+112
+115
+46
117
86
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
12SQ7
BR112SK7
12SA7
12SK7
35L6GT

NOTE: Circuit indicated by ---- (heavy) used on S-7398-9. Circuit indicated --- (light) used on Model S-7398-9-Z. C13, C14, R16 and R17 are omitted on Model S-7398-9.

NOTE: Voltages shown are from terminal to bus. Heater voltages are A.C. when line voltage is alternating.

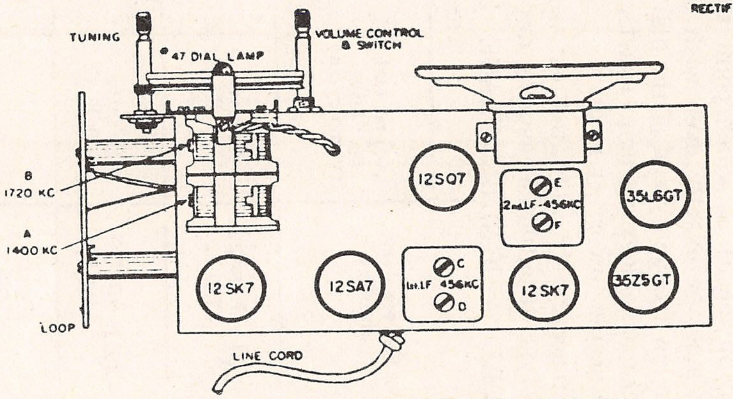
I.F.—456 K.C.

6 TUBE A.C.–D.C.

SUPERHETERODYNE

SINGLE BAND

DECEMBER 8, 1941


TUNING
VOLUME CONTROL & SWITCH
#47 DIAL LAMP
B 1720 KC
A 1400 KC
LOOP
LINE CORD
12SQ7
2nd I.F.-456KC
E
F
35L6GT
12SK7
12SA7
1st I.F. 456KC
C
D
12SK7
35Z5GT

TUBE AND TRIMMER LOCATIONS

## TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters) and includes the popular 1712 KC police channel.

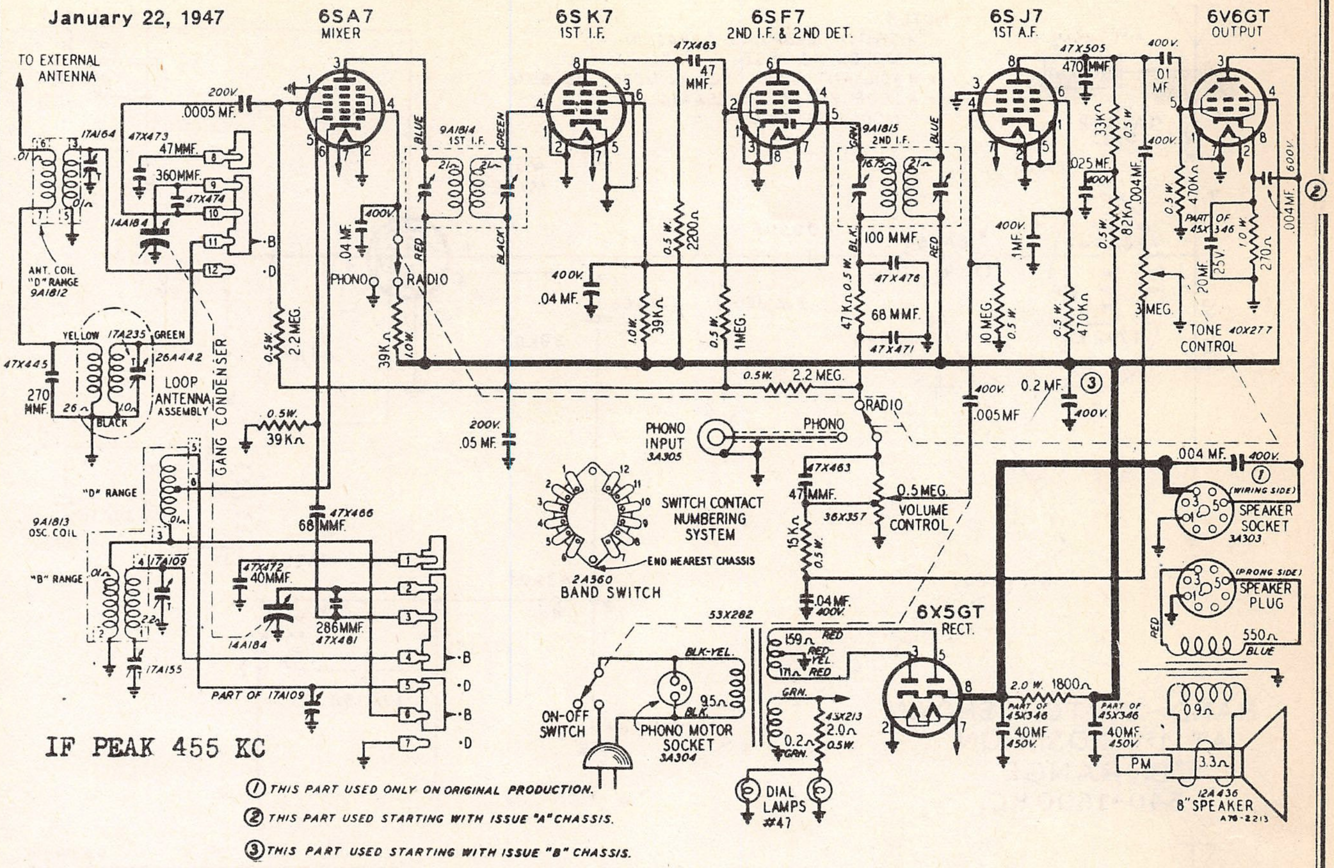
## GROUND

No ground connection should be used when operating this receiver. The receiver gets its ground connection through the power line and any external connection to the chassis may cause a short circuit and consequent damage.

## GAMBLE-SKOGMO INC.

## MODELS 43-7601, 43-7601A, 43-7601B
## MODEL 43-7602

January 22, 1947


6SA7
MIXER
6SK7
1ST I.F.
6SF7
2ND I.F. & 2ND DET.
6SJ7
1ST A.F.
6V6GT
OUTPUT
TO EXTERNAL ANTENNA
.0005 MF.
200V.
47MMF.
360MMF.
ANT. COIL "D" RANGE 9A1812
LOOP ANTENNA ASSEMBLY
GANG CONDENSER
9A1814 1ST I.F.
9A1815 2ND I.F.
BLUE
GREEN
RED
BLACK
PHONO
RADIO
2.2 MEG.
39Kn
2200n
39Kn
1MEG.
100 MMF.
68 MMF.
47Kn
10 MEG.
470Kn
33Kn
82Kn
470Kn
270n
3 MEG.
TONE CONTROL 40X277
0.2 MF.
.005 MF
.004 MF.
PHONO INPUT 3A305
SWITCH CONTACT NUMBERING SYSTEM
END NEAREST CHASSIS
2A560 BAND SWITCH
0.5 MEG. VOLUME CONTROL
15Kn
"D" RANGE
9A1813 OSC. COIL
"B" RANGE
68 MMF.
40MMF.
286MMF.
SPEAKER SOCKET 3A303
SPEAKER PLUG
550n
6X5GT RECT.
1800n
40MF 450V.
ON-OFF SWITCH
PHONO MOTOR SOCKET 3A304
DIAL LAMPS #47
PM
8" SPEAKER
IF PEAK 455 KC

① THIS PART USED ONLY ON ORIGINAL PRODUCTION.

② THIS PART USED STARTING WITH ISSUE "A" CHASSIS.

③ THIS PART USED STARTING WITH ISSUE "B" CHASSIS.

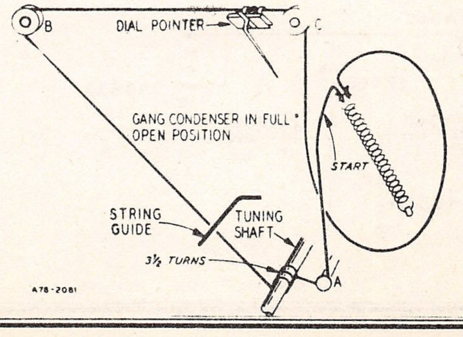
## SUBSTITUTE PARTS LIST

**The following parts are used in some receivers only. Check part number on part before ordering and order part originally used in receiver.**

| | |
|---|---|
| **40X282** | **Tone Control (Substitute for 40X277)** |
| **25X1539** | **Radio-Phono. Switch Lever (When 40X282 is used)**<br>**No. 6-32 x 5/16" Slab Hd. Set Screw (Mtg. 25X1539)** |
| **2A161** | **D.P.D.T. Switch (When 40X282 is used)** |

## DRIVE CORD REPLACEMENT

To install a new drive cord, turn the large drive pulley until the gang condenser is completely unmeshed. Hook one end of the new drive cord to the tension spring and fasten the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the rim of the drive pulley and run it ¼ turn counterclockwise around the pulley. Pass it around the Idler stud A and wind three turns clockwise around the tuning shaft with the turns progressing away from the chassis. Run the string behind the string guide, around pulleys B and C, down and under the large drive pulley, then counterclockwise around the pulley to the slot in the rim. Hook the end of the cord to the end of the tension spring and turn the tuning shaft a few turns to remove any slack in the cord.


B
DIAL POINTER
C
GANG CONDENSER IN FULL OPEN POSITION
START
STRING GUIDE
TUNING SHAFT
3½ TURNS
A
A78-2081

## SPECIFICATIONS

**6 Tube Superheterodyne, including rectifier tube**

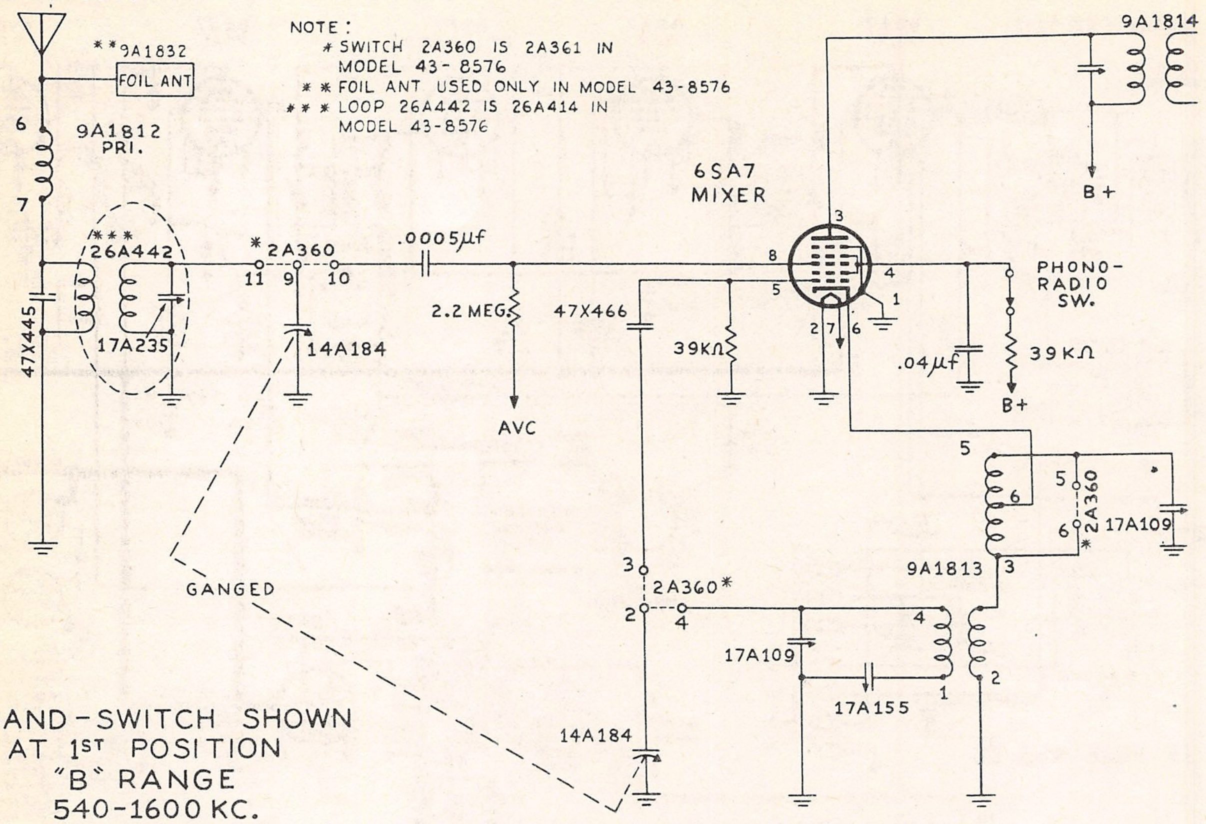
| | |
|---|---|
| **Power Consumption** | **40 w. normal, 60 w. phono operating (at 117 v. A.C.)** |
| **Selectivity** | **40 kc. broad at 1,000 times signal** |
| **Intermediate Frequency** | **455 kc.** |
| **Speaker** | **8 inch P.M. dynamic** |
| **Tuning Frequency Range** | **B range, 540-1,600 kc.; D range, 9-15.5 meg.** |
| **Sensitivity** | **B range, 9 mv. avg.; D range, 20 mv. avg. (for 0.5 w. output with external antenna)** |
| **Power Supply** | **105-125 v. 60 cycles only** |
| **Power Output** | **4 w. maximum 2.3 w., 10% harmonics** |
| **Record Changer** | **Plays ten 12 inch or twelve 10 inch** |

## CIRCUIT DESCRIPTION

The automatic record changer is connected to the rear of the chassis through jacks marked "Phono" and "Phono Motor." The "Phono" jack is switched in or out of the audio circuit by a switch controlled by the tone control knob. This switch also shorts out the r-f signal when it is turned to the phono position.

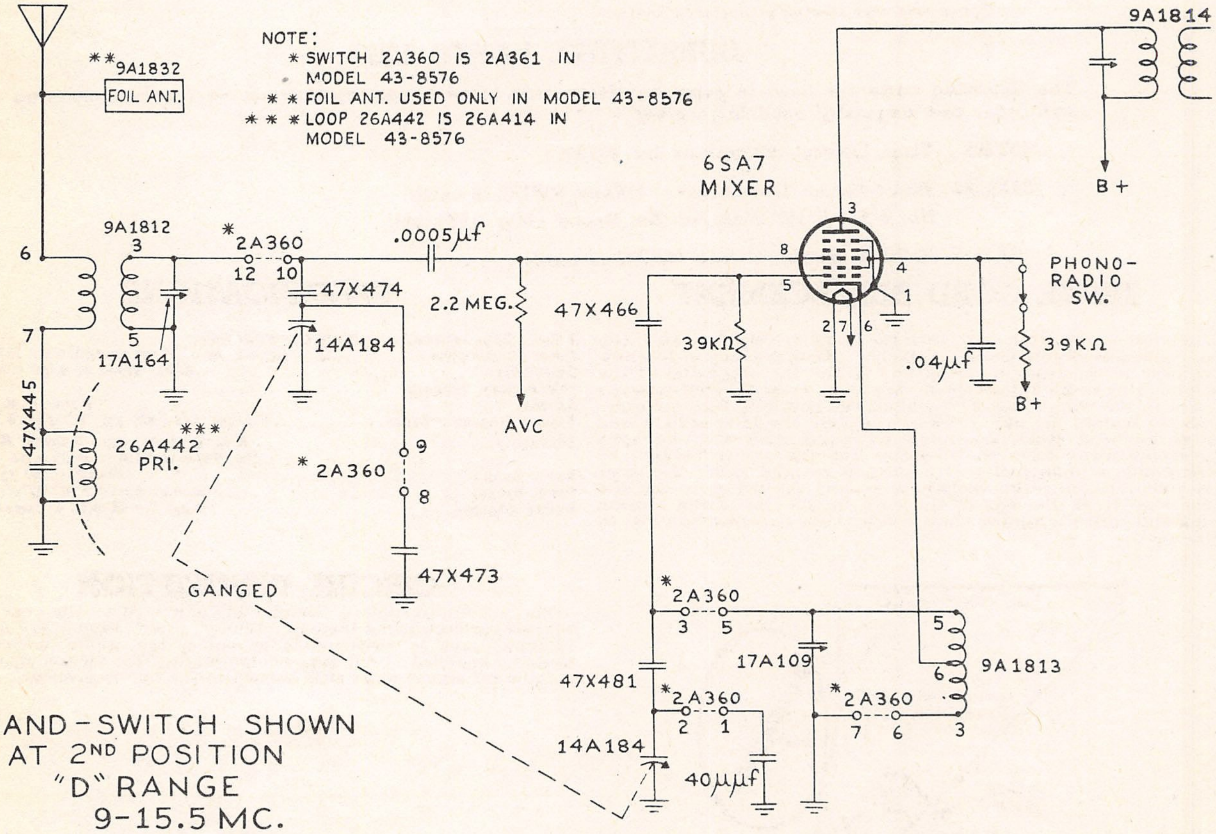
**MODELS 43-7601, 43-7601A,**
**43-7601B**
**MODEL 43-7602**
**MODEL 43-8576**

## GAMBLE-SKOGMO INC.


NOTE:
* SWITCH 2A360 IS 2A361 IN MODEL 43-8576
** FOIL ANT USED ONLY IN MODEL 43-8576
*** LOOP 26A442 IS 26A414 IN MODEL 43-8576

BAND-SWITCH SHOWN
AT 1ST POSITION
"B" RANGE
540-1600 KC.

**9A1832
FOIL ANT
6
9A1812
PRI.
7
***
26A442
47X445
17A235
*2A360
11 9 10
14A184
.0005µf
2.2 MEG.
AVC
47X466
39KΩ
6SA7
MIXER
3
8
5
4
1
2 7 6
.04µf
PHONO-RADIO SW.
39KΩ
B+
9A1814
B+
5
6
5
2A360
6
*
17A109
9A1813
3
3
2A360*
2
4
4
17A109
17A155
1
2
14A184
GANGED

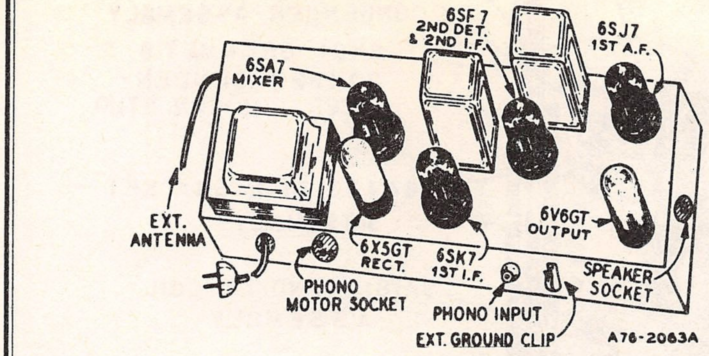

NOTE:
* SWITCH 2A360 IS 2A361 IN MODEL 43-8576
** FOIL ANT. USED ONLY IN MODEL 43-8576
*** LOOP 26A442 IS 26A414 IN MODEL 43-8576

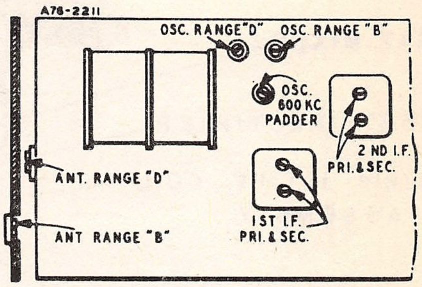
BAND-SWITCH SHOWN
AT 2ND POSITION
"D" RANGE
9-15.5 MC.

**9A1832
FOIL ANT.
9A1812
3
6
7
5
17A164
47X445
***
26A442
PRI.
*2A360
12 10
47X474
14A184
*2A360
9
8
47X473
.0005µf
2.2 MEG.
AVC
47X466
39KΩ
6SA7
MIXER
3
8
5
4
1
2 7 6
.04µf
PHONO-RADIO SW.
39KΩ
B+
9A1814
B+
*2A360
3 5
17A109
5
9A1813
6
3
47X481
*2A360
2 1
*2A360
7 6
14A184
40µµf
GANGED

GAMBLE-SKOGMO INC.

**MODELS 43-7601,43-7601A,**
**43-7601B**
**MODEL 43-7602**


6SF7
2ND DET.
& 2ND I.F.
6SJ7
1ST A.F.
6SA7
MIXER
EXT.
ANTENNA
6X5GT
RECT.
6SK7
1ST I.F.
6V6GT
OUTPUT
PHONO
MOTOR SOCKET
PHONO INPUT
EXT. GROUND CLIP
SPEAKER
SOCKET
A76-2063A


A76-2211
OSC. RANGE "D"
OSC. RANGE "B"
OSC.
600 KC
PADDER
2 ND I.F.
PRI.& SEC.
ANT. RANGE "D"
ANT RANGE "B"
1ST I.F.
PRI.& SEC.

# ALIGNMENT PROCEDURE

Volume Control—Maximum all adjustments.

Connect radio chassis to ground post of signal generator with a short heavy lead.

Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

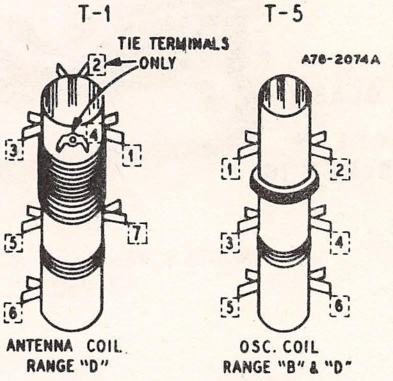
Output Indicating Meter—Non-metallic screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

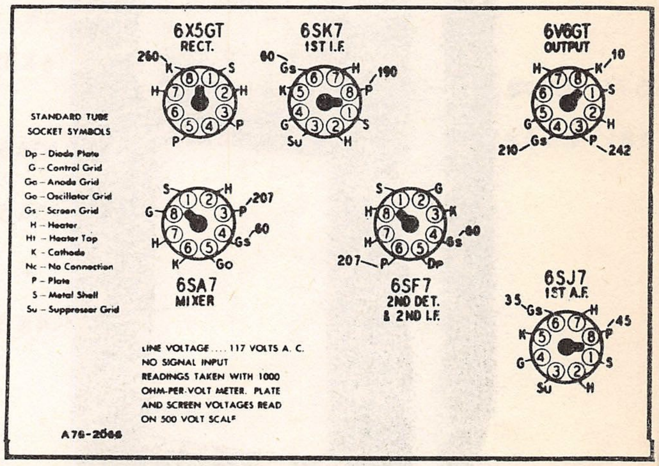
| | SIGNAL GENERATOR | | | BAND | | |
|---|---|---|---|---|---|---|
| | FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | SWITCH SETTING | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM |
| I. F. | 455 Kc | Grid of 6SA7 Pin 8 | .1 mf. | B Range | Turn Rotor to Full Open | 2nd I.F. (Pri.) and (Sec.)<br>1st I.F. (Pri.) and (Sec.) |
| RANGE B | 1,620 Kc. | Antenna Lead | 100 mmf | B Range | Turn Rotor to Full Open | Oscillator Range B |
| | 1,400 Kc. | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output Set Pointer to 1,400 Kc. (See Note A) | Antenna Range B |
| | 600 Kc. | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output | Oscillator (600 Kc. Padder) Rock Rotor See Note B |
| | Repeat above steps at 1,620 and 600 Kc. until readjusting the oscillator. Range B Trimmer causes no further improvement of output. | | | | | |
| RANGE D | 15,600 Kc. | Antenna Lead | 400 ohm | D Range | Turn Rotor to Full Open | Oscillator Range D |
| | 14,000 Kc. | Antenna Lead | 400 ohm | D Range | Tune Rotor to Max. Output | Antenna Range D<br>Rock Rotor—See Note B |
| LOOP RANGE B | Reassemble chassis in cabinet. | | | | | |
| | 1,400 Kc. | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output | Antenna Range B |

NOTE A—Set pointer at the 1,400 KC. mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn Rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.


T-1
T-5
TIE TERMINALS
2 ONLY
A76-2074A
3
4
1
5
7
6
1
2
3
4
5
6
ANTENNA COIL
RANGE "D"
OSC. COIL
RANGE "B" & "D"

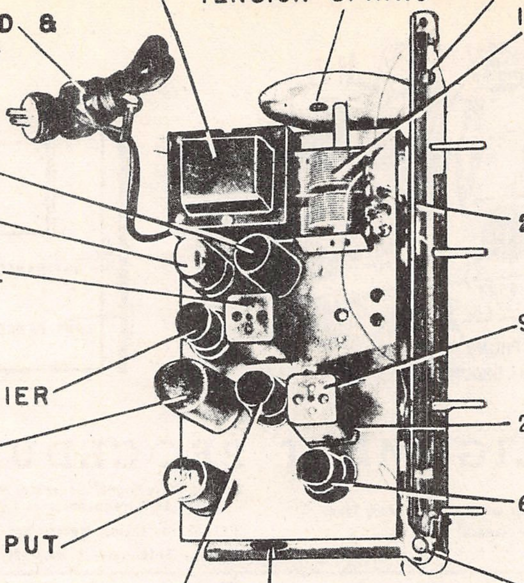
COIL TERMINALS


6X5GT
RECT.
260
K
S
H
H
P
P
6SK7
1ST I.F.
60
Gs
H
190
P
K
G
S
Su
H
6V6GT
OUTPUT
H
K
10
S
G
H
210
Gs
P
242
STANDARD TUBE
SOCKET SYMBOLS
Dp – Diode Plate
G – Control Grid
Ga – Anode Grid
Go – Oscillator Grid
Gs – Screen Grid
H – Heater
Ht – Heater Tap
K – Cathode
Nc – No Connection
P – Plate
S – Metal Shell
Su – Suppressor Grid
S
H
207
P
G
H
Gs
60
K
Go
6SA7
MIXER
S
G
H
K
H
Gs
60
207
P
Dp
6SF7
2ND DET.
& 2ND I.F.
6SJ7
1ST A.F.
35
Gs
H
45
P
K
G
S
Su
H
LINE VOLTAGE .... 117 VOLTS A. C.
NO SIGNAL INPUT
READINGS TAKEN WITH 1000
OHM-PER-VOLT METER. PLATE
AND SCREEN VOLTAGES READ
ON 500 VOLT SCALE
A76-2066

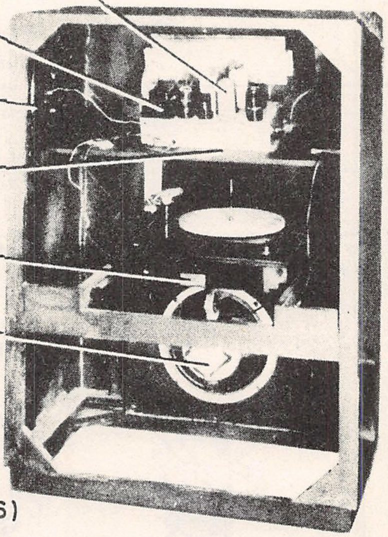
## CIRCUIT CHANGES

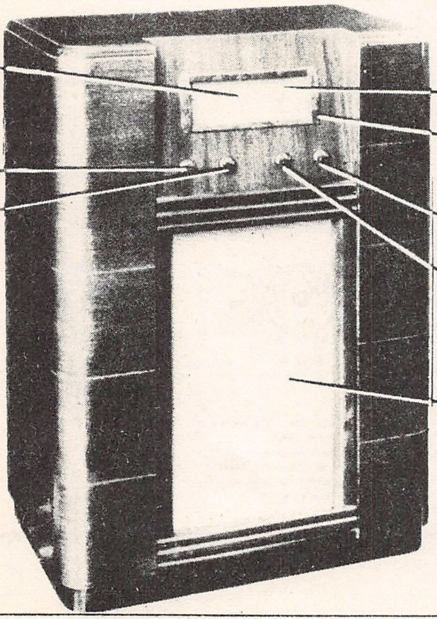
Issue A chassis differ from the original production by the use of a 004 mf 600 volt tubular capacitor connected between the plate and cathode of the output tube instead of the .004 mf 400 volt tubular capacitor originally connected across the primary of the output transformer.

Issue B chassis differ from issue A chassis by the addition of a .2 mf 400 volt tubular capacitor connected from B — to chassis ground as an R-F filter.


53X282 POWER TRANSFORMER
28-113 TENSION SPRING
8X93 RUBBER BUMPER
14A184 GANG CONDENSER ASSEMBLY
6X21 GROMMETS
20X329 CONDENSER CUSHION STUD
13X328 LINE CORD & PLUG ASSEMBLY
6SA7 MIXER
6X5GT RECTIFIER
26A443 DIAL BRACKET ASSEMBLY
9A1814 1ST I.F. COIL ASSEMBLY
9A1815 2ND I.F. COIL ASSEMBLY
6SK7 1ST I.F. AMPLIFIER
28X265 GROUND PLATE
45X346 3 SECTION ELECTROLYTIC
6SJ7 1ST A.F. AMPLIFIER
6V6GT POWER OUTPUT
7A199 PILOT LIGHT SOCKET ASS'Y.
3A303 SPEAKER SOCKET
6SF7 2ND I.F. AMPLIFIER & 2ND DETECTOR

MODELS 43-7601, 43-7601A,
43-7601B; 43-7602

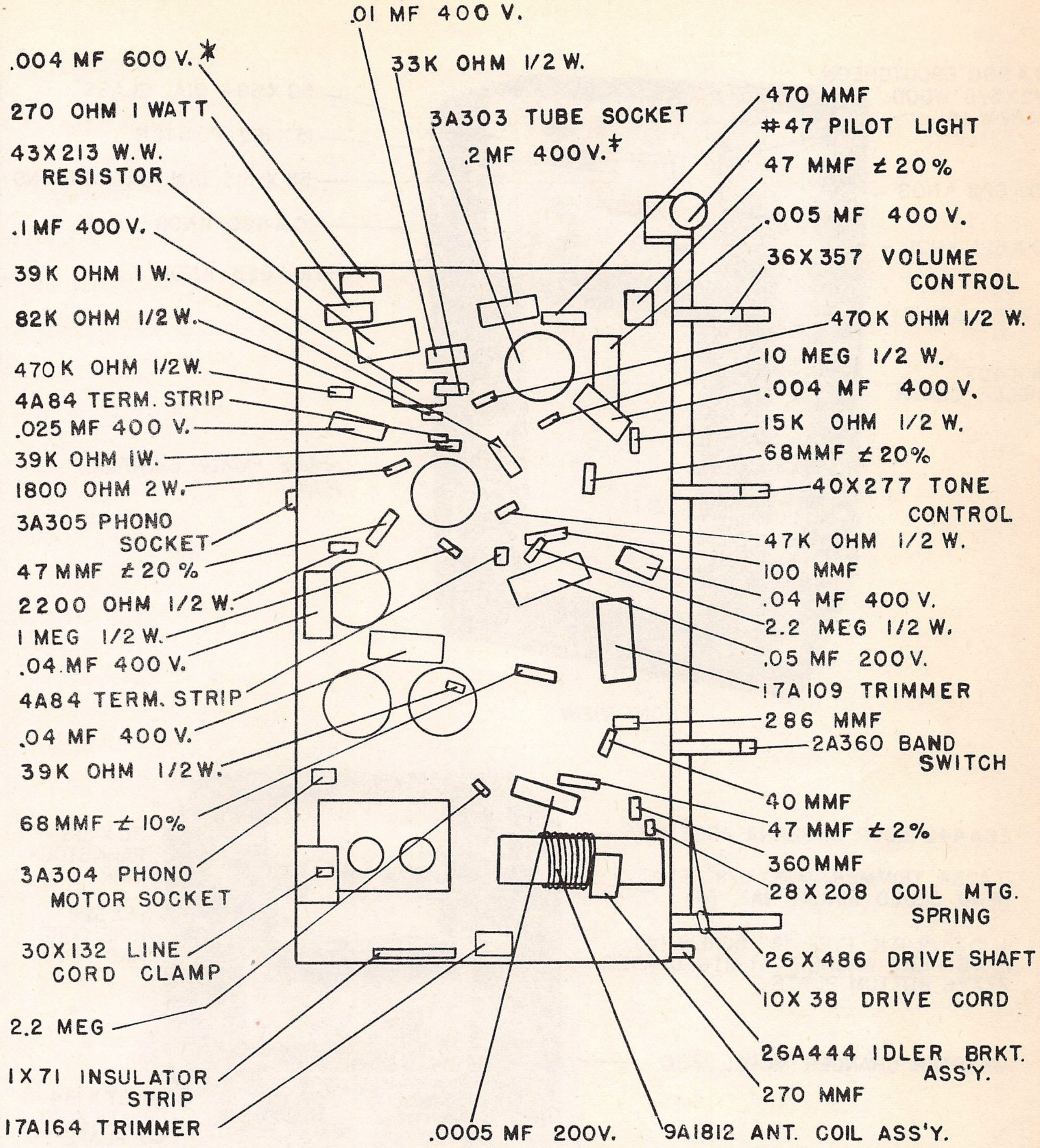

C.45X346 3 SECTION ELECTROLYTIC
53X282 POWER TRANSFORMER
26A442 LOOP ANTENNA
27X56 BOTTOM PLATE
57X184 LOCKING PLATE
12A436 8" PM SPEAKER


5X163 POINTER
58X616 DIAL GLASS
4X353 ESCUTCHEON
2 X 3 8" SCREW (6)
10A579 KNOB
10A581 KNOB
10A578 KNOB
10A583 KNOB
14X371 GRILLE CLOTH

MODELS 43-7601, 43-7601A,
43-7601B

GAMBLE-SKOGMO INC.

MODELS 43-7601, 43-7601A,
43-7601B
MODEL 43-7602


.01 MF 400 V.
33K OHM 1/2 W.
3A303 TUBE SOCKET
.2 MF 400V.‡
.004 MF 600 V.*
270 OHM 1 WATT
43X213 W.W. RESISTOR
.1 MF 400 V.
39K OHM 1 W.
82K OHM 1/2 W.
470K OHM 1/2 W.
4A84 TERM. STRIP
.025 MF 400 V.
39K OHM 1W.
1800 OHM 2 W.
3A305 PHONO SOCKET
47 MMF ± 20%
2200 OHM 1/2 W.
1 MEG 1/2 W.
.04 MF 400 V.
4A84 TERM. STRIP
.04 MF 400 V.
39K OHM 1/2 W.
68 MMF ± 10%
3A304 PHONO MOTOR SOCKET
30X132 LINE CORD CLAMP
2.2 MEG
1X71 INSULATOR STRIP
17A164 TRIMMER
.0005 MF 200V.
9A1812 ANT. COIL ASS'Y.
470 MMF
#47 PILOT LIGHT
47 MMF ± 20%
.005 MF 400 V.
36X357 VOLUME CONTROL
470K OHM 1/2 W.
10 MEG 1/2 W.
.004 MF 400 V.
15K OHM 1/2 W.
68 MMF ± 20%
40X277 TONE CONTROL
47K OHM 1/2 W.
100 MMF
.04 MF 400 V.
2.2 MEG 1/2 W.
.05 MF 200 V.
17A109 TRIMMER
286 MMF
2A360 BAND SWITCH
40 MMF
47 MMF ± 2%
360 MMF
28X208 COIL MTG. SPRING
26X486 DRIVE SHAFT
10X38 DRIVE CORD
26A444 IDLER BRKT. ASS'Y.
270 MMF

‡ USED STARTING ISSUE "B" CHASSIS

* REPLACES .004 MF 400V. STARTING ISSUE "A" CHASSIS

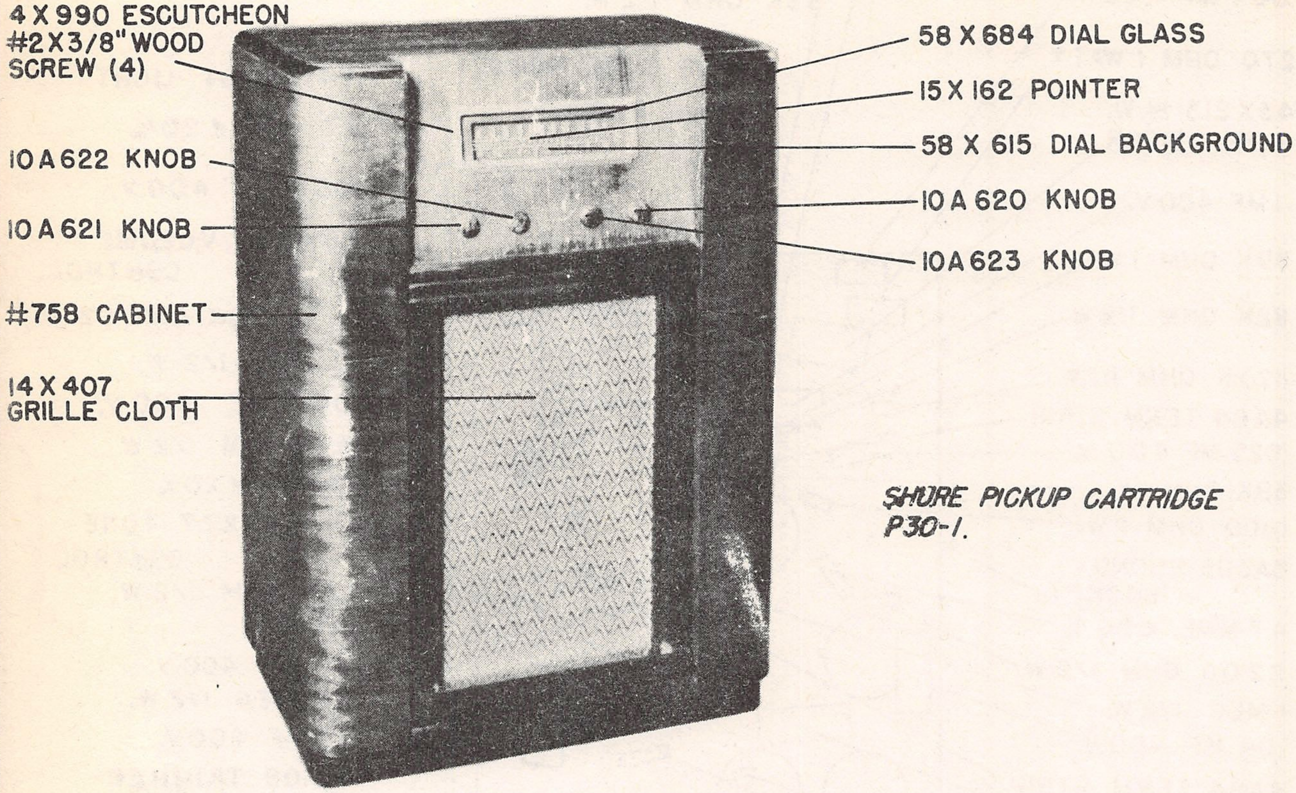
## SUBSTITUTE PARTS LIST

The following parts are used in some receivers only. Check part number on part before ordering and order part originally used in receiver.

| | |
|---|---|
| 40X282 | Tone Control (Substitute for 40X277) |
| 25X1539 | Radio-Phono. Switch Lever (When 40X282 is used)<br>No. 6-32 x 5/16" Slab Hd. Set Screw (Mtg. 25X1539) |
| 2A161 | D.P.D.T. Switch (When 40X282 is used) |

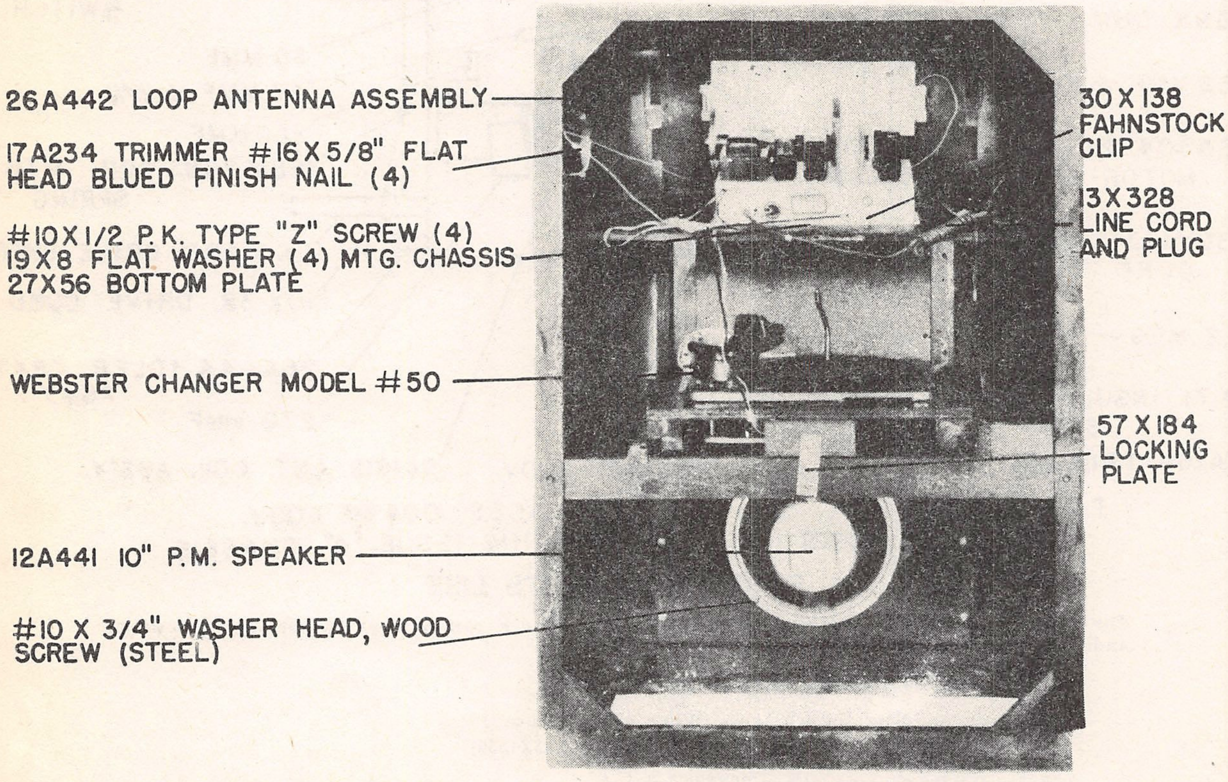
**MODEL 43-7602**

## GAMBLE-SKOGMO INC.


4 X 990 ESCUTCHEON
#2 X 3/8" WOOD SCREW (4)
10 A 622 KNOB
10 A 621 KNOB
#758 CABINET
14 X 407 GRILLE CLOTH
58 X 684 DIAL GLASS
15 X 162 POINTER
58 X 615 DIAL BACKGROUND
10 A 620 KNOB
10 A 623 KNOB

FRONT VIEW

*SHURE PICKUP CARTRIDGE P30-1.*


26A442 LOOP ANTENNA ASSEMBLY
17A234 TRIMMER #16 X 5/8" FLAT HEAD BLUED FINISH NAIL (4)
#10 X 1/2 P.K. TYPE "Z" SCREW (4) 19 X 8 FLAT WASHER (4) MTG. CHASSIS 27X56 BOTTOM PLATE
WEBSTER CHANGER MODEL #50
12A441 10" P.M. SPEAKER
#10 X 3/4" WASHER HEAD, WOOD SCREW (STEEL)
30 X 138 FAHNSTOCK CLIP
13 X 328 LINE CORD AND PLUG
57 X 184 LOCKING PLATE

REAR VIEW

**MODEL 43-8160**

## GAMBLE-SKOGMO INC.

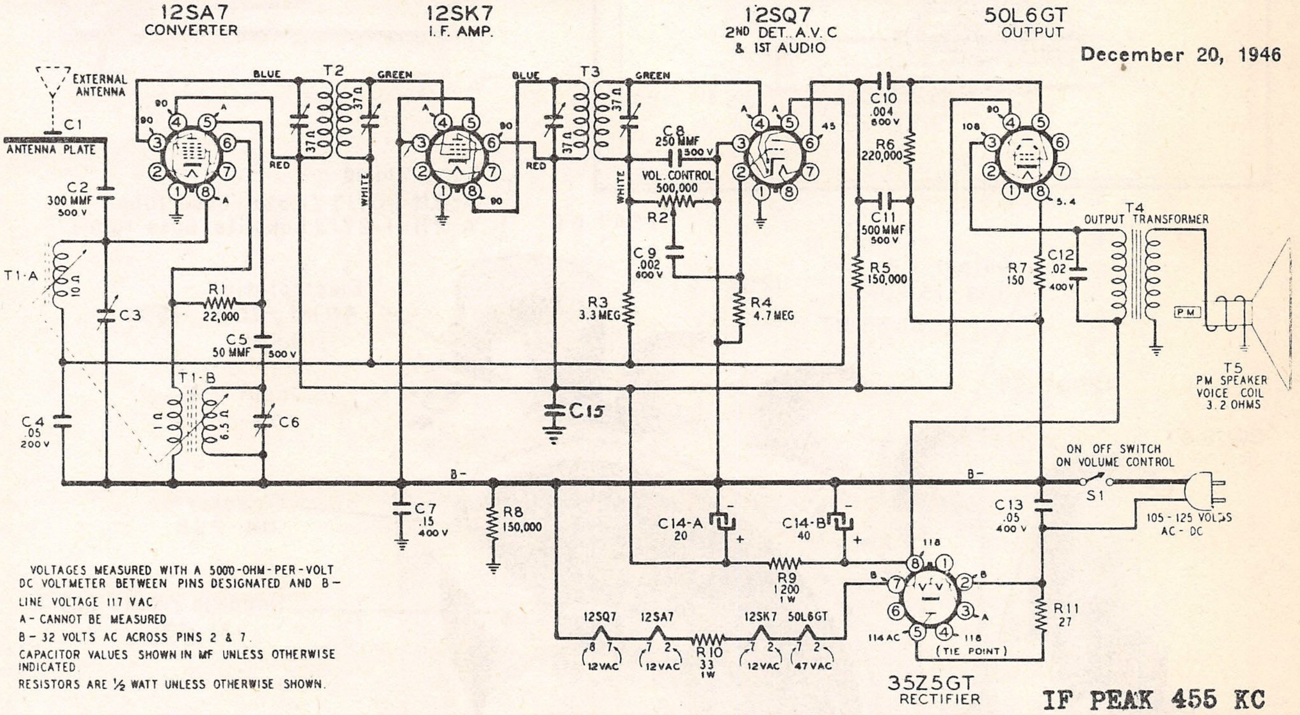
# ALIGNMENT PROCEDURE

Output meter across 3.2-ohm output load.
Volume control at maximum for all adjustments.

Align for maximum output.
Reduce input as needed to keep output near 0.4 volts.

| FREQUENCY | SIGNAL GENERATOR | | GROUND CONNECTION | TUNER SETTING | ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown) |
|---|---|---|---|---|---|
| | COUPLING CAPACITOR | CONNECTION TO RADIO | | | |
| 455 kc | .1 mf | Metal-antenna plate | 12SQ7 Pin 3 (B—) | Iron cores all the way out | Trimmers on output and input I.F. cans |
| 1720 kc | .1 mf | Metal antenna plate | 12SQ7 Pin 3 | Iron cores all the way out | Oscillator trimmer C6 |
| 1720 kc | 200 mmf | External antenna clip | 12SQ7 Pin 3 | Iron cores all the way out | Antenna trimmer C3 |
| 1400 kc | 200 mmf | External antenna clip | 12SQ7 Pin 3 | Turn dial to 1400 kc | Adjust position of antenna coil (see coil assembly view) |
| 1720 kc | 200 mmf | External antenna clip | 12SQ7 Pin 3 | Turn dial to 1720 kc | Antenna trimmer C3* |

*After the antenna coil has been tracked at 1400 kc, it is necessary to check the antenna trimmer C3 again at 1720 kc. If no appreciable change in trimmer adjustment is necessary, the coil is in track. If the trimmer requires considerable change, the position of the antenna coil at 1400 kc must be readjusted. These two adjustments should be made several times, until no trimmer adjustment is required at 1720 kc.



12SA7
CONVERTER
12SK7
I. F. AMP.
12SQ7
2ND DET. A.V.C & 1ST AUDIO
50L6GT
OUTPUT
EXTERNAL ANTENNA
C1
ANTENNA PLATE
C2
300 MMF
500 V
T1-A
10Ω
C3
R1
22,000
C5
50 MMF
500 V
T1-B
1Ω
6.5Ω
C6
C4
.05
200 V
BLUE
T2
GREEN
RED
WHITE
37Ω
T3
C8
250 MMF
500 V
VOL. CONTROL
500,000
R2
C9
.002
600 V
R3
3.3 MEG
R4
4.7 MEG
C15
C10
.004
600 V
R6
220,000
C11
500 MMF
500 V
R5
150,000
R7
150
C12
.02
400 V
T4
OUTPUT TRANSFORMER
PM
T5
PM SPEAKER
VOICE COIL
3.2 OHMS
ON OFF SWITCH
ON VOLUME CONTROL
S1
B-
C13
.05
400 V
105 - 125 VOLTS
AC - DC
C7
.15
400 V
R8
150,000
C14-A
20
C14-B
40
R9
1200
1 W
R11
27
12SQ7
12SA7
12SK7
50L6GT
R10
33
1W
12VAC
12VAC
12VAC
47VAC
114 AC
118
(TIE POINT)
90
45
108
5.4
35Z5GT
RECTIFIER

December 20, 1946

VOLTAGES MEASURED WITH A 5000-OHM-PER-VOLT DC VOLTMETER BETWEEN PINS DESIGNATED AND B—
LINE VOLTAGE 117 VAC
A - CANNOT BE MEASURED
B - 32 VOLTS AC ACROSS PINS 2 & 7.
CAPACITOR VALUES SHOWN IN MF UNLESS OTHERWISE INDICATED
RESISTORS ARE ½ WATT UNLESS OTHERWISE SHOWN.

**IF PEAK 455 KC**

## SCHEMATIC DIAGRAM LEGEND

| | |
|---|---|
| C 1 | Antenna plate, walnut color |
| C 1 | Antenna plate, ivory color |
| C 2 | 300 mmf. 20% mica |
| C 3 | Dual trimmer 74-136 mmf. (antenna) |
| C 4 | .05 mf. 200 v. 25% |
| C 5 | .05 mf. 400 v. 25% |
| C 6 | 95-175 mmf. (oscillator) |
| C 7 | .15 mf. 400 v. 25% |
| C 8 | 250 mmf. 20% mica |
| C 9 | .002 mf. 600 v. 25% |
| C10 | .004 mf. 600 v. 25% |
| C11 | 500 mmf. 20% mica |
| C12 | .02 mf. 400 v. 25% |
| C13 | .05 mf. 400 v. 25% |
| C14-A, B | Electrolytic 40 mf. x 150 v.<br>20 mf. x 150 v. for 60 cycles<br>Electrolytic 60 mf. x 150 v.<br>40 mf. x 150 v. for 25 cycles |
| C15 | .01 mf. 400 v. 25% |

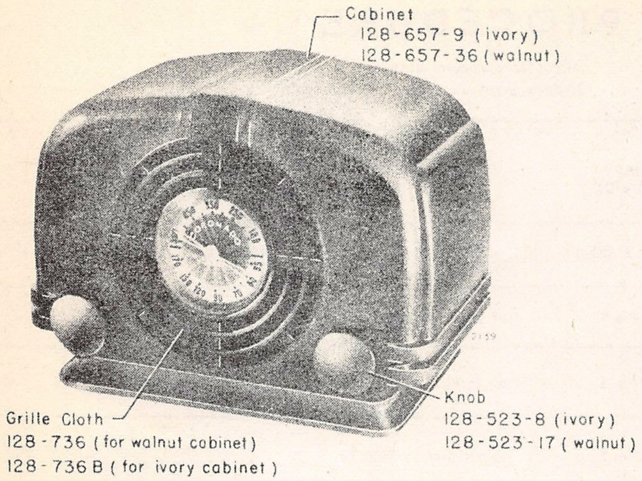
### RESISTORS

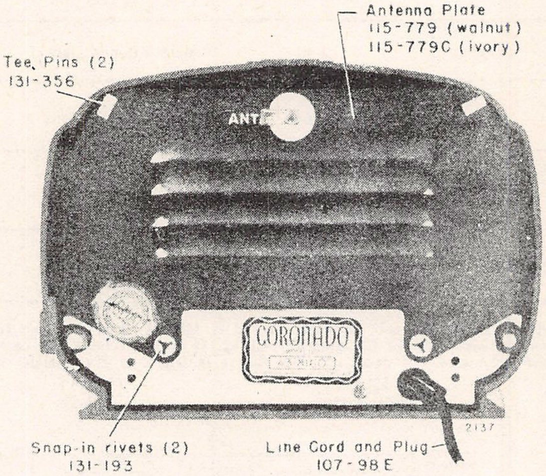
| | |
|---|---|
| R 1 | 22,000 ohms ½ w. 10% |
| R 2 | Volume control, 500,000 ohms, on-off switch |
| R 3 | 3.3 megohms ½ w. 20% |
| R 4 | 4.7 megohms ½ w. 20% |
| R 5 | 150,000 ohms ½ w. 20% |
| R 6 | 220,000 ohms ½ w. 20% |
| R 7 | 150 ohms ½ w. 10% |
| R 8 | 150,000 ohms ½ w. 20% |
| R 9 | 1,200 ohms 1 w. 10% |
| R10 | 33 ohms 1 w. 10% |
| R11 | 27 ohms ½ w. 10% |

### MISCELLANEOUS

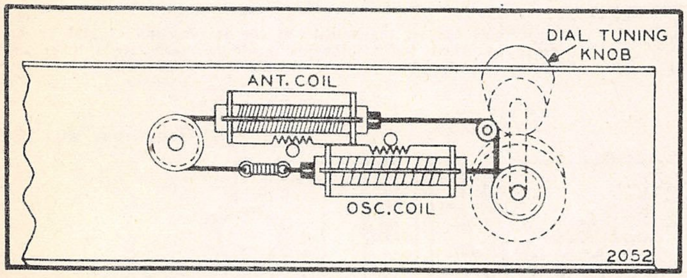
| | |
|---|---|
| T1A, B | Permeability tuning unit complete, including antenna and oscillator coils |
| T2 | Input I.F. coil complete in can. Range of trimmers: 39-73 mmf. each |
| T3 | Output I.F. coil complete in can. Range of trimmers: 39-73 mmf. each |
| T4 | Output transformer |
| T5 | Speaker 4 inch P.M. voice coil impedance, 3.2 ohms |

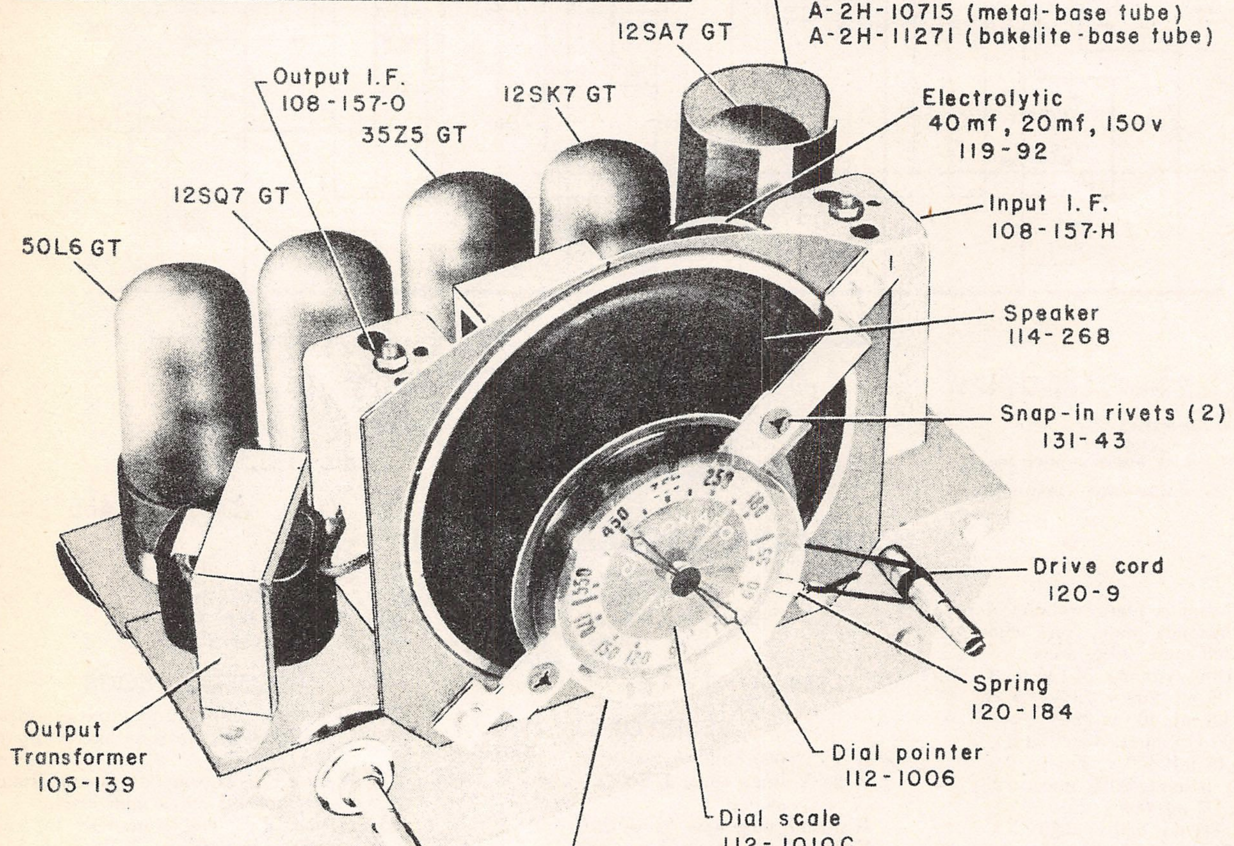
## GAMBLE-SKOGMO INC.

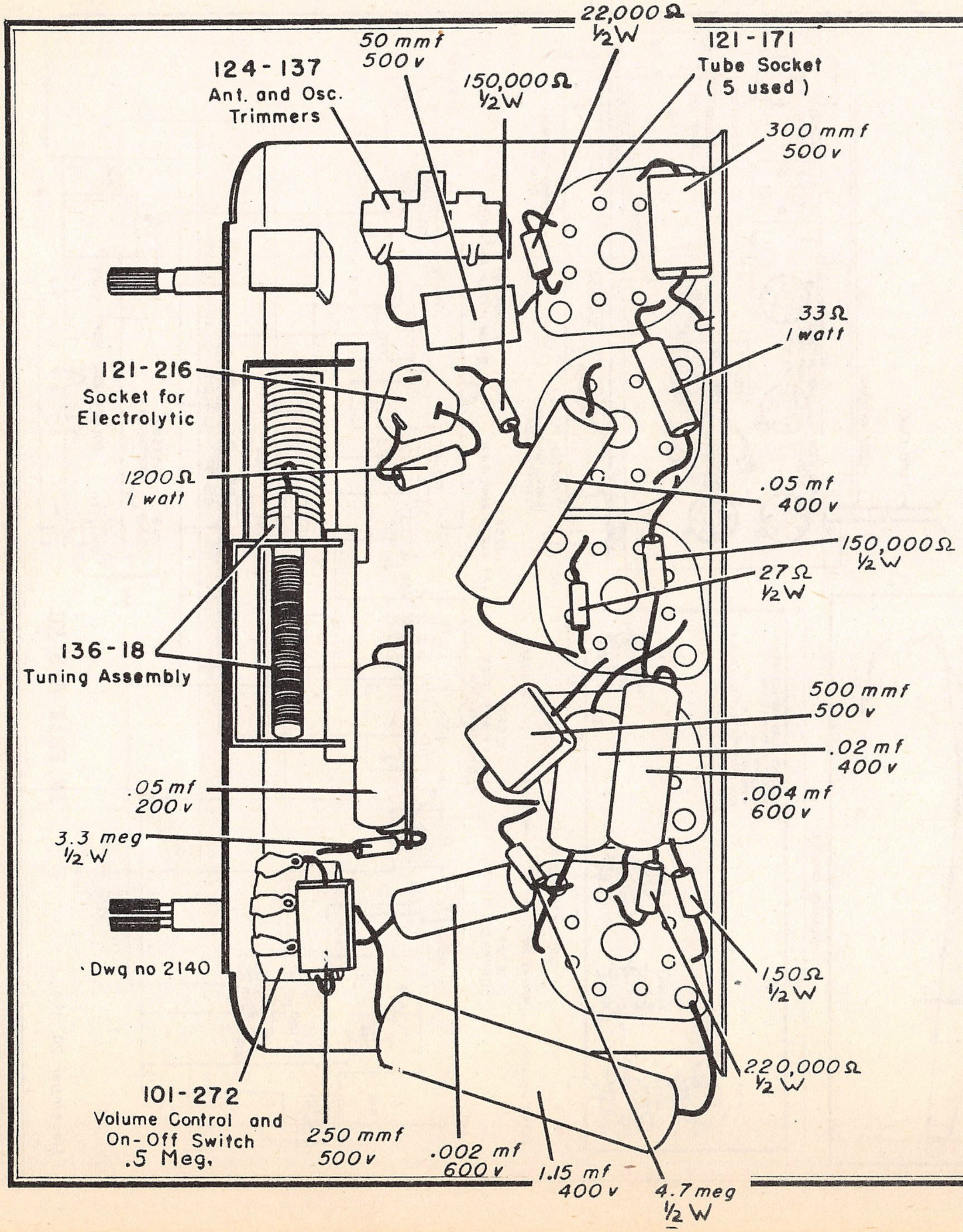

Cabinet
128-657-9 (ivory)
128-657-36 (walnut)
2139
Grille Cloth
128-736 (for walnut cabinet)
128-736 B (for ivory cabinet)
Knob
128-523-8 (ivory)
128-523-17 (walnut)


Antenna Plate
115-779 (walnut)
115-779C (ivory)
Tee, Pins (2)
131-356
ANT
CORONADO
2137
Snap-in rivets (2)
131-193
Line Cord and Plug
107-98E

## SLUG TUNER


DIAL TUNING KNOB
ANT. COIL
OSC. COIL
2052


Tube Shield
A-2H-10715 (metal-base tube)
A-2H-11271 (bakelite-base tube)
12SA7 GT
Output I.F.
108-157-O
12SK7 GT
35Z5 GT
Electrolytic
40 mf, 20 mf, 150 v
119-92
12SQ7 GT
Input I.F.
108-157-H
50L6 GT
Speaker
114-268
Snap-in rivets (2)
131-43
Drive cord
120-9
Spring
120-184
Output Transformer
105-139
Dial pointer
112-1006
Dial scale
112-1010C
2138
Crystal
112-1008

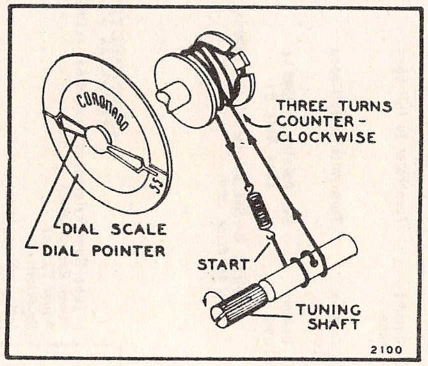

22,000Ω
½W
121-171
Tube Socket
( 5 used )
50 mmf
500 v
150,000Ω
½W
124-137
Ant. and Osc.
Trimmers
300 mmf
500 v
33Ω
1 watt
121-216
Socket for
Electrolytic
1200Ω
1 watt
.05 mf
400 v
150,000Ω
½W
27Ω
½W
136-18
Tuning Assembly
500 mmf
500 v
.02 mf
400 v
.004 mf
600 v
.05 mf
200 v
3.3 meg
½W
Dwg no 2140
150Ω
½W
220,000Ω
½W
101-272
Volume Control and
On-Off Switch
.5 Meg.
250 mmf
500 v
.002 mf
600 v
1.15 mf
400 v
4.7 meg
½W

## SPECIFICATIONS

5 Tube Superheterodyne, including rectifier tube

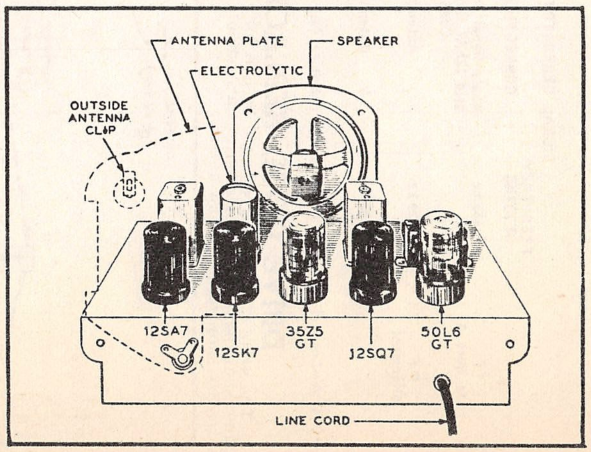
| | |
|---|---|
| Power Consumption | 28 w. |
| Power Output | 0.80 w. undistorted, 1.5 w. maximum |
| Selectivity | 71 kc. broad at 1,000 times signal at 1,000 kc. |
| Antenna | Self-contained plate antenna.<br>Also provision for connection of external antenna |
| Intermediate Frequency | 455 kc. |
| Speaker | 4 inch P.M., voice coil impedance, 3.2 ohms |
| Tuning | Two permeability-tuned circuits |
| Sensitivity | 40 mv. avg. for 50 mw. output |
| Frequency Range | 540 to 1,720 kc. |
| Power Supply | 105 to 125 v., A.C.-D.C., 50-60 cycle |

## DRIVE CORD REPLACEMENT


CORONADO
THREE TURNS
COUNTER-
CLOCKWISE
DIAL SCALE
DIAL POINTER
START
TUNING
SHAFT
2100

1. Turn tuning shaft counter-clockwise.
2. Re-string as shown.
3. Adjust pointer so that the band is covered properly when turning the tuning shaft back and forth.

## CHASSIS VIEW


ANTENNA PLATE
SPEAKER
ELECTROLYTIC
OUTSIDE
ANTENNA
CLIP
12SA7
12SK7
35Z5
GT
12SQ7
50L6
GT
LINE CORD

MODEL 43-8437

GAMBLE-SKOGMO INC.

# ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following enuipment is required for aligning.

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output indicating Meter—Non Metallic Screwdriver.

Dummy Antennas—I.R.E.

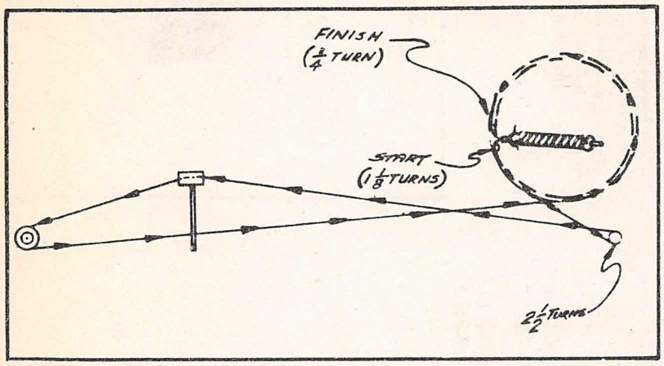
| | SIGNAL GENERATOR | | | | |
|---|---|---|---|---|---|
| | FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | CONDENSER SETTING | ADJUST TRIMMERS |
| I.F.<br>(See Note A) | 455 kc | Apply signal to the converter grid 12SA7 throunh a .05MFD Condenser | I.R.E. Dummy Antenna | Turn rotor to full open | 2nd I.F. (Pri.) & (Sec.)<br>1st I.F. (Pri.) & (Sec.)<br>Adjust for maximum output |
| R.F. Alignment | 1720 kc | Antenna Lead | I.R.E. Dummy Antenna | Turn rotor to full open | C17B Antenna Trimmer |
| | 1500 kc | Antenna Lead | I.R.E. Dummy Antenna | Set Pointer to 1500 kc (See Note B) | Tune C17A for maximum output |

NOTE A—Connect an outnut meter across the voice coil.

NOTE B—Set pointer at the 1500KC mark on the dial scale. Attach pointer to drive cord.

## DRIVE CORD REPLACEMENT

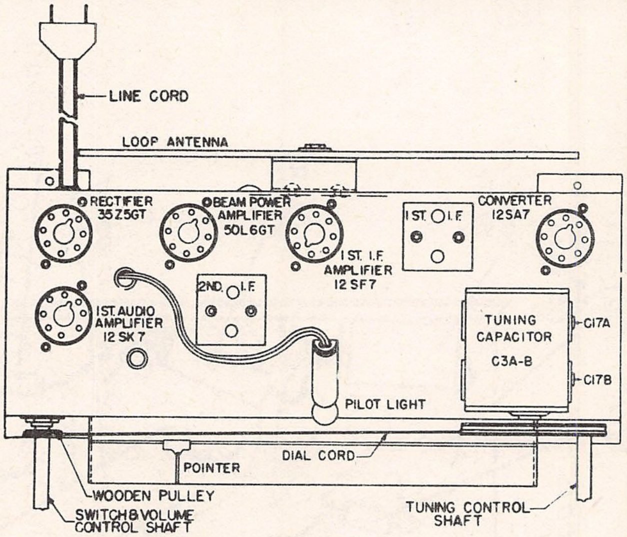
The drive cord can be replaced by carefully following the drawing showing cord replacement. Care should be taken to follow arrows showing start and finish.


FINISH ($\frac{3}{4}$ TURN)
START ($1\frac{1}{8}$ TURNS)
$2\frac{1}{2}$ TURNS

## SPECIFICATIONS

5 Tube Superheterodyne, including rectifier tube

| | |
|---|---|
| Power Consumption | 28 w. (at 117 v. A.C.) |
| Power Output | 1.5 w. maximum 1 w., 10% harmonics |
| Selectivity | 65 kc. broad at 1,000 times signal |
| Intermediate Frequency | 455 kc. |
| Speaker | 5¼ inch P.M. dynamic |
| Tuning Frequency Range | 540 to 1,700 kc. |
| Sensitivity | 85 mv. avg. (for 0.5 w. output with external antenna) |


LINE CORD
LOOP ANTENNA
RECTIFIER 35Z5GT
BEAM POWER AMPLIFIER 50L6GT
1ST. I.F. AMPLIFIER 12SF7
1ST. I.F.
CONVERTER 12SA7
2ND. I.F.
1ST. AUDIO AMPLIFIER 12SK7
TUNING CAPACITOR C3A-B
C17A
C17B
PILOT LIGHT
POINTER
DIAL CORD
WOODEN PULLEY
SWITCH & VOLUME CONTROL SHAFT
TUNING CONTROL SHAFT

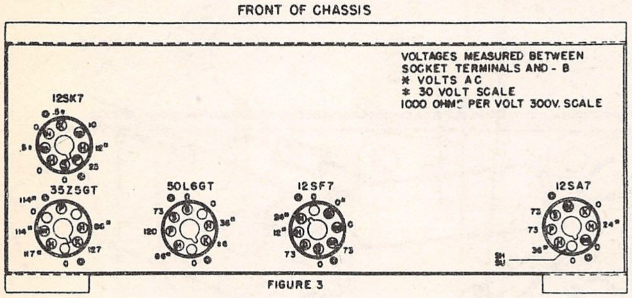
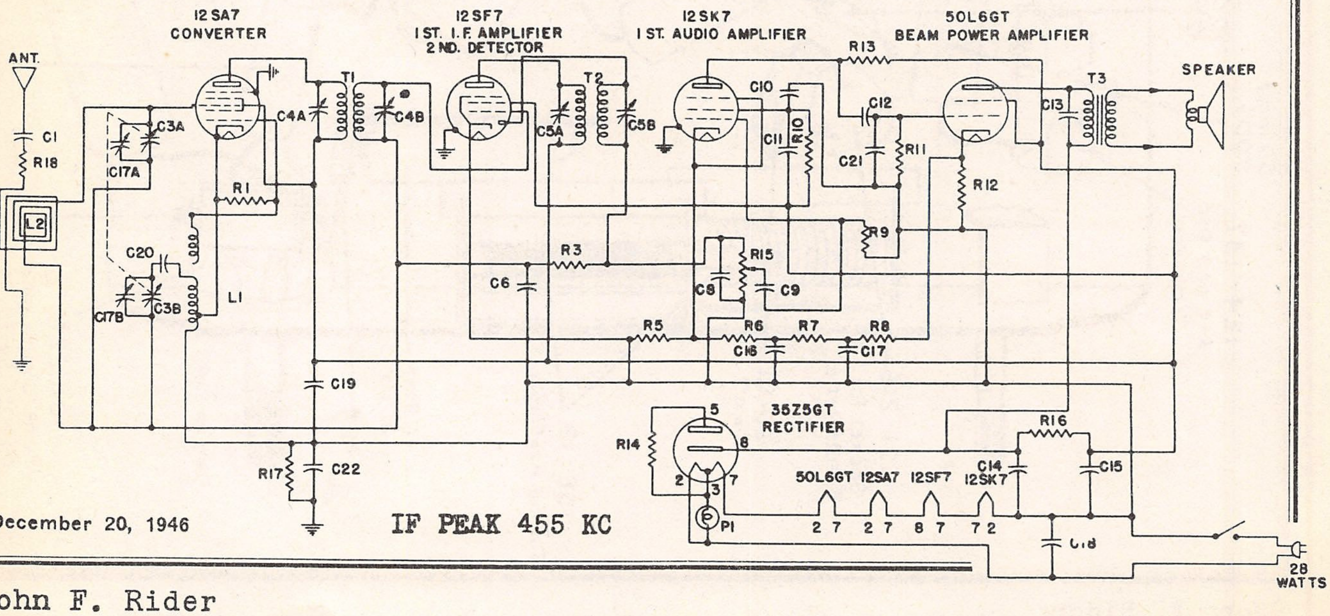

FRONT OF CHASSIS
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND - B
* VOLTS AC
* 30 VOLT SCALE
1000 OHMS PER VOLT 300V. SCALE
12SK7
35Z5GT
50L6GT
12SF7
12SA7

FIGURE 3

BOTTOM VIEW OF CHASSIS

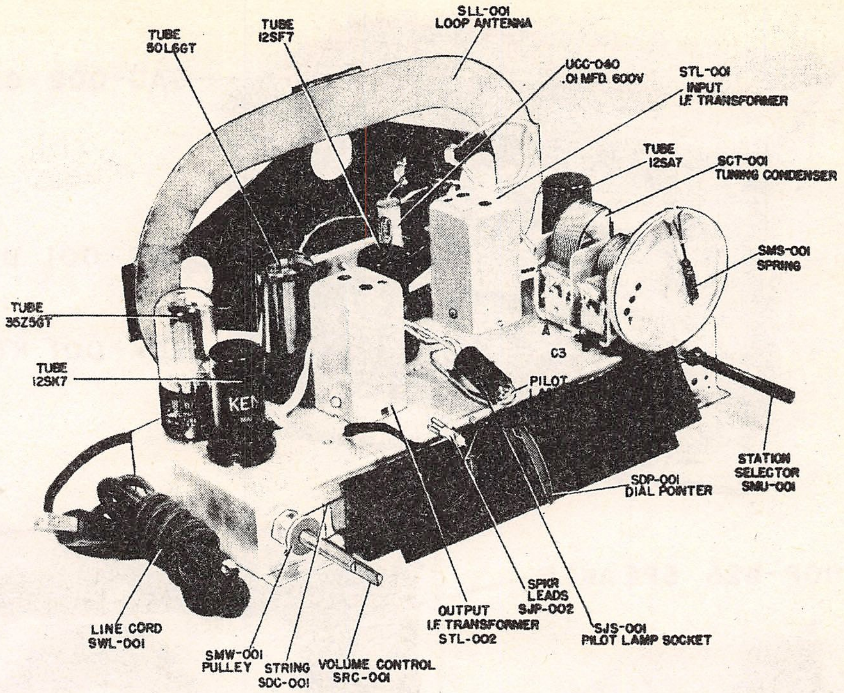
AC LINE VOLTS-117 MAX VOLUME GANG CLOSED NO SIGNAL

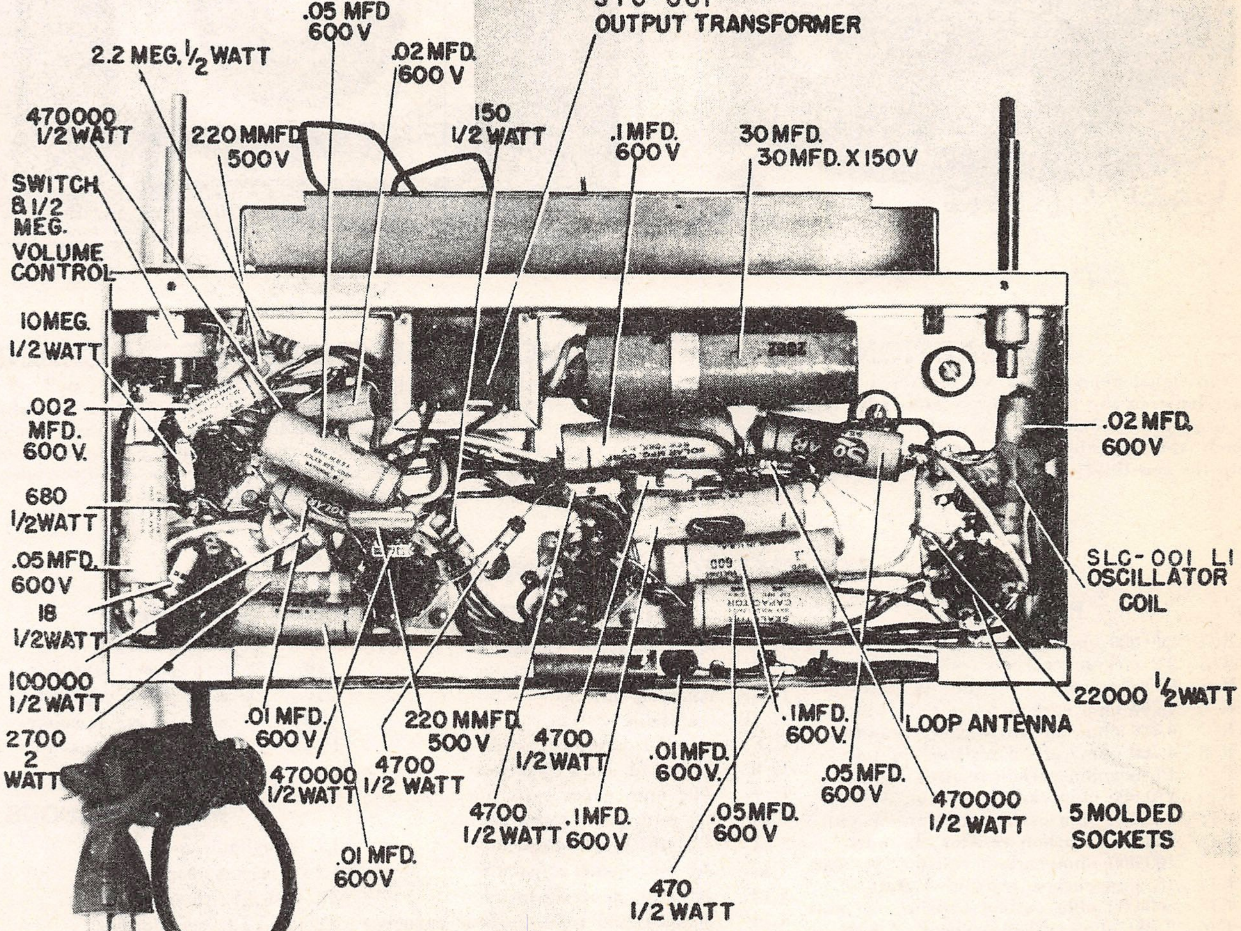

12 SA7 CONVERTER
12 SF7 1 ST. I.F. AMPLIFIER 2 ND. DETECTOR
12 SK7 1 ST. AUDIO AMPLIFIER
50L6GT BEAM POWER AMPLIFIER
SPEAKER
ANT.
C1
R18
L2
C3A
C17A
C4A
T1
C4B
C5A
T2
C5B
C10
C11
R10
C12
C21
R11
R13
T3
C13
R12
R1
R9
C20
C3B
C17B
L1
R3
R15
C6
C8
C9
R5
R6
R7
R8
C16
C17
C19
R17
C22
35Z5GT RECTIFIER
R14
R16
C14
C15
C18
P1
50L6GT 12SA7 12SF7 12SK7
2 7 2 7 8 7 7 2
28 WATTS

December 20, 1946

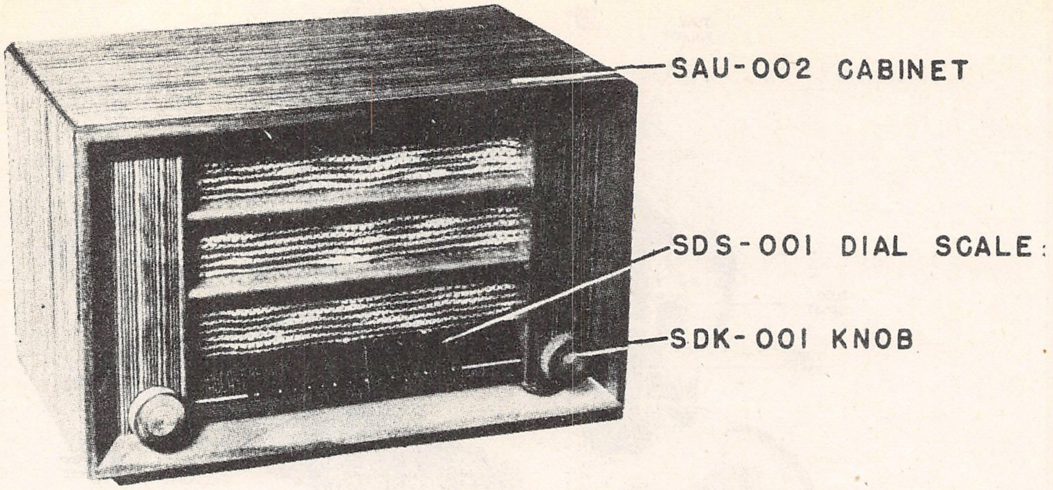
IF PEAK 455 KC

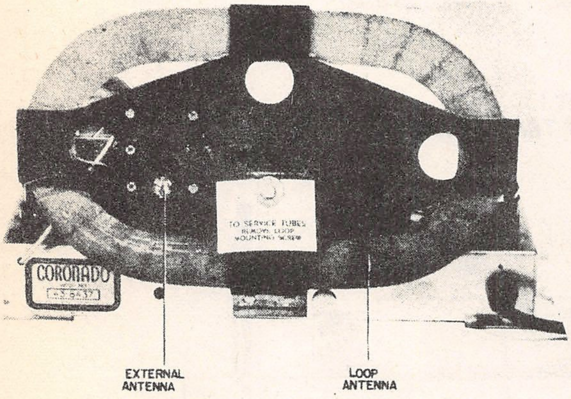
# GAMBLE-SKOGMO INC.

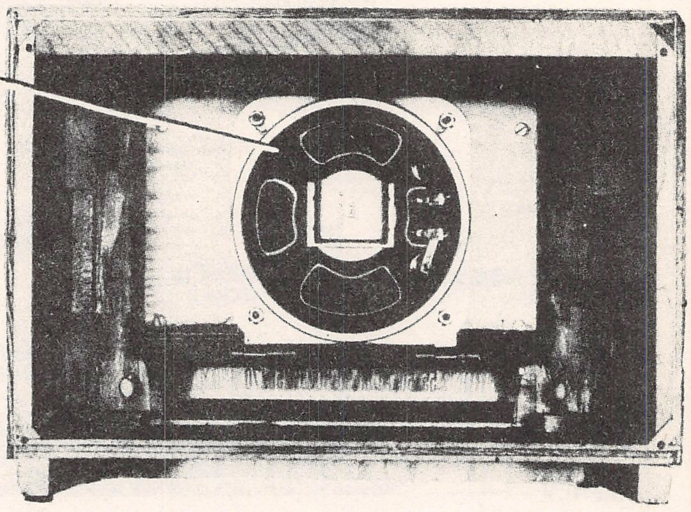

TUBE 50L6GT
TUBE 12SF7
SLL-001 LOOP ANTENNA
UCC-040 .01 MFD. 600V
STL-001 INPUT I.F. TRANSFORMER
TUBE 12SA7
SCT-001 TUNING CONDENSER
SMS-001 SPRING
TUBE 35Z5GT
TUBE 12SK7
C3
PILOT LAMP
STATION SELECTOR SMU-001
SDP-001 DIAL POINTER
SPKR LEADS SJP-002
OUTPUT I.F. TRANSFORMER STL-002
SJS-001 PILOT LAMP SOCKET
LINE CORD SWL-001
SMW-001 PULLEY
STRING SDC-001
VOLUME CONTROL SRC-001


.05 MFD 600 V
STO-001 OUTPUT TRANSFORMER
2.2 MEG. 1/2 WATT
.02 MFD. 600 V
470000 1/2 WATT
220 MMFD. 500 V
150 1/2 WATT
.1 MFD. 600 V
30 MFD. 30 MFD. X 150 V
SWITCH & 1/2 MEG. VOLUME CONTROL
10 MEG. 1/2 WATT
.002 MFD. 600 V.
680 1/2 WATT
.05 MFD. 600 V
18 1/2 WATT
100000 1/2 WATT
2700 2 WATT
.02 MFD. 600 V
SLC-001 LI OSCILLATOR COIL
22000 1/2 WATT
LOOP ANTENNA
5 MOLDED SOCKETS
470000 1/2 WATT
.05 MFD. 600 V
.1 MFD. 600 V.
.01 MFD. 600 V.
.05 MFD. 600 V
470 1/2 WATT
4700 1/2 WATT
.1 MFD. 600 V
4700 1/2 WATT
220 MMFD. 500 V
4700 1/2 WATT
.01 MFD. 600 V
470000 1/2 WATT
.01 MFD. 600 V

# GAMBLE-SKOGMO INC.







## PRECAUTION

If the signal generator is A-C operated, use an isolating transformer between the power supply and radio receiver power input. The use of an isolating capacitor is not recommended, as A-C through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

## REMOVAL OF CHASSIS FROM CABINET

In order to remove the chassis from the cabinet, pull off the two control knobs, remove the four push pins holding the cabinet-back in place, and take out the four chassis mounting bolts from the bottom of the cabinet. When the chassis has been loosened, disconnect the two clips which connect the chassis to the speaker. The chassis can now be removed from the cabinet.

## SCHEMATIC DIAGRAM LEGEND

### RESISTORS

| | |
|---|---|
| R 1 | 220,000 ohm carbon, ½ watt |
| R 3 | 2.2 megohm carbon resistor, ½ watt |
| R 5 | 680 ohm carbon resistor, ½ watt |
| R 6 | 4,700 ohm carbon resistor, ½ watt |
| R 7 | 4,700 ohm carbon resistor, ½ watt |
| R 8 | 4,700 ohm carbon resistor, ½ watt |
| R 9 | 10 megohm carbon resistor, ½ watt |
| R10 | 470,000 ohm carbon resistor, ½ watt |
| R11 | 470,000 ohm carbon resistor, ½ watt |
| R12 | 150 ohm carbon resistor, ½ watt |
| R13 | 100,000 ohm carbon resistor, ½ watt |
| R14 | 18 ohm carbon resistor, 1 watt |
| R15 | 500,000 ohm carbon resistor, ½ watt |
| R16 | 2,700 ohm carbon resistor, 2 watt |
| R17 | 470,000 ohm carbon resistor, ½ watt |
| R18 | 470 ohm carbon resistor, ½ watt |

### CONDENSERS

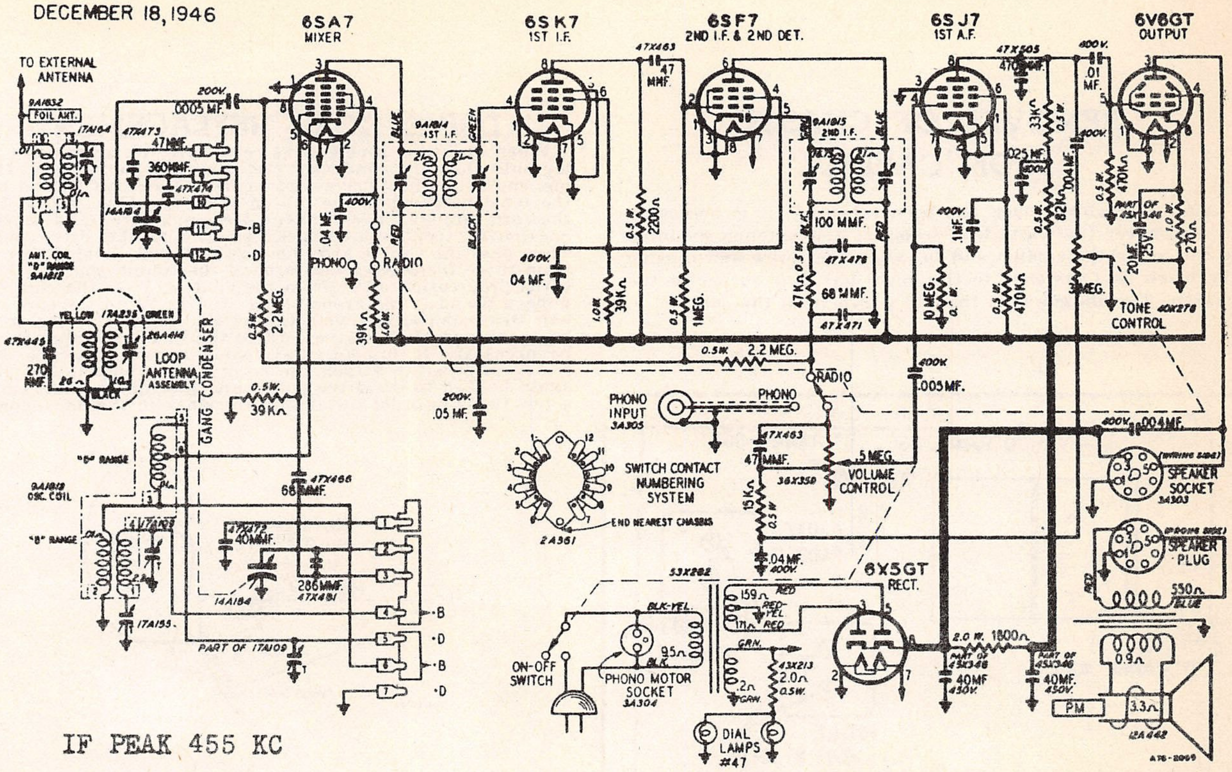
| | |
|---|---|
| C 1 | .01 mfd. paper capacitor |
| C 2 | 47 mmfd. mica capacitor |
| C 3A | Antenna section |
| C 3B | Oscillator section |
| C 6 | .05 mfd. paper capacitor |
| C 8 | 22 mmfd. mica capacitor |
| C 9 | .002 mfd. paper capacitor |
| C10 | .05 mfd. paper capacitor |
| C11 | .02 mfd. paper capacitor |
| C12 | .01 mfd. paper capacitor |
| C13 | .01 mfd. paper capacitor |
| C14 | 30 mfd. 150 v. electrolytic capacitor |
| C15 | 30 mfd. 150 v. electrolytic capacitor |
| C16 | .1 mfd. paper capacitor |
| C17A | Antenna trimmer |
| C17B | Oscillator trimmer |
| C18 | .05 mfd. paper capacitor |
| C19 | .05 mfd. paper capacitor |
| C20 | .02 mfd. paper capacitor |
| C21 | 22 mmfd. mica capacitor |
| C22 | .1 mfd. paper capacitor |

### MISCELLANEOUS

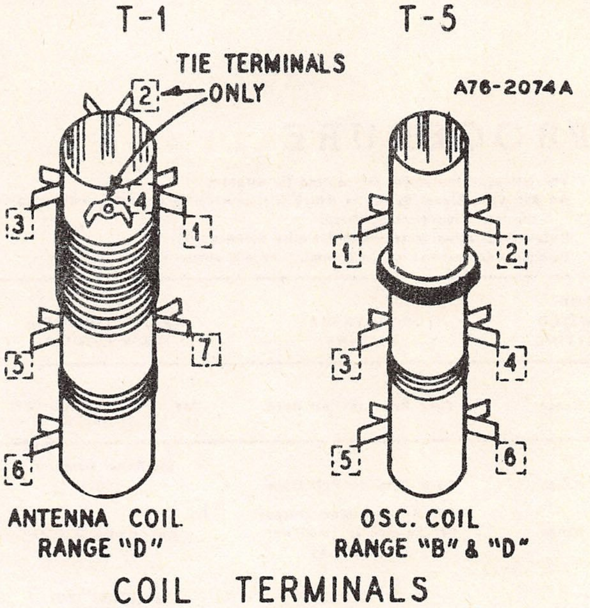
| | |
|---|---|
| L1 | Oscillator coil |
| L2 | Antenna loop |
| T1 | 1st I.F. transformer |
| T2 | 2nd I.F. transformer |
| T3 | Output transformer |
| P1 | Pilot light—Mazda No. 51 |

# GAMBLE-SKOGMO INC. MODEL 43-8576

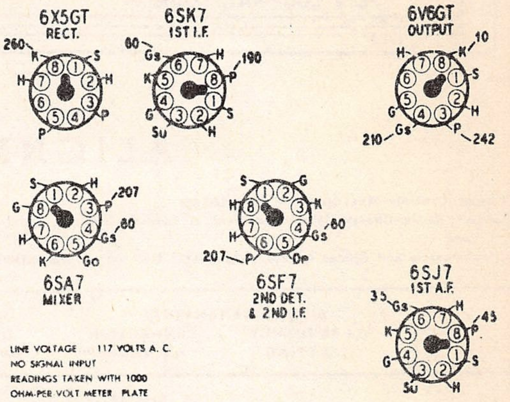
DECEMBER 18, 1946


6SA7
MIXER
6SK7
1ST I.F.
6SF7
2ND I.F. & 2ND DET.
6SJ7
1ST A.F.
6V6GT
OUTPUT
6X5GT
RECT.
TO EXTERNAL ANTENNA
9A1632
FOIL ANT.
ANT. COIL "D" RANGE 9A1812
LOOP ANTENNA ASSEMBLY
YELLOW
GREEN
BLACK
GANG CONDENSER
"D" RANGE
9A1818 OSC. COIL
"B" RANGE
9A1814 1ST I.F.
9A1815 2ND I.F.
BLUE
GREEN
RED
BLACK
PHONO
RADIO
PHONO INPUT 3A305
SWITCH CONTACT NUMBERING SYSTEM
END NEAREST CHASSIS
2A361
.5 MEG. VOLUME CONTROL
TONE CONTROL
SPEAKER SOCKET 3A303
SPEAKER PLUG
PM
12A442
ON-OFF SWITCH
PHONO MOTOR SOCKET 3A304
DIAL LAMPS #47
.0005 MF.
47 MMF.
360 MMF.
270 MMF.
68 MMF.
40 MMF.
286 MMF.
2.2 MEG.
39 K
.05 MF.
.04 MF.
2200
1 MEG.
100 MMF.
10 MEG.
470 K
33 K
82 K
3 MEG.
.01 MF.
.005 MF.
.004 MF.
20 MF. 25V.
270
1800
40 MF 450V.
40 MF. 450V.
550
3.3
0.9
15 K
2.0
95
A76-2069

IF PEAK 455 KC


T-1
T-5
TIE TERMINALS ONLY
A76-2074A
1
2
3
4
5
6
7
ANTENNA COIL RANGE "D"
OSC. COIL RANGE "B" & "D"

COIL TERMINALS


6X5GT
RECT.
6SK7
1ST I.F.
6V6GT
OUTPUT
6SA7
MIXER
6SF7
2ND DET. & 2ND I.F.
6SJ7
1ST A.F.
260
60
190
10
210
242
207
80
207
60
35
43
H
K
S
P
G
Gs
Go
Su
Dp

STANDARD TUBE SOCKET SYMBOLS

Dp – Diode Plate
G – Control Grid
Ga – Anode Grid
Go – Oscillator Grid
Gs – Screen Grid
H – Heater
Ht – Heater Tap
K – Cathode
Nc – No Connection
P – Plate
S – Metal Shell
Su – Suppressor Grid

LINE VOLTAGE 117 VOLTS A. C.
NO SIGNAL INPUT
READINGS TAKEN WITH 1000 OHM-PER VOLT METER. PLATE AND SCREEN VOLTAGES READ ON 500 VOLT SCALE

A76-2066

## SPECIFICATIONS

6 Tube Superheterodyne, Including Rectifier Tube

| | |
|---|---|
| Speaker | 6" PM Dynamic |
| Intermediate Frequency | 455 Kc. |
| Selectivity | 40 Kc. Broad at 1,000 Times Signal |
| Sensitivity (For 0.5 Watt Output, with External Antenna) | |
| B Range | 9 Microvolts Av. |
| D Range | 20 Microvolts Av. |
| Power Consumption (at 117 Volts AC) | 40 Watts (normal) |
| Power Output | 4 Watts, Maximum 2.3 Watts, 10% Harmonics |
| Tuning Frequency Range | |
| B Range | 540-1600 Kilocycles |
| D Range | 9-15.5 Megacycles |

## CIRCUIT DESCRIPTION

The circuit and tube complement of the receiver are as follows: 1—6SA7 1st Detector and Oscillator, 1—6SK7 1st I-F Amplifier, 1—6SF7 2nd I-F Amplifier and 2nd Detector, 1—6SJ7 1st Audio Amplifier, 1—6V6GT Power Output, 1—6X5GT Rectifier. Two No. 47 dial lamps are used for dial illumination.

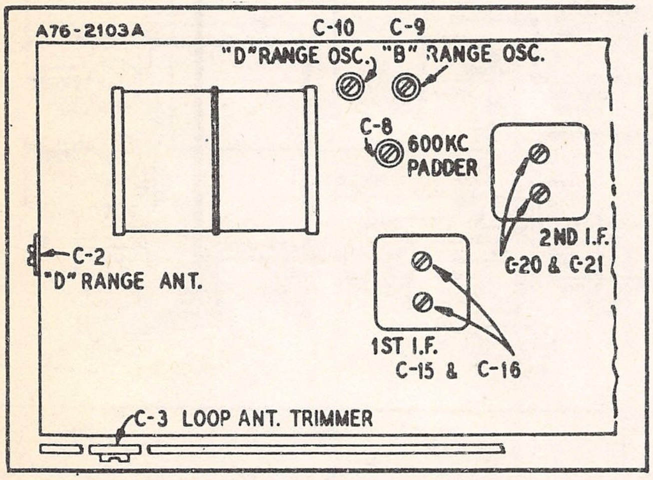
A jack is provided at the rear of the chassis for record player or other special service connections. This jack is switched in or out of the audio circuit with a switch controlled by the tone control knob that also shorts out the r-f signal when it is turned to the phono position.

**MODEL 43-8576**

# GAMBLE-SKOGMO INC.

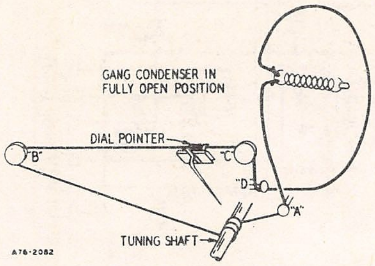
## REMOVAL OF CHASSIS FROM CABINET

After the cabinet back has been taken off, it is necessary to disconnect the white lead from the foil antenna mounted in the top of the cabinet and to loosen the screw and remove the black lead fastened to the lower left rear corner of the chassis. The chassis may then be pulled from the cabinet.



## DRIVE CORD REPLACEMENT

When installing a new drive cord, turn the large drive pulley until the gang condenser plates are fully unmeshed. Hook one end of the new drive cord to the tension spring and hook the tension spring to the tab on the large drive pulley. Pass the cord through the slot in the drive pulley rim and continue one-fourth turn counterclockwise around the drive pulley. Then pass the cord around idler stud A (see illustration) and wind three turns clockwise around the tuning shaft with the turns progressing away from the chassis. Pass the cord over pulleys B and C and around idler stud D. Wrap the cord one-half turn counterclockwise around the large drive pulley and hook the end of the drive cord to the tension spring. It may be necessary to unhook the tension spring from the drive pulley in order to attach the cord, after which it should be again hooked to the drive pulley and the tuning shaft turned a few turns in order to take up the slack in the drive cord.



## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All-Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output indicating Meter—Non-Metallic Screw-driver.

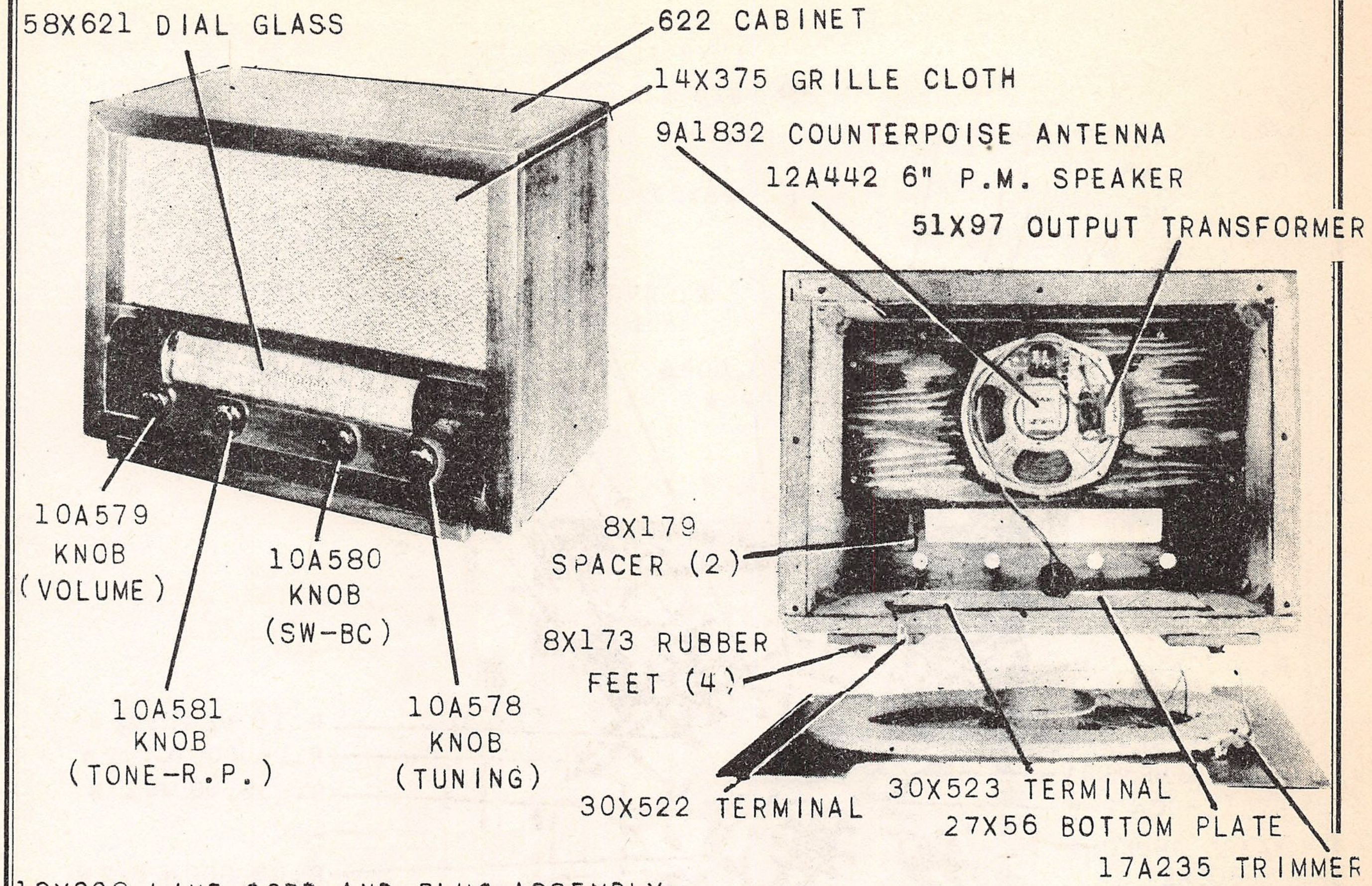
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

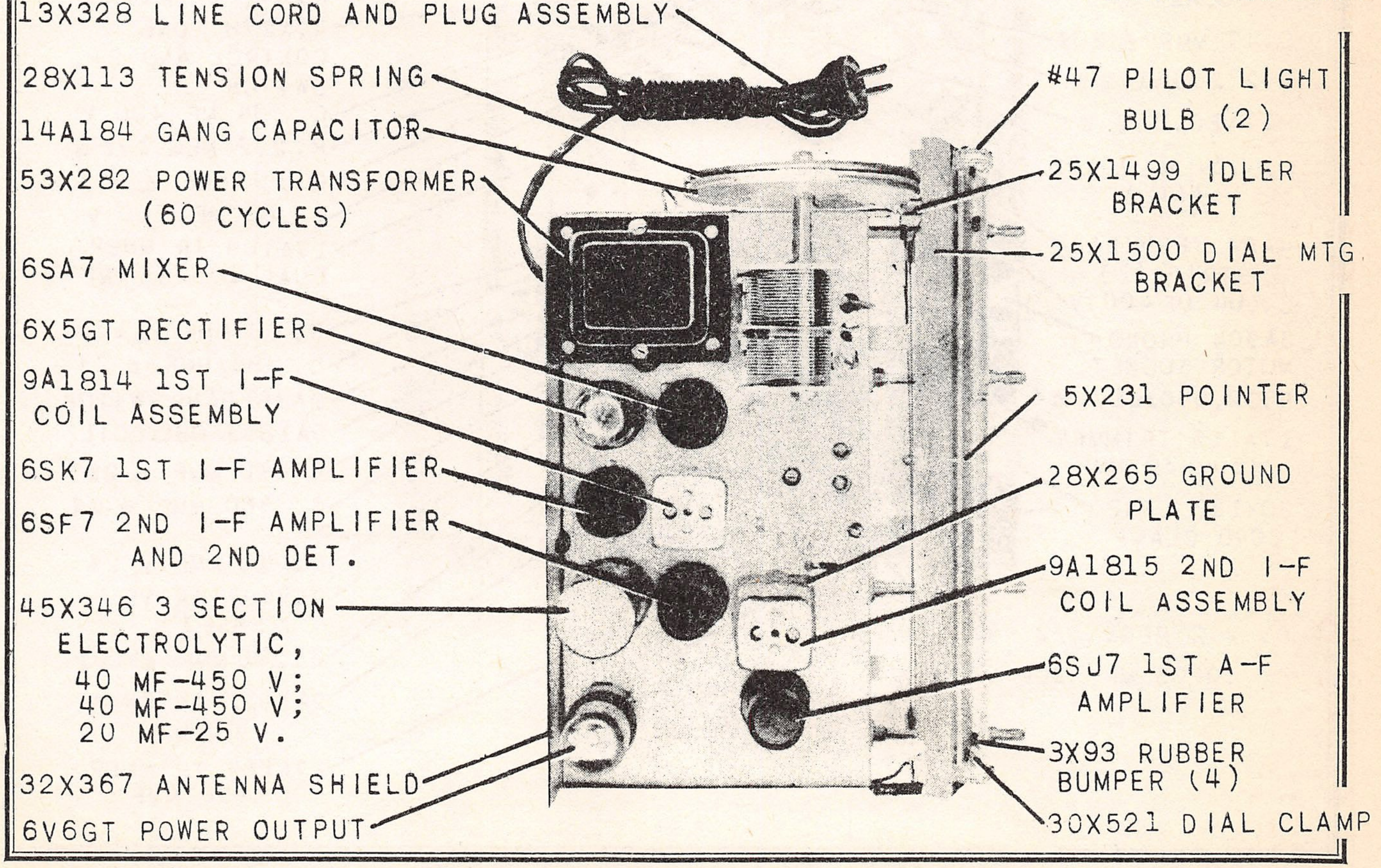
| | SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM |
|---|---|---|---|---|---|---|
| I.F. | 455 Kc. | Grid of 6SA7 Pin 8 | .1 mf. | B Range | Turn Rotor to Full Open | 2nd I.F. (C20) & (C21)<br>1st I.F. (C15) & (C16) |
| RANGE B | 1,620 Kc. | Antenna Lead | 100 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C9) |
| | 1,400 Kc. | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output Set Pointer to 1,400 Kc. (See Note A) | Ant. Range B (C3) |
| | 600 Kc. | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output | Oscillator (C8) Rock Rotor See Note B |
| | | Repeat above steps at 1,620 and 600 Kc. until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output. | | | | |
| RANGE D | 15,600 Kc.<br>14,000 Kc. | Antenna Lead<br>Antenna Lead | 400 ohm<br>400 ohm | D Range<br>D Range | Turn Rotor to Full Open<br>Tune Rotor to Max. Output | Oscillator Range D (C10)<br>Ant. Range D (C2) |
| LOOP RANGE B | | Reassemble chassis in cabinet. | | | | Rock Rotor—See Note B |
| | 1,400 Kc. | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output | Ant. Range B (C3) |

NOTE A—Set pointer at the 1,400 Kc. mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn Rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

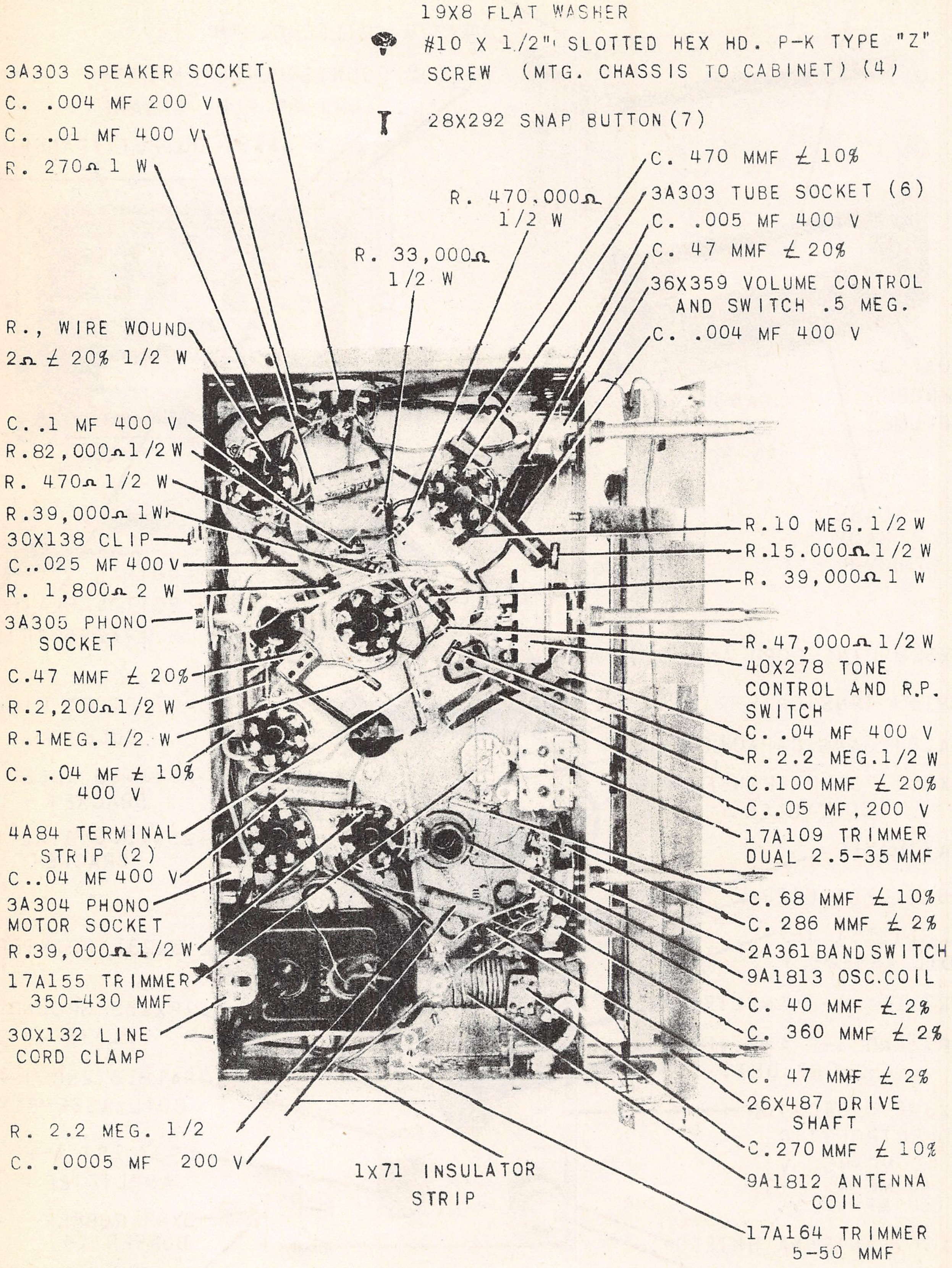
## GAMBLE-SKOGMO INC.


58X621 DIAL GLASS
622 CABINET
14X375 GRILLE CLOTH
9A1832 COUNTERPOISE ANTENNA
12A442 6" P.M. SPEAKER
51X97 OUTPUT TRANSFORMER
10A579 KNOB (VOLUME)
10A580 KNOB (SW-BC)
10A581 KNOB (TONE-R.P.)
10A578 KNOB (TUNING)
8X179 SPACER (2)
8X173 RUBBER FEET (4)
30X522 TERMINAL
30X523 TERMINAL
27X56 BOTTOM PLATE
17A235 TRIMMER


13X328 LINE CORD AND PLUG ASSEMBLY
28X113 TENSION SPRING
14A184 GANG CAPACITOR
53X282 POWER TRANSFORMER (60 CYCLES)
6SA7 MIXER
6X5GT RECTIFIER
9A1814 1ST I-F COIL ASSEMBLY
6SK7 1ST I-F AMPLIFIER
6SF7 2ND I-F AMPLIFIER AND 2ND DET.
45X346 3 SECTION ELECTROLYTIC,
40 MF-450 V;
40 MF-450 V;
20 MF-25 V.
32X367 ANTENNA SHIELD
6V6GT POWER OUTPUT
#47 PILOT LIGHT BULB (2)
25X1499 IDLER BRACKET
25X1500 DIAL MTG BRACKET
5X231 POINTER
28X265 GROUND PLATE
9A1815 2ND I-F COIL ASSEMBLY
6SJ7 1ST A-F AMPLIFIER
3X93 RUBBER BUMPER (4)
30X521 DIAL CLAMP

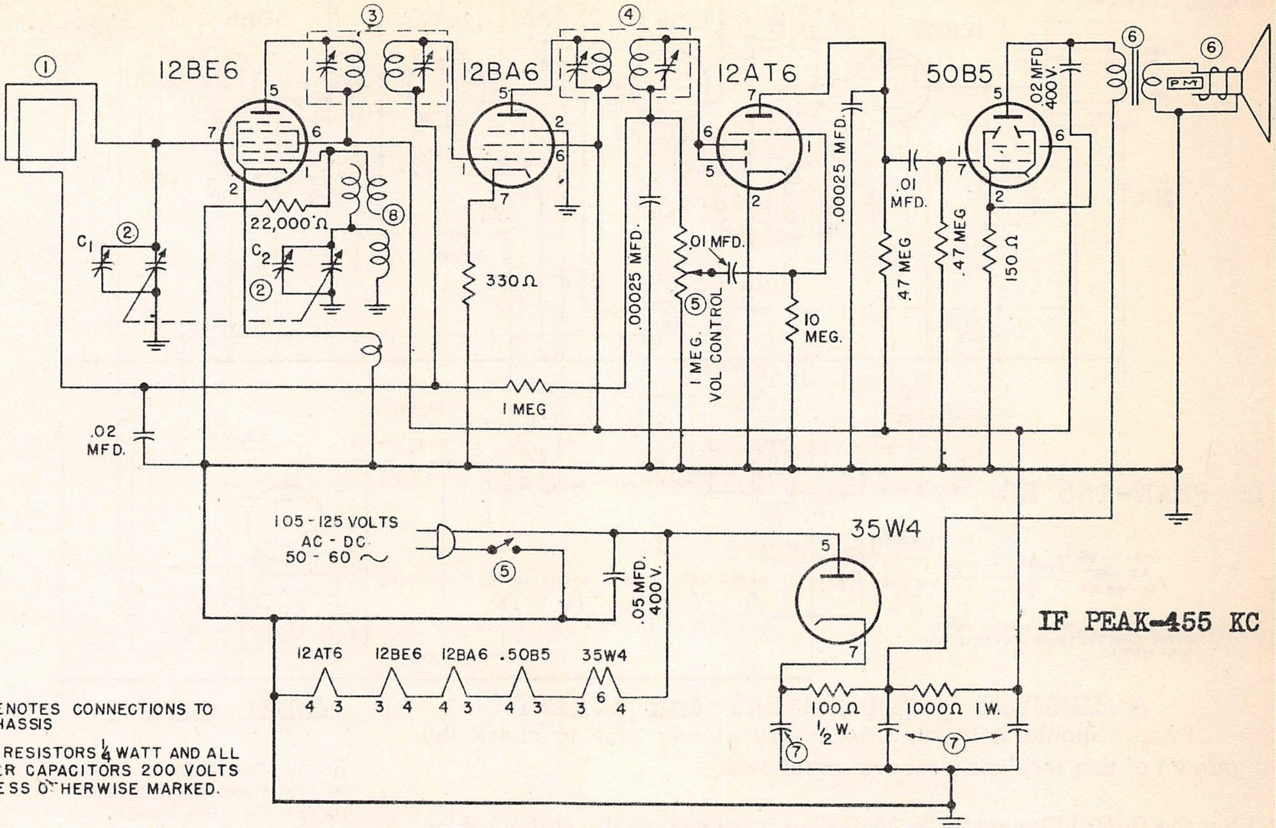
MODEL 43-8576

## GAMBLE-SKOGMO INC.


19X8 FLAT WASHER
#10 X 1/2" SLOTTED HEX HD. P-K TYPE "Z" SCREW (MTG. CHASSIS TO CABINET) (4)
28X292 SNAP BUTTON (7)
3A303 SPEAKER SOCKET
C. .004 MF 200 V
C. .01 MF 400 V
R. 270Ω 1 W
R., WIRE WOUND 2Ω ± 20% 1/2 W
C. .1 MF 400 V
R. 82,000Ω 1/2 W
R. 470Ω 1/2 W
R. 39,000Ω 1 W
30X138 CLIP
C. .025 MF 400 V
R. 1,800Ω 2 W
3A305 PHONO SOCKET
C. 47 MMF ± 20%
R. 2,200Ω 1/2 W
R. 1 MEG. 1/2 W
C. .04 MF ± 10% 400 V
4A84 TERMINAL STRIP (2)
C. .04 MF 400 V
3A304 PHONO MOTOR SOCKET
R. 39,000Ω 1/2 W
17A155 TRIMMER 350-430 MMF
30X132 LINE CORD CLAMP
R. 2.2 MEG. 1/2
C. .0005 MF 200 V
1X71 INSULATOR STRIP
R. 33,000Ω 1/2 W
R. 470,000Ω 1/2 W
C. 470 MMF ± 10%
3A303 TUBE SOCKET (6)
C. .005 MF 400 V
C. 47 MMF ± 20%
36X359 VOLUME CONTROL AND SWITCH .5 MEG.
C. .004 MF 400 V
R. 10 MEG. 1/2 W
R. 15,000Ω 1/2 W
R. 39,000Ω 1 W
R. 47,000Ω 1/2 W
40X278 TONE CONTROL AND R.P. SWITCH
C. .04 MF 400 V
R. 2.2 MEG. 1/2 W
C. 100 MMF ± 20%
C. .05 MF, 200 V
17A109 TRIMMER DUAL 2.5-35 MMF
C. 68 MMF ± 10%
C. 286 MMF ± 2%
2A361 BAND SWITCH
9A1813 OSC. COIL
C. 40 MMF ± 2%
C. 360 MMF ± 2%
C. 47 MMF ± 2%
26X487 DRIVE SHAFT
C. 270 MMF ± 10%
9A1812 ANTENNA COIL
17A164 TRIMMER 5-50 MMF

**The Ensign**
**MODEL 5A1**

# GAROD ELECTRONICS CORP.



①
③
④
⑥
⑥
12BE6
12BA6
12AT6
50B5
35W4
22,000 Ω
⑧
C1
②
C2
②
330 Ω
.00025 MFD.
.00025 MFD.
.01 MFD.
⑤
1 MEG. VOL CONTROL
10 MEG.
.01 MFD.
.47 MEG
.47 MEG
150 Ω
.02 MFD 400 V.
PM
1 MEG
.02 MFD.
105 - 125 VOLTS AC - DC 50 - 60 ~
⑤
.05 MFD. 400 V.
12AT6 12BE6 12BA6 50B5 35W4
100 Ω 1/2 W.
1000 Ω 1 W.
⑦
⑦

⏚ DENOTES CONNECTIONS TO CHASSIS

ALL RESISTORS ¼ WATT AND ALL PAPER CAPACITORS 200 VOLTS UNLESS OTHERWISE MARKED.

IF PEAK-455 KC

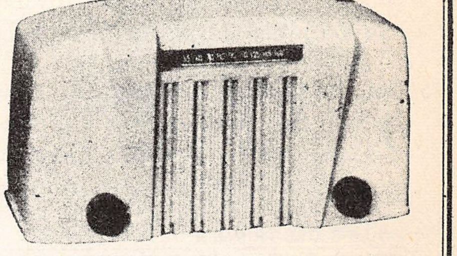
① 1.443 LOOP ASSEMBLY
② 2.200. 2 GANG VARIABLE COND.
③ 1.259 1ST I.F. TRANSFORMER
④ 1.259 2ND I.F. TRANSFORMER
⑤ 8.200-9 OR 8.200-4 VOLUME CONTROL & SWITCH
⑥ 30.303 P.M. 4" SPEAKER & OUTPUT TRANS.
⑦ 5.415-2 ELECTROLYTIC CAP. 20-20-20 MFD.
⑧ 1.444-1 OSCILLATOR COIL

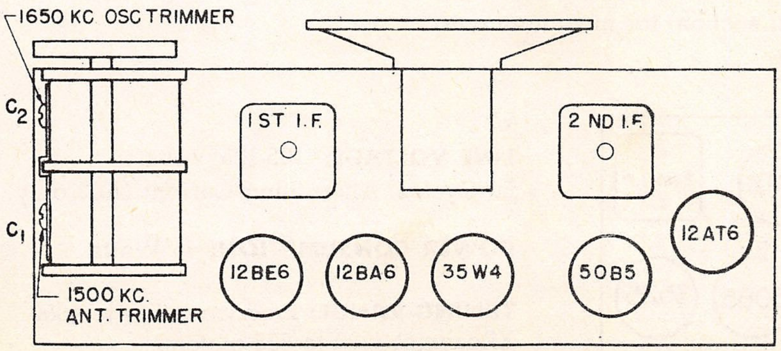
2-47

**LINE VOLTAGE:** This receiver is designed for operation on 105-125 Volts, 50-60 Cycles, either Alternating or Direct Current (AC-DC).

**POWER CONSUMPTION:** 30 Watts.

**TUNING RANGE:** Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).

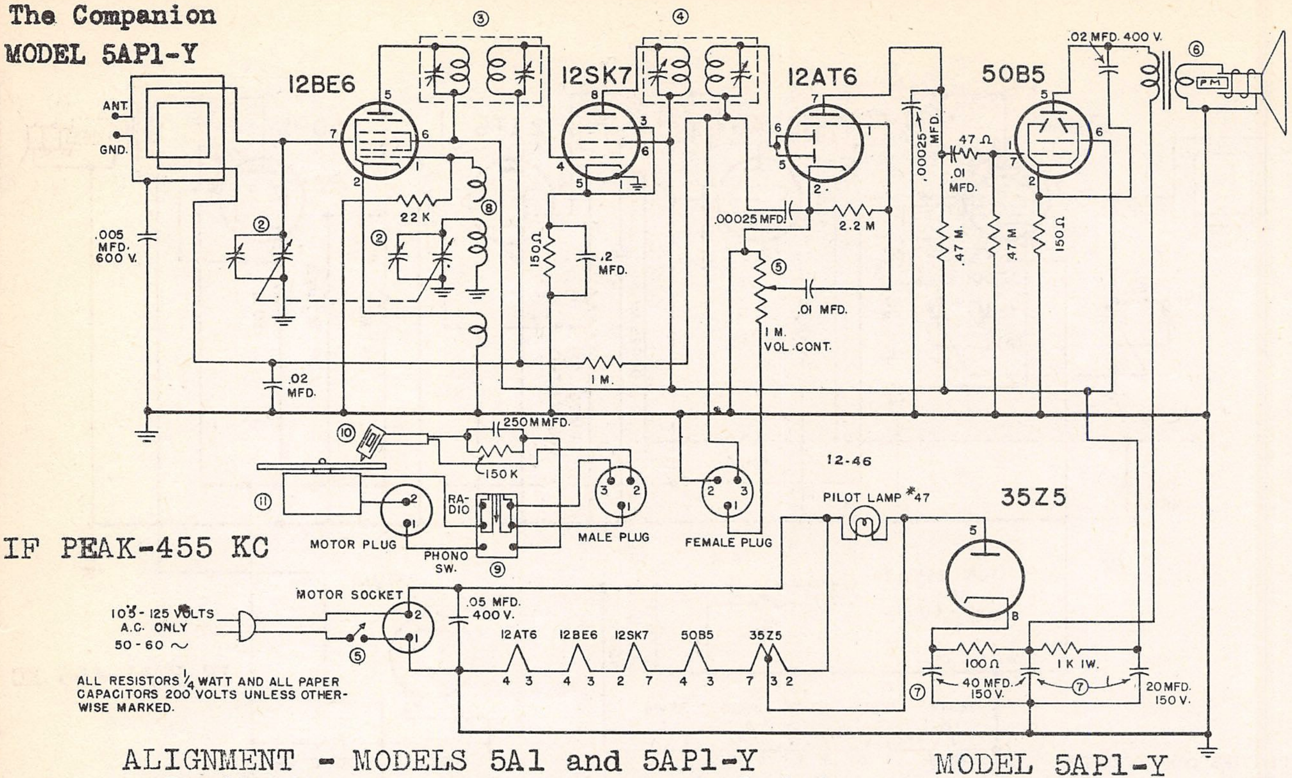




1650 KC. OSC TRIMMER
C2
C1
1500 KC. ANT. TRIMMER
1ST I.F.
2ND I.F.
12BE6
12BA6
35W4
50B5
12AT6

**The Ensign**
**MODEL 5A1**
**The Companion**
**MODEL 5AP1-Y**

# GAROD ELECTRONICS CORP.


ANT.
GND.
12BE6
12SK7
12AT6
50B5
35Z5
12-46
.005 MFD. 600 V.
22 K
150Ω
.2 MFD.
.00025 MFD.
2.2 M
.01 MFD.
1 M. VOL.CONT.
1 M.
.02 MFD.
.00025 MFD.
47 Ω
.01 MFD.
.47 M
.47 M
150Ω
.02 MFD. 400 V.
P.M.
250 MMFD.
150 K
RA-DIO
MOTOR PLUG
PHONO SW.
MALE PLUG
FEMALE PLUG
PILOT LAMP *47
MOTOR SOCKET
105-125 VOLTS A.C. ONLY 50-60 ~
.05 MFD. 400 V.
12AT6 12BE6 12SK7 50B5 35Z5
4 3 4 3 2 7 4 3 7 3 2
100 Ω
1 K 1W.
40 MFD. 150 V.
20 MFD. 150 V.
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

IF PEAK-455 KC

ALL RESISTORS 1/4 WATT AND ALL PAPER CAPACITORS 200 VOLTS UNLESS OTHERWISE MARKED.

## ALIGNMENT - MODELS 5A1 and 5AP1-Y

Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

(1) Set the Signal Generator to 455 KC and connect to the stator lug on the rear section of the Variable Capacitor. Connect the Signal Generator Ground lead to the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the Variable Capacitor to the extreme clockwise position.

(2) Adjust the trimmers located at the top of the first and second I. F. Transformers for maximum output as indicated on the Output Meter.

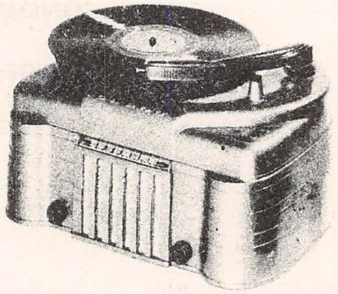
(3) Loosely couple the Signal Generator lead to the Loop and set to 1650 KC.

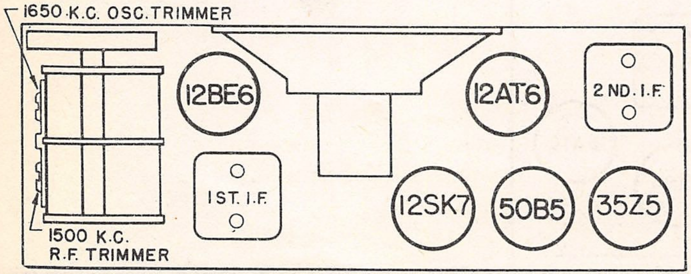
(4) With the Variable Capacitor set at the extreme clockwise position, tune in the 1650 KC signal by means of the Oscillator Trimmer on the Variable Capacitor (front section).

(5) Set the Signal Generator to 1500 KC and turn the Tuning Control so that this frequency is indicated on the dial. Adjust the Antenna Trimmer on the Variable Capacitor (rear section) for maximum output. No other adjustments are necessary.

## MODEL 5AP1-Y

① 1.410 LOOP ASSEMBLY
② 2.200 2 GANG VARIABLE CONDENSER
③ 1.259 1 ST. I.F. TRANSFORMER
④ 1.259 2ND. I.F. TRANSFORMER
⑤ 8.201-2 VOL.CONTROL & SWITCH
⑥ 30.301 P.M. 4"SPEAKER & OUTPUT TRANS.
⑦ 5.400-8 ELECTROLYTIC CAP. 40-40-20 MFD
⑧ 1.402-2 OSCILLATOR COIL
⑨ 11.207 D.P.D.T. SWITCH
⑩ 36.104 PHONO PICKUP
⑪ 36.108 PHONOMOTOR & TURNTABLE




1650 K.C. OSC.TRIMMER
12BE6
12AT6
2 ND. I.F.
1 ST. I.F.
12SK7
50B5
35Z5
1500 K.C. R.F. TRIMMER

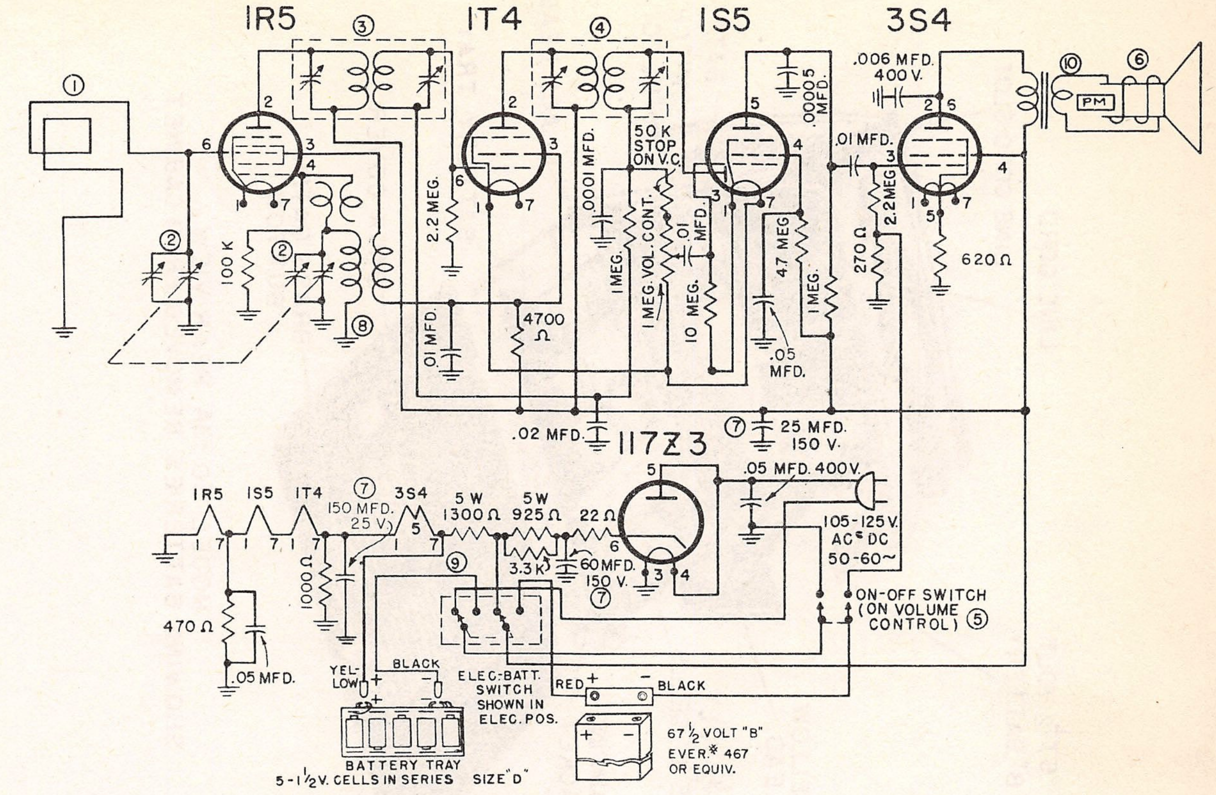
**LINE VOLTAGE:** 105-125 Volts, 60 Cycles, Alternating Current (AC) only.

**POWER CONSUMPTION:** 45 Watts.

**TUNING RANGE:** Broadcast: 540 to 1650 Kilocycles (180 to 555 meters).

## GAROD ELECTRONICS CORP.

MODELS 5D-3, 5D-3A


1R5
1T4
1S5
3S4
117Z3
③
④
①
②
⑧
⑩
⑥
PM
.006 MFD. 400 V.
.00005 MFD.
.01 MFD.
2.2 MEG.
100 K
2.2 MEG.
.0001 MFD.
50 K STOP ON V.C.
1 MEG.
1 MEG. VOL. CONT.
.01 MFD.
10 MEG.
4.7 MEG.
1 MEG.
270 Ω
2.2 MEG
620 Ω
.01 MFD.
4700 Ω
.05 MFD.
.02 MFD.
⑦ 25 MFD. 150 V.
.05 MFD. 400 V.
105-125 V. AC-DC 50-60~
⑦ 150 MFD. 25 V.
5 W 1300 Ω
5 W 925 Ω
22 Ω
3.3 K
60 MFD. 150 V. ⑦
1000 Ω
470 Ω
.05 MFD.
⑨
ON-OFF SWITCH (ON VOLUME CONTROL) ⑤
YELLOW
BLACK
RED
BLACK
ELEC-BATT. SWITCH SHOWN IN ELEC. POS.
BATTERY TRAY 5-1½V. CELLS IN SERIES SIZE "D"
67½ VOLT "B" EVER.* 467 OR EQUIV.

ALL RESISTORS ¼ WATT AND ALL PAPER CAPACITORS 200 VOLTS UNLESS OTHERWISE MARKED.

K = KILOHMS

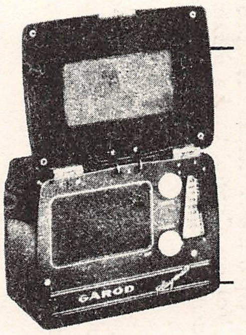
I.F. = 455 K C.

① 1.437 LOOP ANTENNA
② 2.203 2 GANG VARIABLE CONDENSER
③ 1.412 1ST I.F. TRANSFORMER
④ 1.413 2ND I.F. TRANSFORMER
⑤ 8.200-2 VOLUME CONTROL & SWITCH
⑥ 30.313 4" P.M. SPEAKER
⑦ 5.400-3 ELECTROLYTIC CAP. 60-25-150 MFD.
⑧ 1.414 OSCILLATOR COIL
⑨ 11.207 ELECTRIC-BATTERY SWITCH
⑩ 9.205 OUTPUT TRANSFORMER

-3-47

THE FOLLOWING CHANGES IN PARTS
ARE MADE FOR MODEL 5D-3

① 1.405 LOOP ANTENNA
⑥ 30.302 3½" P.M. SPEAKER
⑨ 11.200 ELECTRIC-BATTERY SWITCH



**BATTERY OR LINE VOLTAGE:** This receiver is designed for operation on 105-125 volts, 50-60 cycles either Alternating or Direct Current (AC-DC) and also from self contained batteries.

**POWER CONSUMPTION:** 20 Watts on Electric Operation.

**BATTERY REQUIREMENTS:** The following batteries are required for battery operation:

| QUANTITY | TYPE | MANUFACTURER |
|---|---|---|
| 5 | 1½ volt "A" | Eveready #950, Burgess #2 or equivalent. |
| 1 | 67½ volt "B" | Eveready #467, Burgess #XX45 or equivalent. |

**TUNING RANGE:** Broadcast 540 to 1650 Kilocycles (180 to 555 meters).

**ALIGNMENT:** (Electric Operation) Receiver removed from cabinet. Should it become necessary at any time to check the alignment of this receiver, proceed as follows:

(1) Set the Signal Generator to 455 KC and connect to the stator lug (front section) of variable capacitor. Extend the loop leads and solder to the lug connecting green wire from Ant. Section of variable capacitor and chassis. Connect the Signal Generator ground lead to the chassis. Connect a suitable output meter across the Speaker Voice Coil Connections. Turn the Volume Control to the maximum position. Turn the variable capacitor to the extreme counter clockwise position (minimum capacity).

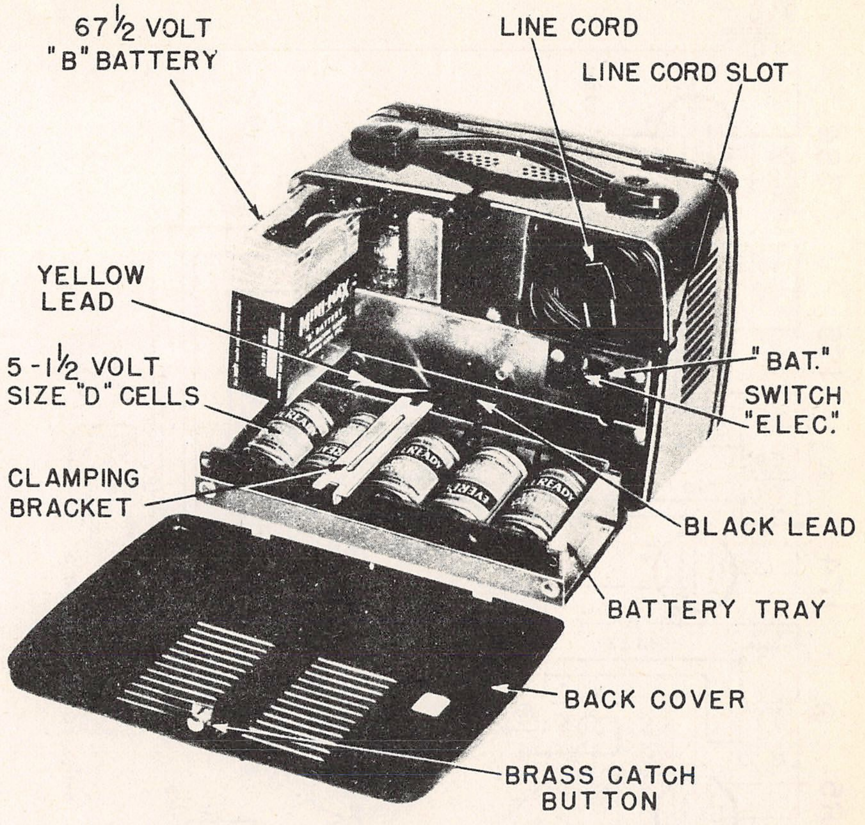
(2) Adjust the trimmers located at the top of the first and second I. F. transformers for maximum output as indicated on the output meter.

(3) Loosely couple the Signal Generator lead to the Loop (open position) and set to 1650 KC.

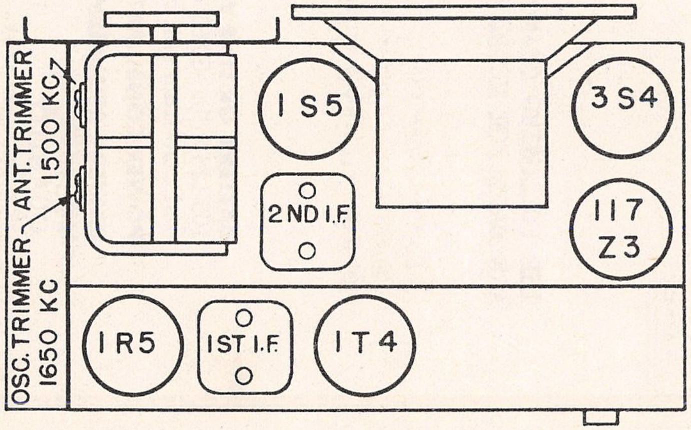
(4) With the variable capacitor set at the extreme counter clockwise position (minimum capacity), tune in the 1650 KC signal by means of the oscillator trimmer on the variable capacitor (rear section).

(5) Set the Signal Generator to 1500 KC and turn the tuning control so that this frequency is indicated on the dial. Adjust the antenna trimmer on the variable capacitor (front section) for maximum output.

(6) Install the chassis into cabinet and check the dial calibration. If further adjustment is required, remove the two plug buttons on the side of the cabinet adjacent to the variable capacitor and adjust the oscillator trimmer as required. Adjust the antenna trimmer for maximum output and replace plug buttons.

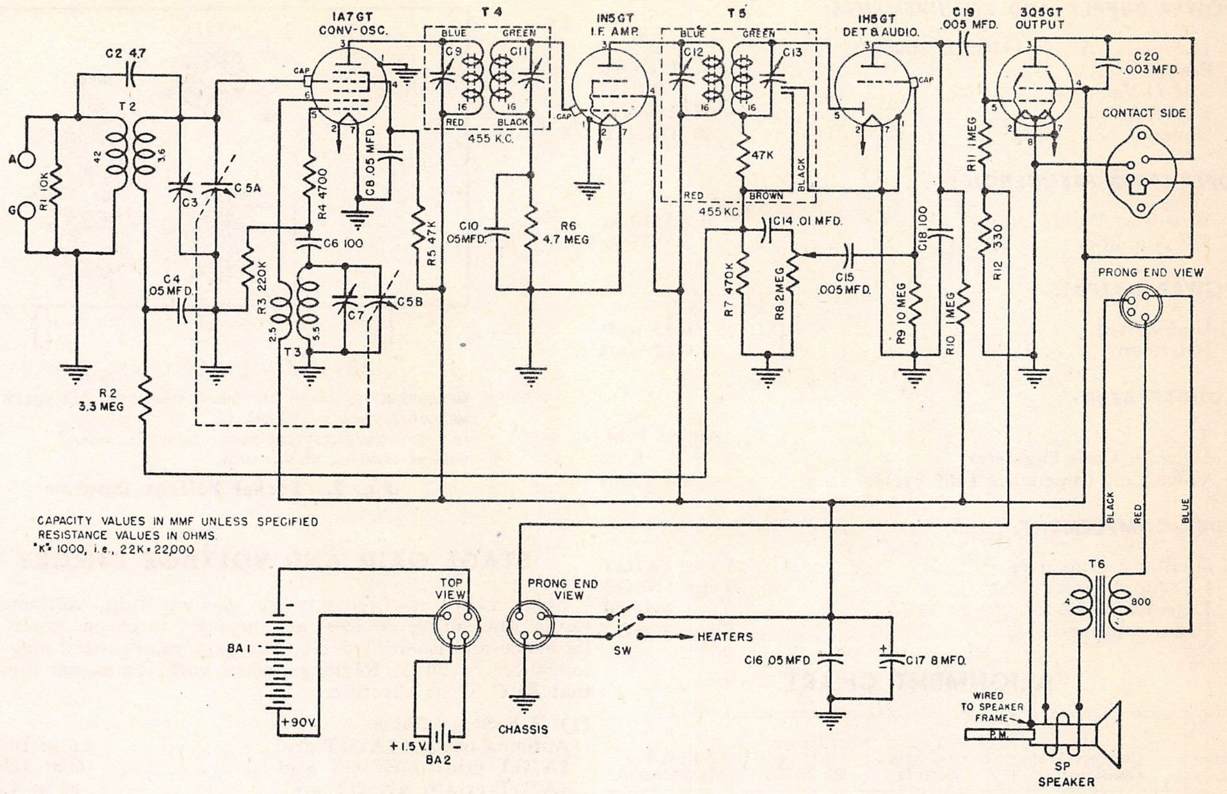

67½ VOLT "B" BATTERY
LINE CORD
LINE CORD SLOT
YELLOW LEAD
5 - 1½ VOLT SIZE "D" CELLS
"BAT." SWITCH "ELEC."
CLAMPING BRACKET
BLACK LEAD
BATTERY TRAY
BACK COVER
BRASS CATCH BUTTON

MODEL 5D-3A REAR VIEW
SHOWING BATTERIES REMOVED FROM CABINET


ANT. TRIMMER
1500 KC
OSC. TRIMMER
1650 KC
1S5
3S4
2ND I.F.
117 Z3
1R5
1ST I.F.
1T4

# GENERAL ELECTRIC CO.

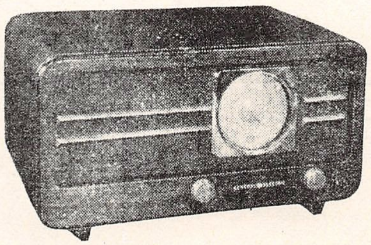
## MODEL 180


1A7GT
CONV-OSC.
T 4
BLUE
GREEN
C9
C11
16
RED
BLACK
455 K.C.
1N5GT
I.F. AMP.
T 5
C12
C13
47K
BROWN
455 KC
1H5GT
DET & AUDIO.
C19
.005 MFD.
3Q5GT
OUTPUT
C20
.003 MFD.
CONTACT SIDE
C2 4.7
T 2
42
3.6
A
G
R1 10K
C3
C 5A
C4
.05 MFD.
R2
3.3 MEG
CAP
R4 4700
C8 .05 MFD.
C6 100
R3 220K
2.5
5.5
T3
C7
C5B
R5 47K
C10
.05MFD.
R6
4.7 MEG
C14 .01 MFD.
R7 470K
R8 2MEG
C15
.005 MFD.
C18 100
R9 10 MEG
R10 1MEG
R11 1MEG
R12 330
PRONG END VIEW
BLACK
RED
BLUE
T6
4
800
TOP VIEW
BA1
+90V
+1.5V
BA2
PRONG END VIEW
CHASSIS
SW
HEATERS
C16 .05 MFD
C17 8 MFD.
WIRED TO SPEAKER FRAME
P.M.
SP
SPEAKER

CAPACITY VALUES IN MMF UNLESS SPECIFIED
RESISTANCE VALUES IN OHMS
"K"= 1000, i.e., 22K = 22,000

### UNIVERSAL REPLACEMENT PARTS

| PART NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| UCC-011 | C4, 8, 10 | CAPACITOR—.05 mfd., 200 v., paper |
| UCC-028 | C16 | CAPACITOR—.05 mfd., 400 v., paper |
| UCC-037 | C20 | CAPACITOR—.003 mfd., 600 v., paper |
| UCC-039 | C15, 19 | CAPACITOR—.005 mfd., 600 v., paper |
| UCC-040 | C14 | CAPACITOR—.01 mfd., 600 v., paper |
| UCU-1028 | C6, 18 | CAPACITOR—100 mmf., mica |
| UOP-629 | SP | SPEAKER—6½ in. permanent magnet |
| UOX-001 |  | CONE—Replacement speaker cone |
| URD-037 | R12 | RESISTOR—330 ohm, ⅓ w., carbon |
| URD-065 | R4 | RESISTOR—4700 ohm, ⅓ w., carbon |
| URD-073 | R1 | RESISTOR—10,000 ohm, ⅓ w., carbon |
| URD-089 | R5 | RESISTOR—47,000 ohm, ⅓ w., carbon |
| URD-105 | R3 | RESISTOR—220,000 ohm, ⅓ w., carbon |
| URD-113 | R7 | RESISTOR—470,000 ohm, ⅓ w., carbon |
| URD-121 | R10 11 | RESISTOR—1 meg., ⅓ w., carbon |
| URD-133 | R2 | RESISTOR—3.3 meg., ⅓ w., carbon |
| URD-137 | R6 | RESISTOR—4.7 meg., ⅓ w., carbon |
| URD-145 | R9 | RESISTOR—10 meg., ⅓ w., carbon |



### SPECIALIZED REPLACEMENT PARTS

| PART NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| RAB-5001 |  | BACK—Cabinet back |
| RAV-5001 |  | CABINET—Model 180 cabinet |
| RCE-5001 | C17 | CAPACITOR—8 mfd., 150 v., electrolytic |
| RCT-5001 | C5A, 5B | CAPACITOR—Tuning condenser |
| RCU-5002 | C2 | CAPACITOR—4.7 mmf., mica |
| RDC-5001 |  | CORD—Drive cord |
| RDE-5001 |  | ESCUTCHEON—Dial escutcheon assembly |
| RDF-5001 |  | WASHER—Felt washer for knobs |
| RDK-5001 |  | KNOB—Volume or tuning knob |
| RDM-5001 |  | FLAG—Off-On indicator flag |
| RDP-5001 |  | POINTER—Plastic dial pointer |
| RDW-5001 |  | GLASS—Dial glass |
| RDX-5001 |  | BRACKET—Dial bracket and pulley assembly |
| RHC-5001 |  | CLIP—Off-On indicator retaining clip |
| RJS-5001 |  | SOCKET—Octal tube socket |
| RJS-5002 |  | SOCKET—Speaker socket |
| RLA-5001 | T2 | COIL—Antenna coil |
| RLC-5001 | T3 | COIL—Oscillator coil |
| RMB-5001 |  | BEARING—Dial drive shaft supporting bearing |
| RMC-5001 |  | CAM—Off-On indicator cam |
| RMU-5001 |  | SHAFT—Dial drive shaft |
| RRC-5001 | R8, S3 | VOLUME CONTROL—2 meg. vol. control and switch |
| RTL-5001 | T5 | TRANSFORMER—2nd i-f transformer |
| RTL-5002 | T4 | TRANSFORMER—1st i-f transformer |
| RTO-5001 | T6 | TRANSFORMER—Output transformer |
| RWX-5501 |  | CABLE ASSEMBLY—Battery cable |
| RYM-5001 |  | CHART—Dial calibration chart |

### POWER SUPPLY AND REQUIREMENTS:

(1.5 volts "A", 90 volts "B" pack)

| | |
|---|---|
| Burgess | 17GD60 |
| Ray-O-Vac | AB-82 |
| Eveready | 748 or 758 |
| General | 60 DL-11L |

### OPERATING FREQUENCIES:

| | |
|---|---|
| Broadcast Band | 540-1710 kc |
| I-F Amplifier | 455 kc |

### POWER OUTPUT:

| | |
|---|---|
| Undistorted | 0.15 watt |
| Maximum | 0.27 watt |

### LOUDSPEAKER:

| | |
|---|---|
| Type | Alnico P.M. |
| Outsider Cone Diameter | 6 in. |
| Voice Coil Impedance (400 cycles) | 3.2 ohms |

### TUBE COMPLEMENT:

| | |
|---|---|
| Oscillator-Converter | Type 1A7GT |
| I-F Amplifier | Type 1N5GT |
| Detector-Audio | Type 1H5GT |
| Power Output | Type 3Q5GT |

## ALIGNMENT CHART

| Step | Connect Test Oscillator To | Test Oscillator Setting | Pointer Setting On Radio | Adjust For Max. Output |
|---|---|---|---|---|
| 1 | IN5GT IF grid in series with .05 mfd. | 455 KC | 550 KC | 1st IF trans. trimmers |
| 2 | 1A7GT Conv. grid in series with .05 mfd. | 455 KC | 550 KC | 2nd IF trans. trimmers |
| 3 | To Ant. Post through 200 mmf. dummy and to Grd. Post. | 1500 KC | 1500 KC | C7* (osc.) and C3 (R-F) |

*Rock gang condenser when making alignment.

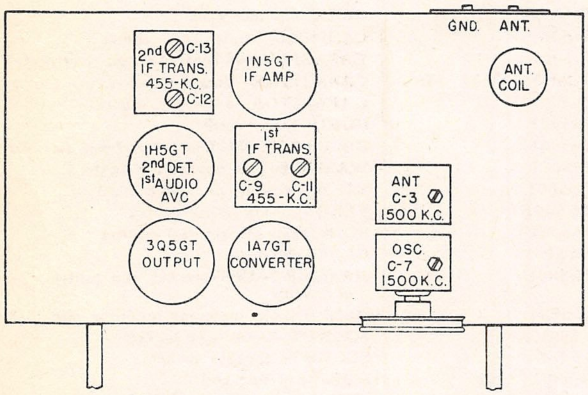
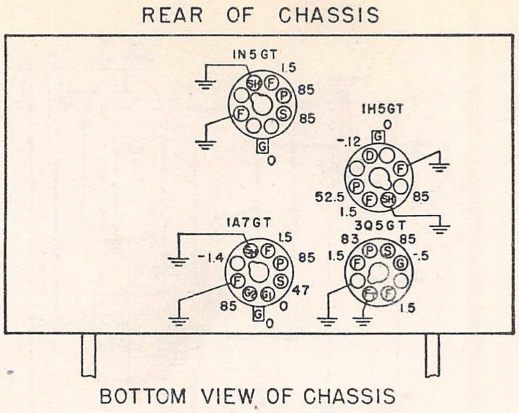

GND.
ANT.
2nd C-13
IF TRANS.
455-K.C.
C-12
IN5GT
IF AMP
ANT.
COIL
IH5GT
2nd DET.
1st AUDIO
AVC
1st
IF TRANS.
C-9
C-11
455-K.C.
ANT
C-3
1500 K.C.
3Q5GT
OUTPUT
IA7GT
CONVERTER
OSC.
C-7
1500 K.C.

Fig. 1. Tube and Trimmer Location

RSM-1


REAR OF CHASSIS
IN5GT
1.5
SH
F
85
P
S
85
F
G
0
IH5GT
0
-.12
G
D
F
P
52.5
F
SH
85
1.5
IA7GT
1.5
-1.4
SH
F
85
P
S
F
G2
G1
47
85
0
G
0
3Q5GT
83
85
1.5
P
S
-.5
G
F
F
F
1.5
BOTTOM VIEW OF CHASSIS

MEASUREMENTS TAKEN ON 20,000 OHMS PER VOLT METER.
MEASURED FROM PIN TO CHASSIS.
1.5 V "A"–90 V "B" BATTERY PACK. NO SIGNAL INPUT.
VOLUME CONTROL AT MAXIMUM.

Fig. 2. Socket Voltage Diagram

## STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

(1) R-F Stage Gains.

| | |
|---|---|
| Antenna post to 1A7GT grid | 6.6 at 1000 kc |
| 1A7GT grid to 1N5GT grid | 46 at 1000 kc |
| 1A7GT grid to 1N5GT grid | 60 at 455 kc |
| IN5GT grid at 1H5GT diode plates | 80 at 455 kc |

(2) Audio Gain.
.06 volt at 400 cycles across volume control (R8) with control set at maximum will give approximately .05 watts output across speaker voice coil.

(3) D-C voltage developed across oscillator grid resistor (R2) averages 7 volts at 1000 kc.

(4) Socket Pin Voltages.
Figure 2 shows voltages from all tube pins to B-. Voltage readings much lower than those specified may help localize defective components or tubes.

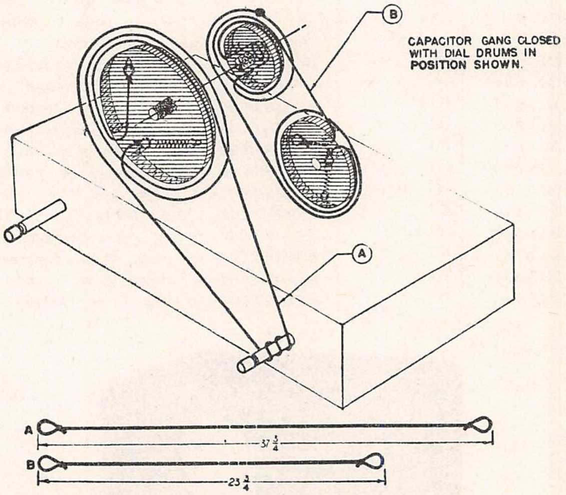
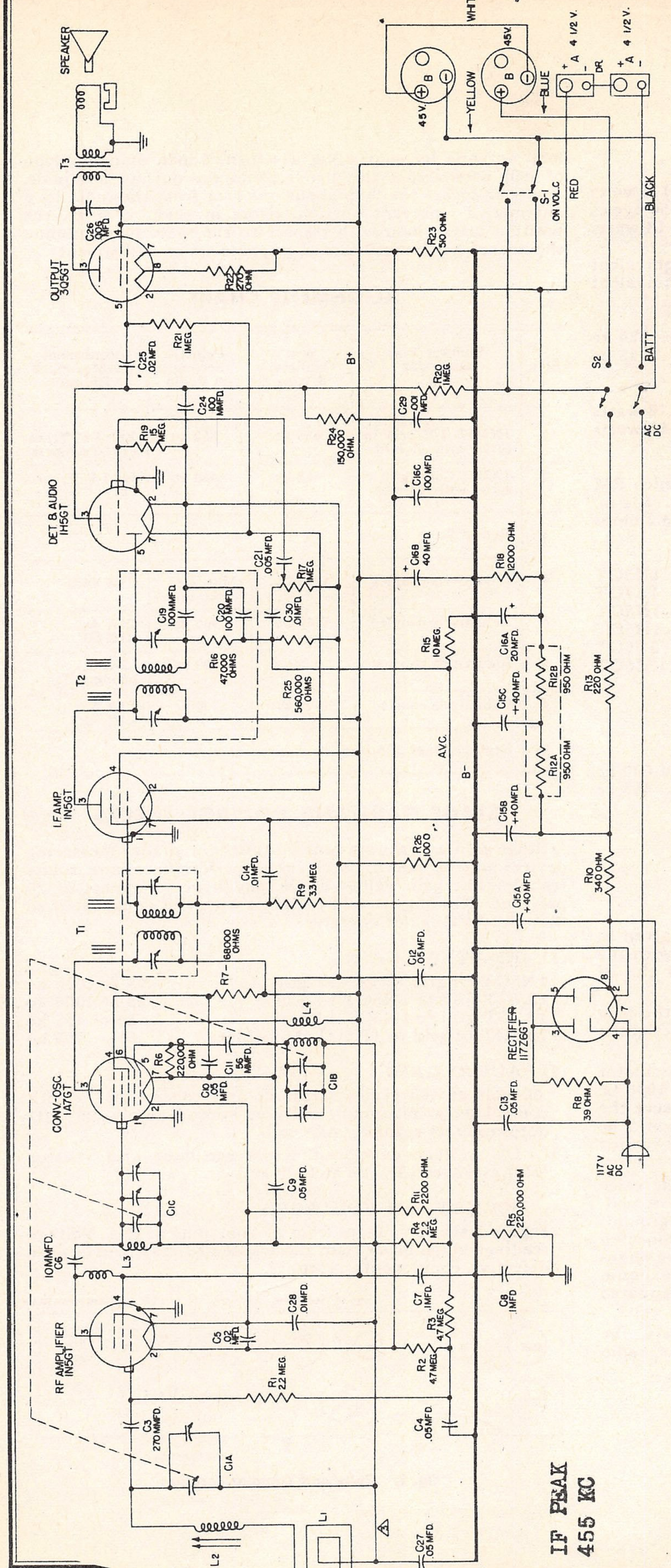

B
CAPACITOR GANG CLOSED WITH DIAL DRUMS IN POSITION SHOWN.
A
A
37 3/4
B
23 3/4

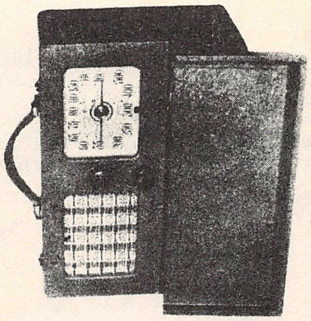
Fig. 3. Dial Stringing

# GENERAL ELECTRIC CO.

**MODEL 254**

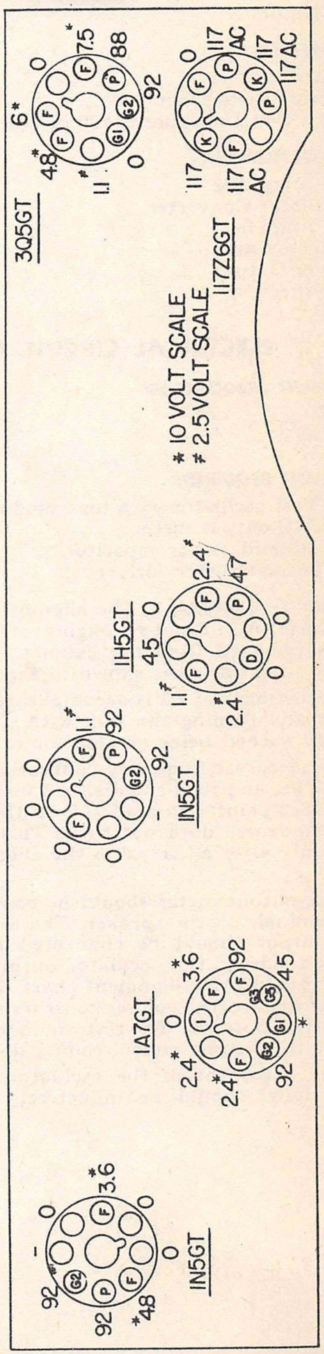

SPEAKER
T3
C26 .005 MFD
OUTPUT 3Q5GT
R22 270 OHM
R23 510 OHM
R21 1 MEG.
C25 .02 MFD.
B+
R20 1 MEG.
C29 .004 MFD.
R24 150,000 OHM.
C24 100 MMFD.
R19 15 MEG.
DET. & AUDIO 1H5GT
C16C 100 MFD.
C16B 40 MFD.
R18 2000 OHM
C21 .005 MFD.
R17 1 MEG.
C19 100 MMFD.
C20 100 MMFD.
C30 .01 MFD.
R16 47,000 OHMS
R25 560,000 OHMS
R15 10 MEG.
C16A 20 MFD.
T2
C15C +40 MFD.
R12B 950 OHM
R12A 950 OHM
R13 220 OHM
A.V.C.
B-
I.F. AMP 1N5GT
C15B +40 MFD.
R26 1000
C14 .01 MFD.
R9 3.3 MEG.
R10 340 OHM
C15A +40 MFD.
T1
R7 - 68000 OHMS
C12 .05 MFD.
RECTIFIER 117Z6GT
L4
CONV-OSC 1A7GT
R6 220,000 OHM
C11 56 MMFD.
C10 .05 MFD.
C1B
C13 .05 MFD.
R8 39 OHM
117 V AC DC
C9 .05 MFD.
R11 2200 OHM.
C1C
R4 2.2 MEG
R5 220,000 OHM
10 MMFD. C6
L3
C28 .01 MFD.
C7 .1 MFD.
R3 4.7 MEG
C8 .1 MFD
RF AMPLIFIER 1N5GT
C5 .02 MFD.
R2 4.7 MEG.
R1 22 MEG
C3 270 MMFD.
C1A
C4 .05 MFD.
L1
L2
C27 .05 MFD.
WHITE
45V
B
YELLOW
BLUE
+ A 4 1/2 V. -
DR
S-1 ON VOL.C
RED
BLACK
S2
BATT
AC DC

IF PEAK
455 KC



### CONDITIONS OF TEST

MEASUREMENTS TAKEN WITH 20,000 OHMS PER VOLT METER
READINGS TAKEN BETWEEN SOCKET PIN & B-
A-C LINE VOLTS = 117 V.
SWITCH S2 IN AC-DC POSITION


3Q5GT
6*
7.5*
88
92
4.8*
1.1#
0
117Z6GT
117
117 AC
* 10 VOLT SCALE
# 2.5 VOLT SCALE
1H5GT
45
2.4#
47
1.1#
0
1N5GT
92
1.1#
0
-
1A7GT
3.6
92
45
2.4*
0
1N5GT
3.6*
92
*4.8
-
BOTTOM VIEW OF CHASSIS

**POWER SUPPLY:**

(AC-DC Operation)

| | |
|---|---|
| Voltage | 105–125 volts |
| Frequency (on a-c) | 50–60 cycles |
| Power Consumption | 18 watts |

(Battery Operation)

2—4½-volt "A" Batteries. . Eveready No. 746 or equivalent
2—45-volt "B" Batteries. . . Eveready No. 482 or equivalent

**OPERATING FREQUENCIES:**

| | |
|---|---|
| Broadcast Band | 540–1620 kc |
| I-F Amplifier | 455 kc |

**POWER OUTPUT:**

| | |
|---|---|
| Undistorted | 0.15 watts |
| Maximum | 0.27 watts |

**LOUDSPEAKER:**

| | |
|---|---|
| Type | Alnico PM |
| Outside Cone Diameter | 5¼ in. |
| Voice Coil Impedance (400 cycles) | 3.2 ohms |

**TUBE COMPLEMENT:**

| | |
|---|---|
| R-F Amplifier | 1N5GT |
| Oscillator-Converter | 1A7GT |
| I-F Amplifier | 1N5GT |
| Detector-Audio | 1H5GT |
| Power Output | 3Q5GT |
| Rectifier | 117Z6GT |

## ELECTRICAL CIRCUIT ALIGNMENT

**ALIGNMENT FREQUENCIES:**

| | |
|---|---|
| R-F | 1620, 1500 kc and 600 kc |
| I-F | 455 kc |

**EQUIPMENT REQUIRED:**

1. Test oscillator with tone modulation
2. A-C output meter
3. .05 mfd. paper capacitor
4. Insulated screwdriver

**PROCEDURE—GENERAL.** 1. The alignment procedure is given in table form. All i-f and r-f alignments may be made with the chassis removed from the cabinet. The location of the i-f and r-f adjustments is shown in Figure 1.

2. Adjustment of L2 is accomplished by loosening the lock washer and turning the slug with a screwdriver. Retighten the lock washer, being careful not to turn the slug.

3. For accurate frequency calibration, set the test oscillator at 1000 kc, and turn the dial to tune in maximum a 1000-kc signal. Set pointer to read 100 on the dial, making sure the gang condenser does not turn. This adjustment should be made only after all steps on the alignment chart are carried out.

4. The output meter should be connected across the voice coil terminals on the speaker. The low side of the test oscillator output should be connected to the chassis ground; the high side of the oscillator output should be connected as indicated in the alignment chart. During the entire alignment procedure, the volume control should be at its maximum (clockwise) position. The test oscillator should be attenuated so that the output meter reading doesn't exceed ½ volt.

5. For alignment of the oscillator and r-f trimmers, the input signal should be inductively coupled to the radio loop antenna by connecting a 4-turn, 6-inch diameter loop of bell wire across the signal generator output terminals, and then locate the loop about one foot from the radio loop antenna. To prevent possible errors in peak readings, the position of the loop with respect to the radio loop antenna should not be changed during any one set of adjustments.

## ALIGNMENT CHART

| Step | Connect Test Oscillator to | Test Oscillator Setting | Pointer Setting on Radio | Adjustment for Maximum Output |
|---|---|---|---|---|
| 1 | 1N5GT I-F grid in series with .05 mfd | 455 kc | 550 kc | 2nd I-F Trans. (T2) Trimmers |
| 2 | 1A7GT Conv. grid in series with .05 mfd | 455 kc | 550 kc | 1st I-F Trans. (T1) |
| 3 | Repeat Steps 1 and 2 | | | |
| 4 | Inductively coupled | 1620 kc | Max. freq. cond. open | CIB OSC |
| 5 | Inductively coupled | 1500 kc | 1500 kc | C1A Ant.<br>C1C RF |
| 6 | Inductively coupled | 600 kc | 600 kc | L2 Ant. Loading Coil |
| 7 | Inductively coupled | 1500 kc | 1500 kc | C1A Ant.<br>C1C RF |
| 8 | Recheck Steps 5, 6, and 7 | | | |

## STAGE GAIN AND VOLTAGE CHECKS

Stage gain by vacuum tube voltmeter or similar measuring devices may be used to check circuit performances and isolate trouble. The gain values listed may have tolerances of 20 per cent. Readings should be taken with low signal input so that the AVC is not effective.

(1) RF STAGE GAINS.

| | |
|---|---|
| 1N5GT r-f grid to 1A7GT grid | 25 at 1000 kc |
| 1A7GT grid to 1N5GT i-f grid | 25 at 1000 kc |
| 1A7GT grid to 1N5GT i-f grid | 30 at 455 kc |
| 1N5GT i-f grid to 1H5GT diode plate | 65 at 455 kc |

(2) AUDIO GAIN.

.06 volt at 400 cycles across volume control (R17) with control set at maximum will give approximately .05 watt output across speaker voice coil.

(3) DC voltage developed across oscillator grid resistor (R6) averages 13 volts at 1000 kc.

(4) SOCKET PIN VOLTAGES.

Figure 3 shows voltages from all tube pins to B –. Voltage readings much lower than those specified may help localize defective components or tubes.

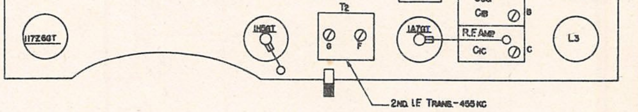


Fig. 1. Tube and Trimmer Location

## REPLACEMENT PARTS LIST—MODEL 254

### SPECIALIZED REPLACEMENT PARTS (CONT'D)

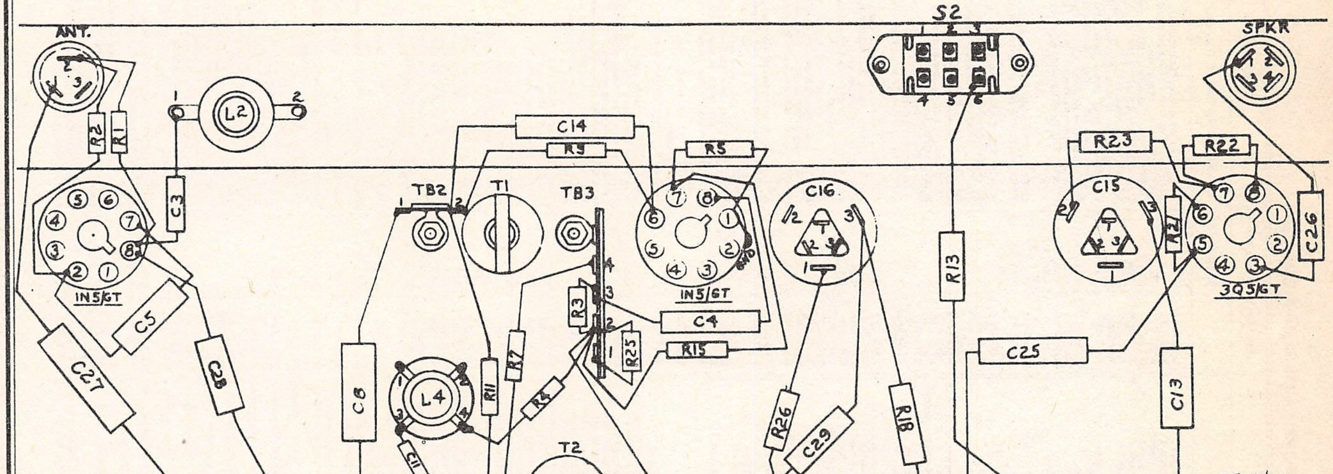
| CAT. NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| SCE-021 | C15A, B, C | CAPACITOR—40 mf., 150 v.; 40 mf., 150 v.; 40 mf., 150 v.; electrolytic |
| SCT-010 | C1A, B, C | CONDENSER—Tuning condenser, pulley, and trimmers |
| SDC-002 | | CORD—Dial cord |
| SDK-036 | | KNOB—Control knob |
| SDP-003 | | POINTER—Dial pointer |
| SDS-012 | | SCALE—Dial scale |
| SDW-003 | | WINDOW—Dial scale window |
| SDX-006 | | DRIVE—Dial drive assembly |
| SJJ-009 | | CONNECTOR—Female speaker connector |
| SJJ-010 | | CONNECTOR—Female antenna connector |
| SJP-007 | | CONNECTOR—Male 2-contact "A" battery connector |
| SJP-008 | | CONNECTOR—Male 3-contact "B" battery connector |
| SJP-009 | | CONNECTOR—Male speaker connector, 4-contact |
| SJS-031 | | SOCKET—Octal tube socket |
| SJS-035 | | SOCKET—Octal tube socket |
| SLA-002 | L2 | COIL—Antenna loading coil |
| SLB-002 | L3 | COIL—R-F transformer |
| SLC-011 | L4 | COIL—Oscillator coil |
| SLL-003 | L1 | BEAM-A-SCOPE—Loop antenna assembly |
| SMS-012 | | SPRING—Dial cord spring |
| SMS-013 | | SPRING—Indicator spring |
| SMX-014 | | TRIGGER—Trigger bushing assembly |
| SRC-044 | R17, S1 | VOLUME CONTROL—1.0 meg., potentiometer and switch |
| SRW-024 | R12A, B | RESISTOR—1900 ohms, CT, 5 w., w.w. |
| SRW-025 | R8 | RESISTOR—39 ohms, 5 w., w.w. |
| SRW-026 | R10 | RESISTOR—340 ohms, 5 w., w.w. |
| SSS-009 | S2 | SWITCH—Battery-line selector slide switch |
| STL-009 | T1 | TRANSFORMER—1st I-F transformer |
| STL-010 | T2 | TRANSFORMER—2nd I-F transformer |
| STO-007 | T3 | TRANSFORMER—Output transformer |
| SWL-006 | | CORD—Power cord |

### UNIVERSAL REPLACEMENT PARTS

| CAT. NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| UCC-018 | C29 | CAPACITOR—0.001 mfd., 400 v., paper |
| UCC-025 | C14, 28, 30 | CAPACITOR—0.01 mfd., 400 v., paper |
| UCC-030 | C7, 8 | CAPACITOR—0.1 mfd., 400 v., paper |
| UCC-039 | C21, 26 | CAPACITOR—0.005 mfd., 400 v., paper |
| UCC-041 | C5, 25 | CAPACITOR—0.02 mfd., 600 v., paper |
| UCC-045 | C4, 9, 10, 12, 13, 27 | CAPACITOR—0.05 mfd., 600 v., paper |
| UCU-1004 | C6 | CAPACITOR—10 mmfd., 500 v., mica |
| UCU-1022 | C11 | CAPACITOR—56 mmfd., 500 v., mica |
| UCU-1028 | C24 | CAPACITOR—100 mmfd., 500 v., mica |
| UCU-1038 | C3 | CAPACITOR—270 mmfd., 500 v., mica |
| UOP-546 | | LOUDSPEAKER—5¼-inch PM speaker |
| UOX-008 | | CONE—Replacement cone |
| URD-049 | R26 | RESISTOR—1000 ohms, ½ w., carbon |
| URD-057 | R11 | RESISTOR—2200 ohms, ½ w., carbon |
| URD-093 | R7 | RESISTOR—68,000 ohms, ½ w., carbon |
| URD-101 | R24 | RESISTOR—150,000 ohms, ½ w., carbon |
| URD-105 | R5, 6 | RESISTOR—220,000 ohms, ½ w., carbon |
| URD-113 | R25 | RESISTOR—470,000 ohms, ½ w., carbon |
| URD-121 | R20, 21 | RESISTOR—1 meg., ½ w., carbon |
| URD-129 | R1, 4 | RESISTOR—2.2 meg., ½ w., carbon |
| URD-133 | R9 | RESISTOR—3.3 meg., ½ w., carbon |
| URD-137 | R2, 3 | RESISTOR—4.7 meg., ½ w., carbon |
| URD-145 | R15 | RESISTOR—10 meg., ½ w., carbon |
| URD-149 | R19 | RESISTOR—15 meg., ½ w., carbon |
| URE-033 | R13 | RESISTOR—200 ohms, 1 w., carbon |
| URE-035 | R22 | RESISTOR—270 ohms, 1 w., carbon |
| URE-1042 | R23 | RESISTOR—510 ohms, 1 w., carbon |
| URF-075 | R18 | RESISTOR—12,000 ohms, 2 w., carbon |

### SPECIALIZED REPLACEMENT PARTS

| CAT. NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| SAT-001 | | CABINET—Tan finish cabinet |
| SCE-020 | C16A, B, C | CAPACITOR—20 mf., 150 v.; 40 mf., 150 v.; 100 mf., 50 v.; electrolytic |



*Component Location, Bottom View of Chassis*

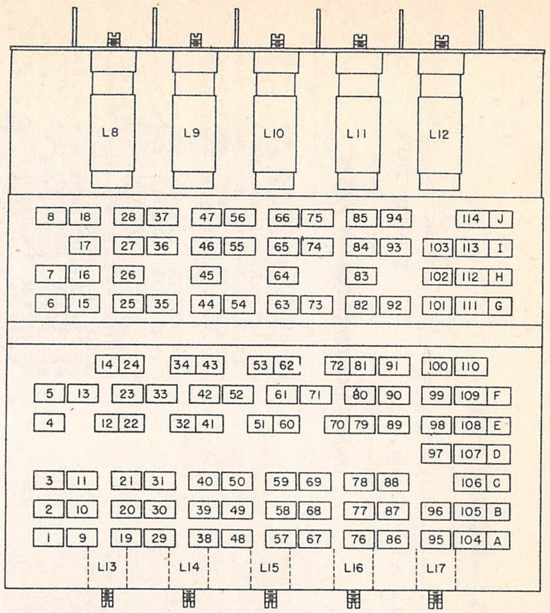
## REPLACEMENT PARTS LIST—MODEL 260

### UNIVERSAL REPLACEMENT PARTS

| Part No. | Symbol | Description |
|---|---|---|
| UCC-030 | C8, 17 | CAPACITOR—.1 mfd., 400 v., paper |
| UCC-032 | C22 | CAPACITOR—.25 mfd., 400 v., paper |
| UCC-039 | C21, 38 | CAPACITOR—.005 mfd., 600 v., paper |
| UCC-040 | C23 | CAPACITOR—.01 mfd., 600 v., paper |
| UCC-041 | C24 | CAPACITOR—.02 mfd., 600 v., paper |
| UCC-048 | C6, 16, 25, 32 | CAPACITOR—.05 mfd., 400 v., paper |
| UCG-3049 | C13 | CAPACITOR—750 mmf., silver mica |
| UCN-501 | C54 | CAPACITOR—1.0 mmf., ceramic |
| UCN-2506 | C49 | CAPACITOR—6.8 mmf., ceramic |
| UCU-028 | C19, 20 | CAPACITOR—100 mmf., mica |
| UCU-064 | C12, 27, 28 | CAPACITOR—3300 mmf., mica |
| UCU-1032 | C36 | CAPACITOR—150 mmf., mica |
| UCU-1040 | C4, 18 | CAPACITOR—330 mmf., mica |
| UCU-2563 | C9 | CAPACITOR—3000 mmf., mica |
| UCW-1004 | C5 | CAPACITOR—10 mmf., ceramic |
| UCW-2007 | C44 | CAPACITOR—13 mmf., ceramic |
| UCW-2009 | C53 | CAPACITOR—16 mmf., ceramic |
| UCW-2010 | C46 | CAPACITOR—18 mmf., ceramic |
| UCW-2016 | C47 | CAPACITOR—33 mmf., ceramic |
| UCW-2017 | C50, 52 | CAPACITOR—36 mmf., ceramic |
| UCW-2022 | C37, 45 | CAPACITOR—56 mmf., ceramic |
| UCW-2025 | C48 | CAPACITOR—75 mmf., ceramic |
| UIC-001 | | CEMENT—Cement for speaker cone replacement |
| UIC-002 | | THINNER—Speaker cement thinner |
| UOP-545 | SPKR | SPEAKER—5¼-in. P.M. speaker |
| UOX-006 | | CONE—Replacement cone kit |
| URD-051 | R23 | RESISTOR—1200 ohms, ½ w., carbon |
| URD-059 | R15 | RESISTOR—2700 ohms, ½ w., carbon |
| URD-061 | R6 | RESISTOR—3300 ohms, ½ w., carbon |
| URD-073 | R21 | RESISTOR—10,000 ohms, ½ w., carbon |
| URD-075 | R16 | RESISTOR—12,000 ohms, ½ w., carbon |
| URD-085 | R5 | RESISTOR—33,000 ohms, ½ w., carbon |
| URD-089 | R9 | RESISTOR—47,000 ohms, ½ w., carbon |
| URD-093 | R13 | RESISTOR—68,000 ohms, ½ w., carbon |
| URD-095 | R3 | RESISTOR—82,000 ohms, ½ w., carbon |
| URD-105 | R2, 12 | RESISTOR—220,000 ohms, ½ w., carbon |
| URD-109 | R24 | RESISTOR—330,000 ohms, ½ w., carbon |
| URD-121 | R1, 4, 14 | RESISTOR—1.0 meg., ½ w., carbon |
| URD-129 | R8 | RESISTOR—2.2 meg., ½ w., carbon |
| URD-137 | R11, 19, R20, 22 | RESISTOR—4.7 meg., ½ w., carbon |
| URE-053 | R17 | RESISTOR—1500 ohms, 1 w., carbon |

### SPECIALIZED REPLACEMENT PARTS

| Part No. | Symbol | Description |
|---|---|---|
| RAC-002 | | COVER—Battery compartment cover |
| RAC-003 | | COVER—Power supply compartment cover |
| RAC-006 | | COVER—Case back cover (crinkle brown) |
| RAC-007 | | COVER—Case back cover (crinkle grey) |
| RAC-008 | | COVER—Case right end cover (crinkle brown) |
| RAC-009 | | COVER—Case right end cover (crinkle grey) |
| RAC-012 | | COVER—Case left end cover (crinkle brown) |
| RAC-013 | | COVER—Case left end cover (crinkle grey) |
| RAC-018 | | COVER—Back cover (Hammertone grey) |
| RAC-019 | | COVER—Back cover (Hammertone blue-green) |
| RAC-020 | | COVER—Back cover (Hammertone copper) |
| RAC-024 | | COVER—Left end cover (Hammertone grey) |
| RAC-025 | | COVER—Left end cover (Hammertone blue-green) |
| RAC-026 | | COVER—Left end cover (Hammertone copper) |
| RAC-030 | | COVER—Right end cover (Hammertone grey) |
| RAC-031 | | COVER—Right end cover (Hammertone blue-green) |
| RAC-032 | | COVER—Right end cover (Hammertone copper) |
| RAC-036 | | COVER—Antenna plug (crinkle brown) |
| RAC-037 | | COVER—Antenna plug (crinkle grey) |
| RAC-038 | | COVER—Antenna plug (Hammertone grey) |
| RAC-039 | | COVER—Antenna plug (Hammertone blue-green) |
| RAC-040 | | COVER—Antenna plug (Hammertone copper) |
| RAC-041 | | COVER—Trimmer cover (crinkle brown) |
| RAC-042 | | COVER—Trimmer cover (crinkle grey) |
| RAC-043 | | COVER—Trimmer cover (Hammertone grey) |
| RAC-044 | | COVER—Trimmer cover (Hammertone blue-green) |
| RAC-045 | | COVER—Trimmer cover (Hammertone copper) |
| RAG-005 | | COVER—Case front and grille cover (crinkle brown) |
| RAG-006 | | COVER—Case front and grille cover (crinkle grey) |
| RAG-013 | | COVER—Case front and grille cover (Hammertone grey) |
| RAG-014 | | COVER—Case front and grille cover (Hammertone blue-green) |
| RAG-015 | | COVER—Case front and grille cover (Hammertone copper) |
| RAI-001 | | BRACE—Cover brace assembly, supports hinge (crinkle brown) |
| RAI-002 | | BRACE—Cover brace assembly supports hinge (crinkle grey) |
| RAI-004 | | BRACE—Cover brace assembly, supports cover (Hammertone grey) |
| RAI-005 | | BRACE—Cover brace assembly, supports cover (Hammertone blue-green) |
| RAI-006 | | BRACE—Cover brace assembly, supports cover (Hammertone copper) |
| RAX-004 | | COVER—Case top cover assembly (crinkle brown) |
| RAX-005 | | STAY ARM ASSEMBLY |
| RAX-006 | | COVER—Case top cover assembly (crinkle grey) |
| RAX-011 | | COVER—Top cover (Hammertone grey) |
| RAX-012 | | COVER—Top cover (Hammertone blue-green) |
| RAX-013 | | COVER—Top cover (Hammertone copper) |
| RBC-001 | B2 | CELL—Bias cell assembly |
| RCC-068 | C30 | CAPACITOR—0.5 mfd., 120 v., paper |
| RCC-069 | C29 | CAPACITOR—0.5 mfd., 120 v., paper |
| RCC-070 | C34, 35 | CAPACITOR—0.5 mfd., 120 v., paper |
| RCC-073 | C31 | CAPACITOR—.003 mfd., 1500 v., paper |
| RCE-007 | C26A, B, C | CAPACITOR—15 mfd., 150 v.; 15 mfd., 150 v; 1200 mfd., 1.5 v.; dry electrolytic |
| RCE-012 | C51 | CAPACITOR—10 mfd., 150 v., dry electrolytic |
| RCE-016 | C33 | CAPACITOR—1200 mfd., 1.5 v., dry electrolytic |
| RCT-011 | C1A, B;<br>C2A, B;<br>C3A, B | CONDENSER—Tuning condenser and trimmers |
| RCW-062 | C7 | CAPACITOR—100 mmf., ceramic |
| RCY-012 | C39, 40, 41, C42, 43 | TRIMMER STRIP—Antenna trimmer strip |
| RDB-005 | | PUSH BUTTON—Single push button |
| RDC-011 | | ASSEMBLY—Dial cord and spring |
| RDE-009 | | ESCUTCHEON—Main dial escutcheon |
| RDK-020 | | KNOB—Tuning knob |
| RDK-033 | | KNOB—Volume control knob |
| RDP-013 | | POINTER—Dial pointer assembly |
| RDS-019 | | SCALE—Dial scale |
| RDX-017 | | PUSH BUTTON—Charge-Tone push button and escutcheon assembly |
| RDX-018 | | PUSH BUTTON—Band selector push button and escutcheon assembly |
| RDX-022 | S1 | SWITCH—Push button band switch assembly |
| REF-001 | F1 | FUSE—¼ amp. fuse, Type 3AG-¼ |
| REV-001 | V1 | VIBRATOR—Vibrator unit |
| REX-001 | X1, 2, 3, 4 | RECTIFIER—Copper oxide rectifier assembly |
| RHF-001 | | FOOT—Cabinet foot |
| RHK-001 | | KNOB—Lock mechanism (crinkle brown) |
| RHK-002 | | KNOB—Lock mechanism (crinkle grey) |
| RHK-003 | | KNOB—Lock mechanism (Hammertone grey) |
| RHK-004 | | KNOB—Lock mechanism (Hammertone blue-green) |
| RHK-005 | | KNOB—Lock mechanism (Hammertone copper) |
| RHX-003 | | HARDWARE—Tuning condenser mounting hardware |
| RHX-008 | | STUD—Handle stud and cotter |
| RHY-001 | | HANDLE—Case cover handle (crinkle brown) |
| RHY-002 | | HANDLE—Case cover handle (crinkle grey) |
| RHY-003 | | HANDLE—Case cover handle (Hammertone grey) |
| RHY-004 | | HANDLE—Case cover handle (Hammertone blue-green) |
| RHY-005 | | HANDLE—Case cover handle (Hammertone copper) |
| RIG-001 | | GASKET—Dial scale gasket |
| RJB-004 | P2 | BOARD—Loop antenna terminal board |
| RJP-014 | | PLUG—Battery terminal contact pins |
| RJS-019 | | SOCKET—Vibrator socket |
| RJS-020 | | SOCKET—Loktal base tube socket |
| RJS-021 | | SOCKET—Electrolytic mounting plate socket |
| RJS-026 | | SOCKET—Octal base tube socket |
| RJW-001 | | HOLDER—Fuse holder |
| RLB-011 | L3 | COIL—Broadcast RF coil |
| RLB-012 | L8 | COIL—RF coil, 49 meter |
| RLB-013 | L9 | COIL—RF coil, 31 meter |
| RLB-014 | L10 | COIL—RF coil, 25 meter |
| RLB-015 | L11 | COIL—RF coil, 19 meter |
| RLB-016 | L12 | COIL—RF coil, 16 meter |
| RLC-018 | L4 | COIL—Broadcast oscillator coil |
| RLC-035 | L13 | COIL—Oscillator coil, 49 meter |
| RLC-036 | L14 | COIL—Oscillator coil, 31 meter |
| RLC-037 | L15 | COIL—Oscillator coil, 25 meter |
| RLC-038 | L16 | COIL—Oscillator coil, 19 meter |
| RLC-039 | L17 | COIL—Oscillator coil, 16 meter |
| RLF-001 | L5 and 6 | CHOKE—Vibrator and B + choke |
| RLF-004 | L7 | CHOKE—Filament choke |
| RLL-007 | L2 | BEAM-A-SCOPE—SW band loop antenna (external) |
| RLL-012 | L1 | BEAM-A-SCOPE—"B" band loop in cover (crinkle brown) |
| RLL-019 | L1 | BEAM-A-SCOPE—"B" band loop in cover (crinkle grey) |
| RLL-020 | L1 | BEAM-A-SCOPE—"B" band loop in cover (Hammertone grey) |
| RLL-021 | L1 | BEAM-A-SCOPE—"B" band loop in cover (Hammertone blue-green) |
| RLL-022 | L1 | BEAM-A-SCOPE—"B" band loop in cover (Hammertone copper) |
| RLP-009 | L18 | CHOKE—I-f plate choke |
| RMC-008 | | CAM—Cover lock mechanism cam |
| RMC-009 | | CATCH—Cover lock mechanism catch |
| RMU-013 | | SHAFT—Tuning shaft and retainer ring |
| RMW-004 | | PULLEY—Dial drive pulley (small), and stud |
| RMW-009 | | PULLEY—Dial drive pulley (large), and stud |
| RMX-013 | | CATCH—Battery compartment cover catch |
| RMX-020 | | CHAIN—Trimmer cover chain |
| RMX-082 | | CATCH—Spring catch for rear cabinet cover |
| RMX-083 | | TUBE—Vent tube and casing |
| RRC-015 | R10 | VOLUME CONTROL—1.0 megohm potentiometer |
| RRW-018 | R18 | RESISTOR—7.5 ohm, ½ w., w.w. |
| RSP-003 | S2 and 3 | SWITCH—Operation and tone push button switch |
| RTC-001 | T4 | TRANSFORMER—Charging transformer |
| RTC-002 | T6 | TRANSFORMER—Charging transformer |
| RTL-028 | T1 and 2 | TRANSFORMER—IF transformer, 1st or 2nd |
| RTO-007 | T3 | TRANSFORMER—Output transformer |
| RTV-001 | T5 | TRANSFORMER—Vibrator transformer |
| RWL-005 | P3 | CORD—Power cord |



TERMINALS A THROUGH J ARE NON-OPERATING LUGS ON THE SWITCH AND ARE USED ONLY FOR TIE-IN CONNECTIONS.

**Band Selector Switch Terminal Diagram**

**ELECTRICAL RATING:**

**Charging from A-C Line:**

| | |
|---|---|
| Voltage | 105–125 volts, a-c only |
| Frequency | 50/60 cycles/sec. |
| Wattage | 12 watts |

**Operating from Internal Battery:**

| | |
|---|---|
| Voltage | 2.1 volts |
| Current | 1.9 amperes |
| Wattage | 4 watts |
| Hours of Operation without Recharging Battery | 10-13 Approx. |

**Battery Requirement:**

Willard 2.0 volt, No. 25-2, rechargeable battery or equivalent.

**Fuse:**

GE, No. 2548, ¼-ampere rating.

**OPERATING FREQUENCIES:**

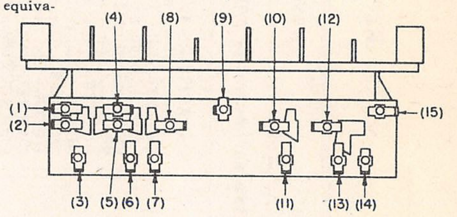
| | |
|---|---|
| I-F Amplifier | 455 kc |
| Broadcast Band | 540–1600 kc |
| 49 M. Band | 5.9–6.5 mc |
| 31 M. Band | 9.5–9.85 mc |
| 25 M. Band | 11.65–11.9 mc |
| 19 M. Band | 15.07–15.35 mc |
| 16 M. Band | 17.65–17.9 mc |

**POWER OUTPUT:**

| | |
|---|---|
| Undistorted | 248 milliwatts |
| Maximum | 365 milliwatts |

**LOUDSPEAKER:**

| | |
|---|---|
| Type | Alnico PM |
| Outside Cone Diameter | 5¼ inches |
| Voice Coil Impedance (400 cps) | 3.2 ohms |

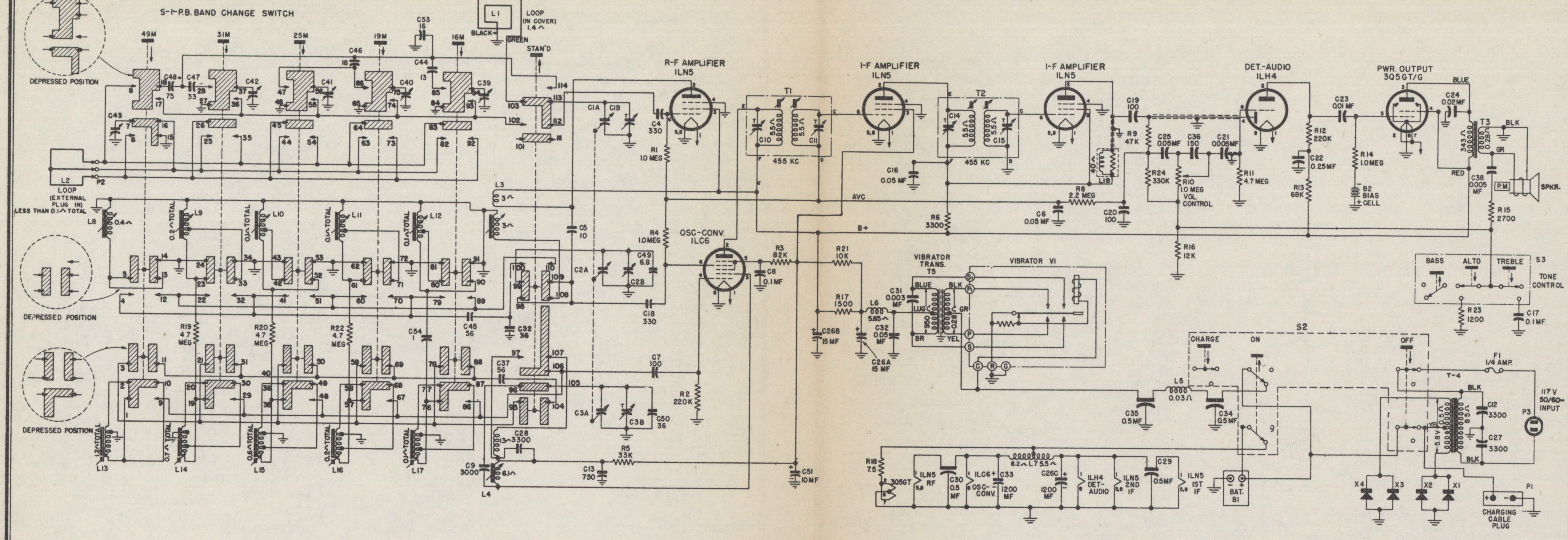


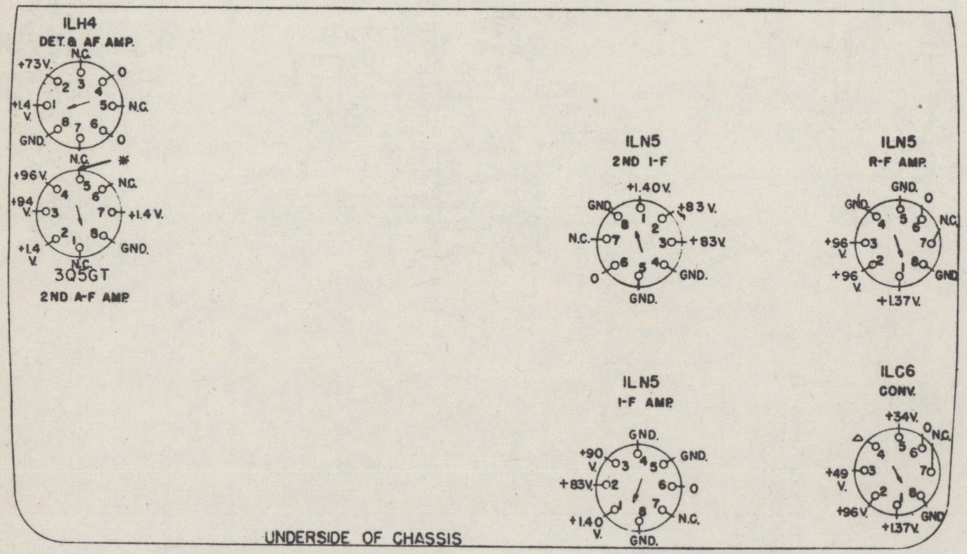
(1) TO F1
(2) TO JUNCTION T4 & C12
(3) TO JUNCTION R18 & 3Q5GT FIL.(2&7)
(4) TO P1 & CENTER TAP T4 SECONDARY
(5) TO BATTERY (+)
(6) TO C34
(7) TO L7 (CENTER) & R18
(8) TO BATTERY (+)
(9) TO GND.
(10)(12) TO R15
(11) TO R23
(13) TO C17
(14) TO R10 & C21
(15) TO C21 & R11

**Operations Switch Wiring Diagram**

**MODEL 260**

# GENERAL ELECTRIC CO.

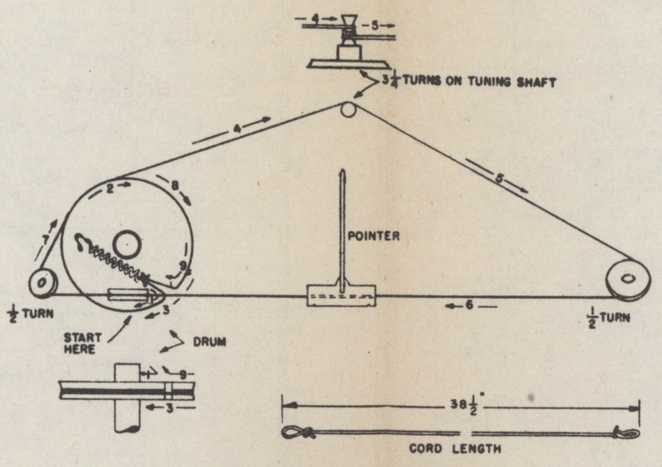

S-1-P.B. BAND CHANGE SWITCH
DEPRESSED POSITION
49M
31M
25M
19M
16M
LOOP (IN COVER) 1.4 ∧
BLACK
GREEN
STAN'D
LOOP (EXTERNAL PLUG IN) LESS THAN 0.1∧ TOTAL
R-F AMPLIFIER 1LN5
I-F AMPLIFIER 1LN5
I-F AMPLIFIER 1LN5
DET.-AUDIO 1LH4
PWR. OUTPUT 3Q5GT/G
OSC-CONV. 1LC6
455 KC
AVC
B+
R1 10 MEG
R4 1.0 MEG
R2 220K
R3 82K
R21 10K
R17 1500
R8 2.2 MEG
R6 3300
R9 47K
R24 330K
R10 1.0 MEG VOL. CONTROL
R11 4.7 MEG
R12 220K
R13 68K
R14 1.0 MEG
R15 2700
R16 12K
R19 4.7 MEG
R20 4.7 MEG
R22 4.7 MEG
R5 33K
R18 7.5
R23 1200
B2 BIAS CELL
SPKR.
P.M.
VIBRATOR TRANS. T5
VIBRATOR V1
BASS
ALTO
TREBLE
S3
TONE CONTROL
S2
CHARGE
ON
OFF
F1 1/4 AMP.
T-4
117 V 50/60~ INPUT
P3
P1
CHARGING CABLE PLUG
BAT. B1
X1
X2
X3
X4
L13
L14
L15
L16
L17
L4


1LH4
DET. & AF AMP.
3Q5GT
2ND A-F AMP.
1LN5
2ND I-F
1LN5
R-F AMP.
1LN5
I-F AMP.
1LC6
CONV.
UNDERSIDE OF CHASSIS

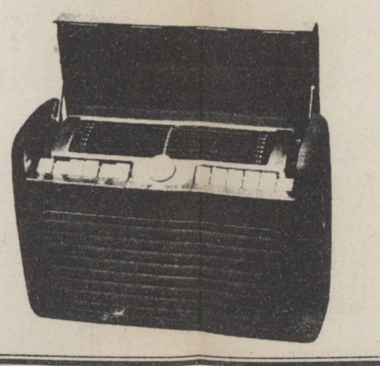
CONDITIONS OF TEST:
ALL MEASUREMENTS D-C
MEASUREMENTS MADE TO GROUND
MEASUREMENTS MADE WITH 20,000 OHM/VOLT METER
LINE VOLTAGE 117 V.- BATTERY FULLY CHARGED
VOL. CONTROL MAX. CLOCKWISE
TONE CONTROL TREBLE POSITION
RECEIVER OPERATING ON BROADCAST BAND

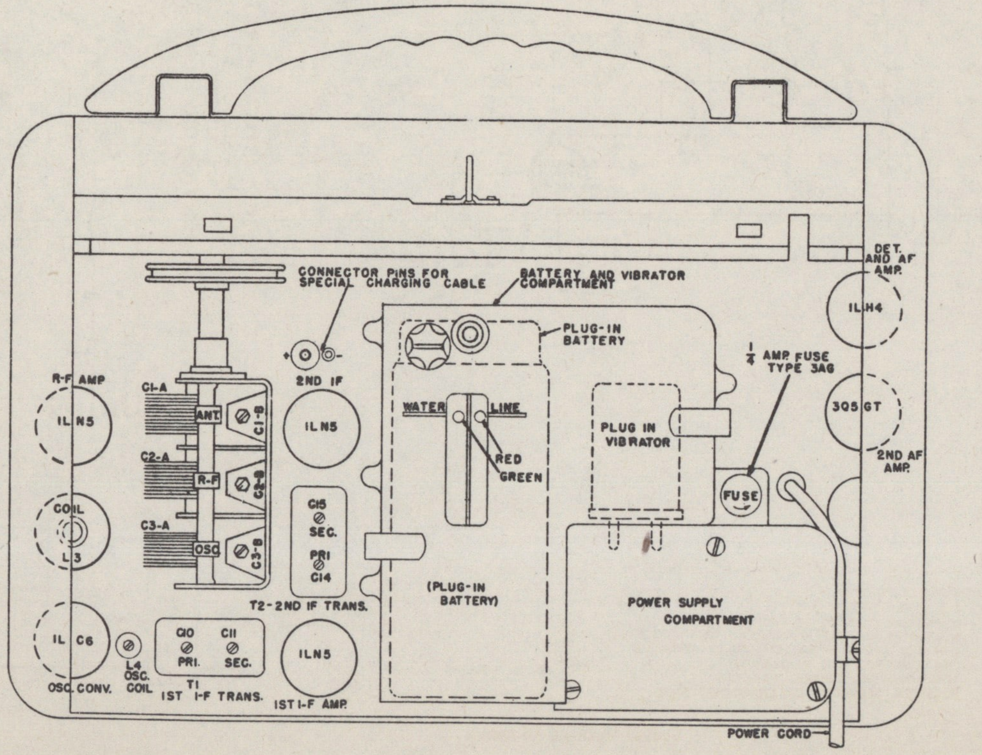
N.C - NOT CONNECTED TO TUBE
# - 4.5V IF MEASURED WITH V.T.V.M.
CENTER POST ON ALL LOCTAL TUBES IS GROUNDED
△ READING AFFECTED BY INSTRUMENT

**Socket Voltage Diagram**


3½ TURNS ON TUNING SHAFT
POINTER
½ TURN
½ TURN
START HERE
DRUM
38½"
CORD LENGTH

**Dial Stringing Diagram**

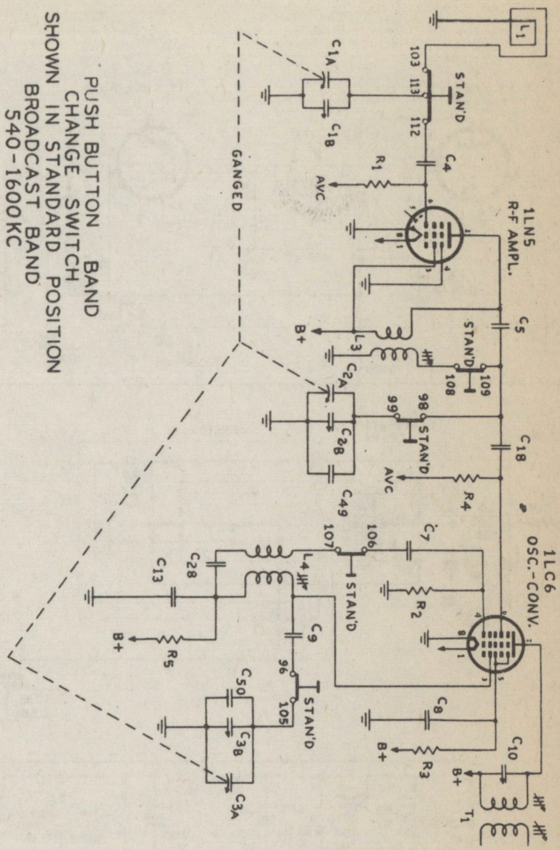



CONNECTOR PINS FOR SPECIAL CHARGING CABLE
BATTERY AND VIBRATOR COMPARTMENT
PLUG-IN BATTERY
R-F AMP
1LN5
2ND IF
1LN5
WATER LINE
RED
GREEN
PLUG IN VIBRATOR
¼ AMP. FUSE TYPE 3AG
FUSE
DET. AND AF AMP.
1LH4
3Q5GT
2ND AF AMP.
COIL L3
1LC6
OSC. CONV.
L6 OSC. COIL
C10 PRI.
C11 SEC.
T1 1ST I-F TRANS.
1LN5
1ST I-F AMP.
C15 SEC.
PRI C14
T2-2ND IF TRANS.
(PLUG-IN BATTERY)
POWER SUPPLY COMPARTMENT
POWER CORD
C1-A
C2-A
C3-A
ANT
R-F
OSC
C1-B
C2-B
C3-B

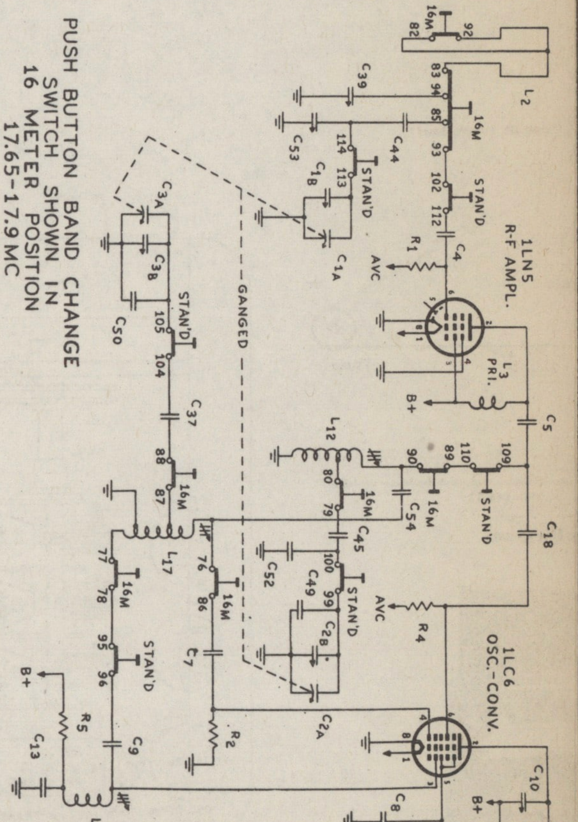
**Tube and Trimmer Location**

MODEL 260

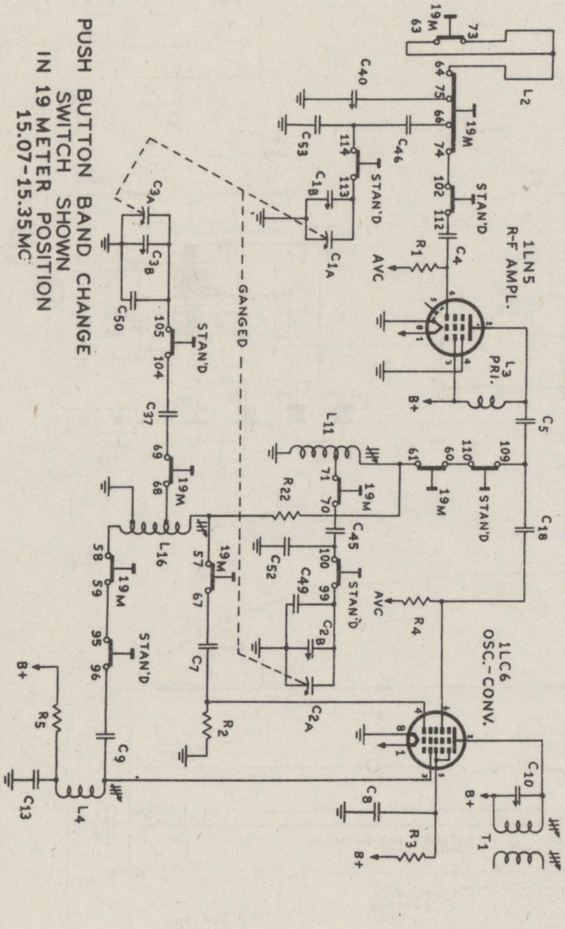
# GENERAL ELECTRIC CO.


1LN5
R-F AMPL.
1LC6
OSC.-CONV.
L1
STAN'D
C1A
C1B
C2A
C2B
C3A
C3B
C4
C5
C7
C8
C9
C10
C13
C18
C28
C49
C50
R1
R2
R3
R4
R5
L3
L4
T1
AVC
B+
GANGED

PUSH BUTTON BAND CHANGE SWITCH SHOWN IN STANDARD POSITION BROADCAST BAND 540-1600KC


1LN5
R-F AMPL.
1LC6
OSC.-CONV.
L2
L3 PRI.
L4
L12
L17
T1
16M
STAN'D
C1A
C1B
C2A
C2B
C3A
C3B
C4
C5
C7
C8
C9
C10
C13
C18
C37
C39
C44
C45
C49
C50
C52
C53
C54
R1
R2
R3
R4
R5
AVC
B+
GANGED

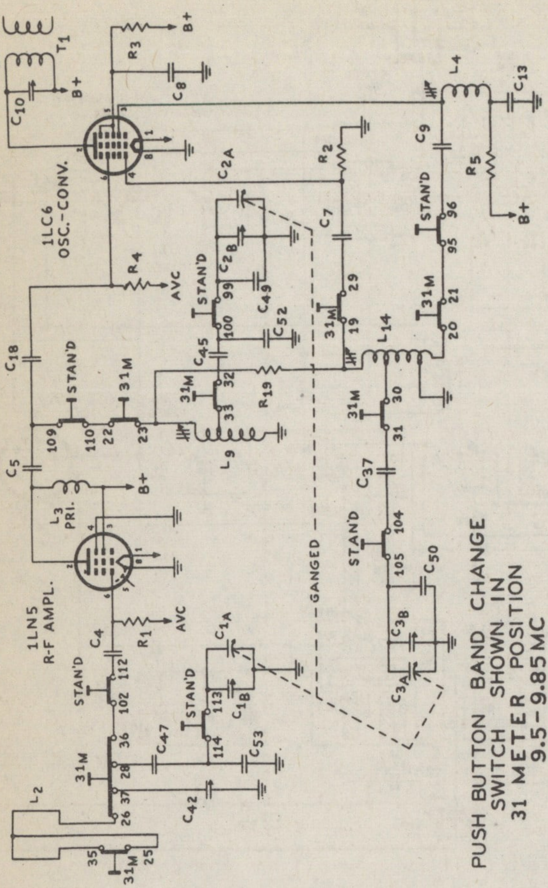
PUSH BUTTON BAND CHANGE SWITCH SHOWN IN 16 METER POSITION 17.65-17.9MC


1LN5
R-F AMPL.
1LC6
OSC.-CONV.
L2
L3 PRI.
L4
L11
L16
T1
19M
STAN'D
C1A
C1B
C2A
C2B
C3A
C3B
C4
C5
C7
C8
C9
C10
C13
C18
C37
C40
C45
C46
C49
C50
C52
C53
R1
R2
R3
R4
R5
R22
AVC
B+
GANGED

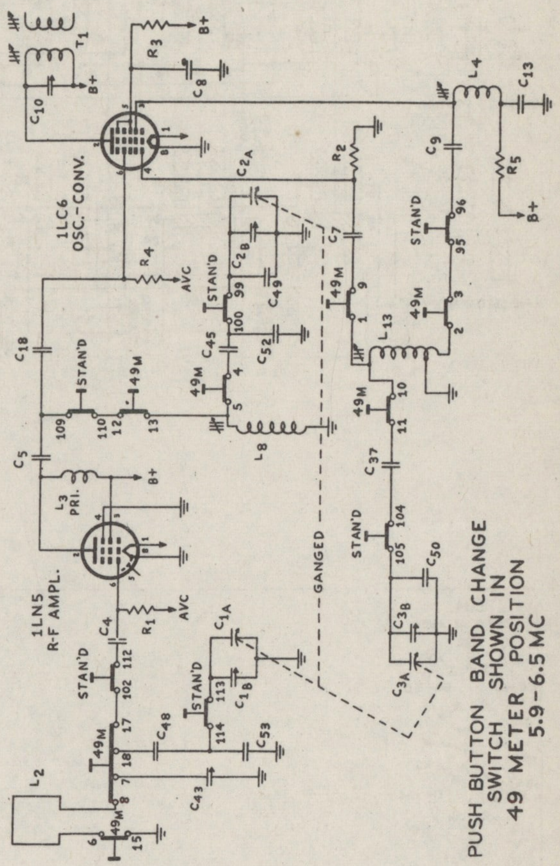
PUSH BUTTON BAND CHANGE SWITCH SHOWN IN 19 METER POSITION 15.07-15.35MC

**MODEL 260**

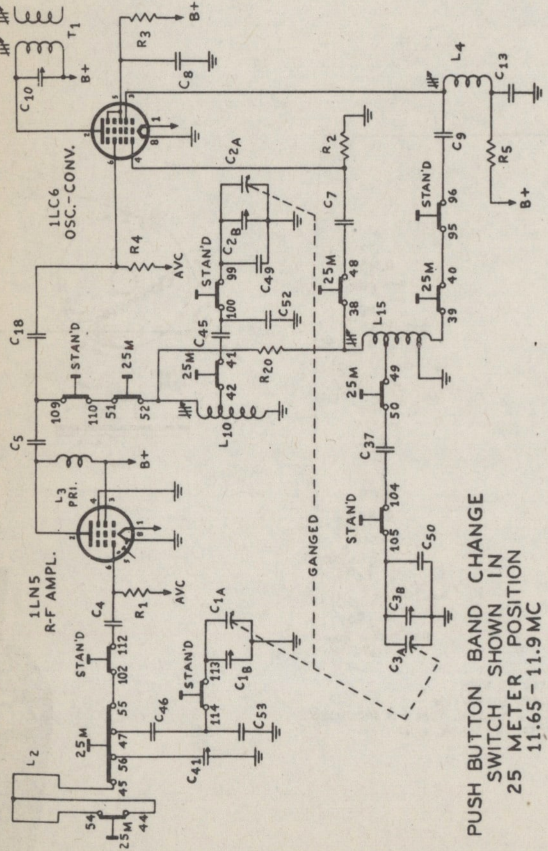
## GENERAL ELECTRIC CO.


T1
B+
R3
C8
C10
L4
C13
C9
R5
1LC6
OSC.-CONV.
R2
C2A
C7
STAN'D
96
95
R4
AVC
C2B
C49
C52
100
99
31M
29
19
L14
21
20
C18
C45
32
33
R19
30
31
109
110
22
23
L9
C5
L3
PRI.
C37
104
105
C50
GANGED
1LN5
R-F AMPL.
R1
C4
112
102
C1A
C1B
113
114
C3B
C3A
36
28
37
26
C47
C53
C42
L2
35
25

PUSH BUTTON BAND CHANGE SWITCH SHOWN IN 31 METER POSITION 9.5-9.85 MC


T1
B+
R3
C8
C10
L4
C13
C9
R5
1LC6
OSC.-CONV.
R2
C2A
C7
R4
AVC
C2B
C49
STAN'D
99
100
C45
C52
49M
9
1
3
2
96
95
L13
10
11
C18
4
5
109
110
12
13
L8
C5
L3
PRI.
C37
104
105
C50
GANGED
1LN5
R-F AMPL.
R1
C4
112
102
C1A
C1B
113
114
C3B
C3A
17
18
7
8
C48
C53
C43
L2
6
15

PUSH BUTTON BAND CHANGE SWITCH SHOWN IN 49 METER POSITION 5.9-6.5 MC


T1
B+
R3
C8
C10
L4
C13
C9
R5
1LC6
OSC.-CONV.
R2
C2A
C7
STAN'D
96
95
R4
AVC
C2B
C49
C52
100
99
25M
48
38
40
39
L15
C18
C45
41
42
R20
49
50
109
110
51
52
L10
C5
L3
PRI.
C37
104
105
C50
GANGED
1LN5
R-F AMPL.
R1
C4
112
102
C1A
C1B
113
114
C3B
C3A
55
47
56
45
C46
C53
C41
L2
54
44

PUSH BUTTON BAND CHANGE SWITCH SHOWN IN 25 METER POSITION 11.65-11.9 MC

## ELECTRICAL CIRCUIT ALIGNMENT

### 1. EQUIPMENT REQUIRED.

1. Signal Generator with Audio Tone Modulation.
2. A-c output meter, 1 or 1½ volts full scale, 1000 ohms/-volt.
3. Insulated screwdriver.

### 2. ALIGNMENT PROCEDURE.

1. *General.*—The alignment procedure is given in table form for convenience. Reference is made to Figures 3, 5, and 6 for the trimmer locations. The low side of the signal generator should be connected to the chassis of the receiver for i-f alignment; the high side should be connected as indicated in the Alignment Chart. A meter or some other suitable indicating device must be connected to the output of the receiver. Two methods for connecting an output meter are given in later paragraphs.

When aligning the receiver, the Volume Control on the receiver should be turned to its maximum position and the TREBLE push button should be depressed. The output signal of the signal generator should be kept as low as possible at all times; the reading of a meter connected across the voice coil leads of the receiver should be kept below ½ volt by changing the signal generator output. If the signal level is too high, the AVC becomes effective and alignment errors may result.

The following paragraphs give greater details regarding the connection of the output meter and the signal generator to the receiver during alignment.

2. *Connecting the Output Meter.*—In aligning the receiver, some means for indicating differences in the output voltage will be required. Either of the following methods is satisfactory. The first requires more disassembly of the receiver case than the second, but the second requires additional test equipment.

*Method 1.*—A satisfactory method for indicating differences in output is to connect a rectifier-type a-c meter of 1 or 1½ volts full scale deflection across the speaker voice coil terminals. To gain access to the speaker, remove the front panel from the radio as previously described. Connect a lead to the green lead that connects to the ungrounded side of the speaker voice coil. Thread this lead through into the rear compartment. The front panel is reinstalled in place so that the stray capacities in the set will be the same as when the set is operating normally. Connect the meter between this lead and ground. A convenient ground connection may be obtained by removing the push-button band change switch escutcheon, and connecting a clip lead to the exposed chassis.

## STAGE GAINS AND VOLTAGE CHECKS

**Stage gain measurements may be made with a vacuum tube voltmeter to check circuit performance and to locate stages which are not operating properly. The gain values listed may have a tolerance of 20%.**

**1. *R-F and I-F Stage Gains.***

| | |
|---|---|
| R-F amplifier grid (6) to converter grid (6) | 8.0 at 1000 kc |
| R-F amplifier grid (6) to converter grid (6) | 6.0 at 6100 and 9600 kc |
| R-F amplifier grid (6) to converter grid (6) | 5.0 at 11.8, 15.2 and 17.8 mc |
| Converter grid (6) to 1st IF grid (6) | 26 at 455 kc |
| Converter grid (6) to 1st IF grid (6) | 15 at 1000 kc |
| Converter grid (6) to 1st IF grid (6) | 15 at 6100 kc, 9600 kc, 11.8 mc, 15.2 mc, and 17.8 mc |
| 1st IF grid (6) to 2nd IF grid (6) | 69 at 455 kc |
| 2nd IF grid (6) to diode plates | 3.9 at 455 kc |

**2. *Audio Gain.***

**The power output across the speaker voice coil should be approximately 50 milliwatts with a 400 cps audio signal of 0.07 volts applied across the volume control, R10 (volume control maximum—TREBLE push button depressed).**

**3. *Oscillator Grid Bias.***

**The d-c voltage developed across the oscillator grid leak (R2) averages 6.5 volts at 1000 kc.**

*Method 2.*—The following is an alternate method which eliminates the necessity of removing the front panel of the set, but which requires additional test equipment. Make an indicating device by connecting a 4- to 6-inch diameter magnetic speaker or the high-impedance leads from the output transformer of a good p-m dynamic speaker to the terminals of a rectifier-type microammeter with a full scale deflection of 100 microamperes or less. For convenience, the meter and speaker may be mounted in a small box in such a way that the meter will be visible when the speaker is placed in front of the speaker on the receiver being aligned.

To use this device, place its speaker in front of and about an inch away from the speaker of the receiver being aligned. The meter will then deflect in proportion to the intensity of the sound produced by the speaker, and therefore may be used as an output meter. The meter must not be moved during alignment.

3. *Connecting the Signal Generator.*—For aligning the i-f transformers, the output of the signal generator should be coupled through a 0.05 mf. capacitor to the grid (pin 6) of the 1LC6 oscillator-converter tube. This may be accomplished easily by connecting the capacitor to the stator of C2-A, the middle section of the tuning gang, as this stator is connected to the converter grid through a blocking condenser. The low side of the signal generator output should be connected to the chassis ground to complete the circuit.

For aligning the oscillator, r-f, and loop circuits, the r-f signal should be inductively coupled by means of a three- or four-turn, 6-inch diameter, loop of bell wire across the signal generator output terminals. The loop should be located about one foot from the radio cover, with cover open for broadcast alignment, and about one foot away from the external loop **when making the shortwave band alignment. To prevent possible errors in peak readings, the position of the loop with respect to the receiver should not be changed during any one set of adjustments.**

**4. *Alignment Suggestions.*—The dial pointer should fall under the extreme left end mark on the dial scale when the gang condenser is fully closed. If necessary, move the dial pointer along the dial drive cord until such registration is obtained.**

**To gain access to the shortwave oscillator tuning slugs, L13 through L17, remove the snap cover from the bottom of the receiver. The short-wave antenna and converter trimmers are accessible when the push-button band-change switch escutcheon (right-hand side) is removed. When aligning the trimmers on the gang condenser (for broadcast band alignment), close the cabinet back cover and make the adjustments through the snap button openings in the back cover.**

**The oscillator operates on the high frequency side of the signal on all bands. With this method of operation, and with the dial set at an alignment point, the image response should be heard when the signal generator is tuned to a frequency 910 kc higher than the alignment frequency.**

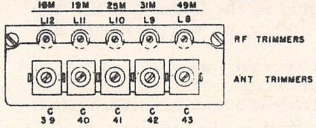
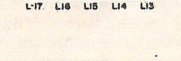


**Fig. 5. RF and Antenna Trimmer Location**

**Fig. 6. Oscillator Trimmer Location**



## ALIGNMENT CHART

***Depress Treble Push Button***
***Turn Volume Control to Maximum***

| Step | Sig. Gen. Setting | Connect Signal Generator to | Depress Push Button | Dial Scale Setting | Adjust |
|---|---|---|---|---|---|
| 1 | 455 kc | Stator of C-2A in series with .05 mf | Standard | Below 550 kc | 2nd i-f (T2) trimmers for max. |
| 2 | 455 kc | Stator of C-2A in series with .05 mf | Standard | Below 550 kc | 1st i-f (T1) trimmers for max. |
| 3 | 1500 kc | Inductively coupled | Standard | 1500 kc | **C-3B, C-2B, and C-1B for max. in sequence given |
| 4 | 580 kc | Inductively coupled | Standard | 580 kc | * L4 and L3 for max. |
| 5 | Repeat Step 3 | | | | |
| 6 | 6.1 mc | Inductively coupled | 49 M | 6.1 mc | L13 for max. |
| 7 | 6.1 mc | Inductively coupled | 49 M | 6.1 mc | * L8 and C43 for max. |
| 8 | 9.6 mc | Inductively coupled | 31 M | 9.6 mc | L14 for max. |
| 9 | 9.6 mc | Inductively coupled | 31 M | 9.6 mc | * L9 and C42 for max. |
| 10 | 11.8 mc | Inductively coupled | 25 M | 11.8 mc | L15 for max. |
| 11 | 11.8 mc | Inductively coupled | 25 M | 11.8 mc | * L10 and C41 for max. |
| 12 | 15.22 mc | Inductively coupled | 19 M | 15.22 mc | L16 for max. |
| 13 | 15.22 mc | Inductively coupled | 19 M | 15.22 mc | * L11 and C40 for max. |
| 14 | 17.8 mc | Inductively coupled | 16 M | 17.8 mc | L17 for max. |
| 15 | 17.8 mc | Inductively coupled | 16 M | 17.8 mc | * L12 and C39 for max. |

* Alternately peak circuits to obtain peak while rocking gang condenser.
** Remove snap buttons on back cover to permit these adjustments and close back cover while aligning.
NOTE.—The oscillator operates on the high frequency side of the signal on all bands.

## BATTERY INFORMATION

The receiver uses a 2-volt Willard Radio Battery No. 25-2 or equivalent. It has a 25 ampere-hour capacity and should be cared for in the same manner as any other storage battery.

***Charge Indicator***

The degree of charge of the battery can be determined by raising the back cover of the radio and referring to the charge ball indicators visible through the hole in the metal battery case.

If the battery is fully charged, two indicator balls will be visible at the surface of the liquid in the battery. When the battery discharges, these ball indicators will sink and disappear in the following order:

1. Green indicator sinks when approximately 20 per cent of battery capacity has been discharged.
2 The red ball sinks when battery is 80 per cent discharged.

On charge, the balls rise or float in the reverse order and the charge may be stopped when both balls appear in the opening.

***To Charge Battery***

The battery is charged by merely plugging the receiver power cord in the rated a-c power outlet and depressing the CHARGE push button. Frequent check should be made of the charge indicator and when both indicator balls are visible, the battery is adequately charged. Charging the battery after all indicator balls are visible will not harm the battery except that it will evaporate the water faster. A completely discharged battery will be restored usually within 20 to 30 hours.

When operating the receiver from the a-c house current, the battery floats or is being charged at a slow rate. Thus, if you wish to operate the receiver at the same time that you are charging even a fully discharged battery, plug the power cord in the a-c receptacle and depress the ON push button. Prolonged operation in this manner usually will cause the battery potential to stabilize at some voltage determined by the line voltage and the characteristics of the charging circuit components. The degree of charge obtainable with this method of operation likewise is dependent on the line voltage and the characteristics of the charging circuit components.

***Battery Operating Instructions***

1. Add distilled or tap water in the filler cap at sufficiently frequent intervals to keep liquid level at indicator mark as viewed through opening in battery case. DO NOT OVERFILL as this impairs the nonspill feature.
2. Whenever possible, it is best not to allow the battery to become discharged to the extent that both indicators disappear.

However, if both indicators have sunk, the battery should be recharged immediately or within 24 hours.

3. A battery will continually discharge at a slow rate even when not in use. For this reason, monthly checks should be made of the charge condition, and the battery should be placed on charge when necessary. This will prevent damage to the battery such as freezing during cold weather.

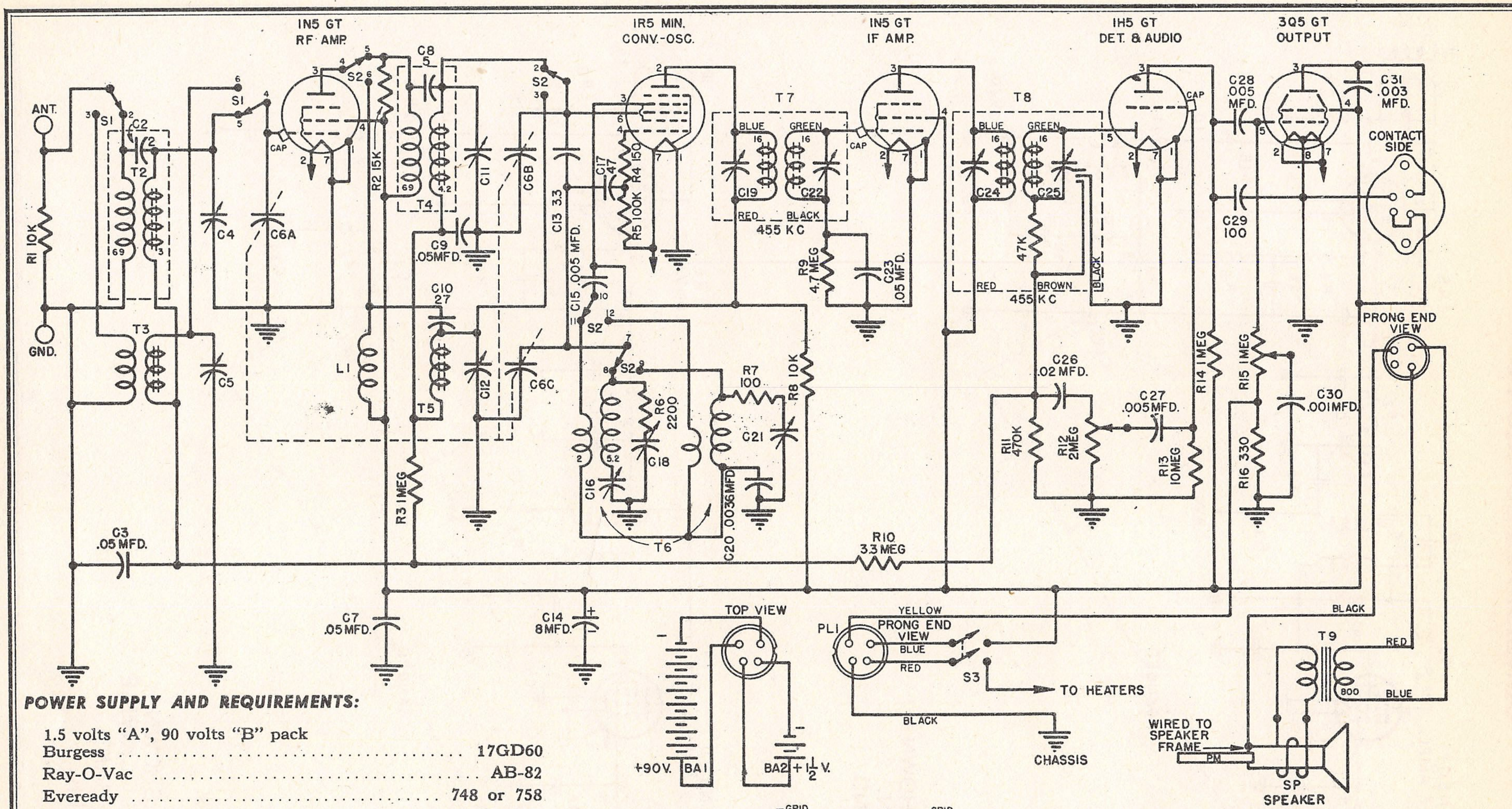
## BATTERY INSTALLATION

The following instructions should be carefully followed in installing a battery, or replacing an old one:

1. Remove new battery from packing carton.
2. If needed, add water to bring liquid level to indicator mark on battery container. *Do not overfill.*
3. Raise back cover on radio, remove battery case cover. The latter is removed by unclipping the two catches. Pry off cover.
4. Unplug old battery if present, and replace with new battery.
5. Place battery on charge, if necessary, as described in a previous paragraph, until both indicators are showing in the opening in the case cover.

# GENERAL ELECTRIC CO.

## MODEL 280


IN5 GT RF AMP.
IR5 MIN. CONV.-OSC.
IN5 GT IF AMP.
IH5 GT DET. & AUDIO
3Q5 GT OUTPUT
ANT.
GND.
RI 10K
S1
C2
T2
T3
C4
C5
C6A
C6B
C6C
S2
C8 5
T4
C9 .05MFD.
C10 27
C11
C12
T5
L1
R2 15K
R3 1MEG
C3 .05MFD.
C7 .05MFD.
C13 3.3
C15 .005 MFD.
C17 47
R4 150
R5 100K
C14 8MFD.
C16
C18
R6 2200
T6
R7 100
R8 10K
C20 .0036MFD
C21
T7
BLUE
GREEN
C19
C22
RED
BLACK
455 KC
R9 4.7MEG
C23 .05MFD.
R10 3.3MEG
T8
C24
C25
47K
BROWN
455 KC
C26 .02MFD.
C27 .005MFD.
R11 470K
R12 2MEG
R13 10MEG
R14 1MEG
R15 1MEG
R16 330
C28 .005 MFD.
C29 100
C30 .001MFD.
C31 .003 MFD.
CONTACT SIDE
PRONG END VIEW
TOP VIEW
PL1
PRONG END VIEW
YELLOW
BLUE
RED
BLACK
S3
TO HEATERS
CHASSIS
+90V.
BA1
BA2
+1½ V.
T9
800
WIRED TO SPEAKER FRAME
PM
SP
SPEAKER
CAP

### POWER SUPPLY AND REQUIREMENTS:

| | |
|---|---|
| 1.5 volts "A", 90 volts "B" pack | |
| Burgess | 17GD60 |
| Ray-O-Vac | AB-82 |
| Eveready | 748 or 758 |
| General | 60 DL-11L |

### OPERATING FREQUENCIES:

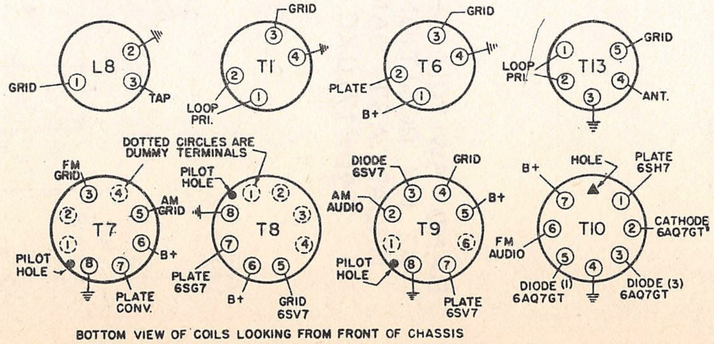
| | |
|---|---|
| Broadcast Band | 540-1710 kc |
| Shortwave Band | 5.8-18.3 mc |
| I-F Amplifier | 455 kc |

### POWER OUTPUT:

| | |
|---|---|
| Undistorted | 0.15 watt |
| Maximum | 0.27 watt |

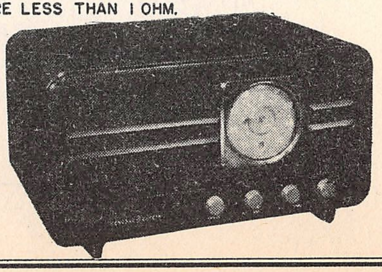
### LOUDSPEAKER:

| | |
|---|---|
| Type | Alnico P.M. |
| Outside Cone Diameter | 6 in. |
| Voice Coil Impedance (400 cycles) | 3.2 ohms |

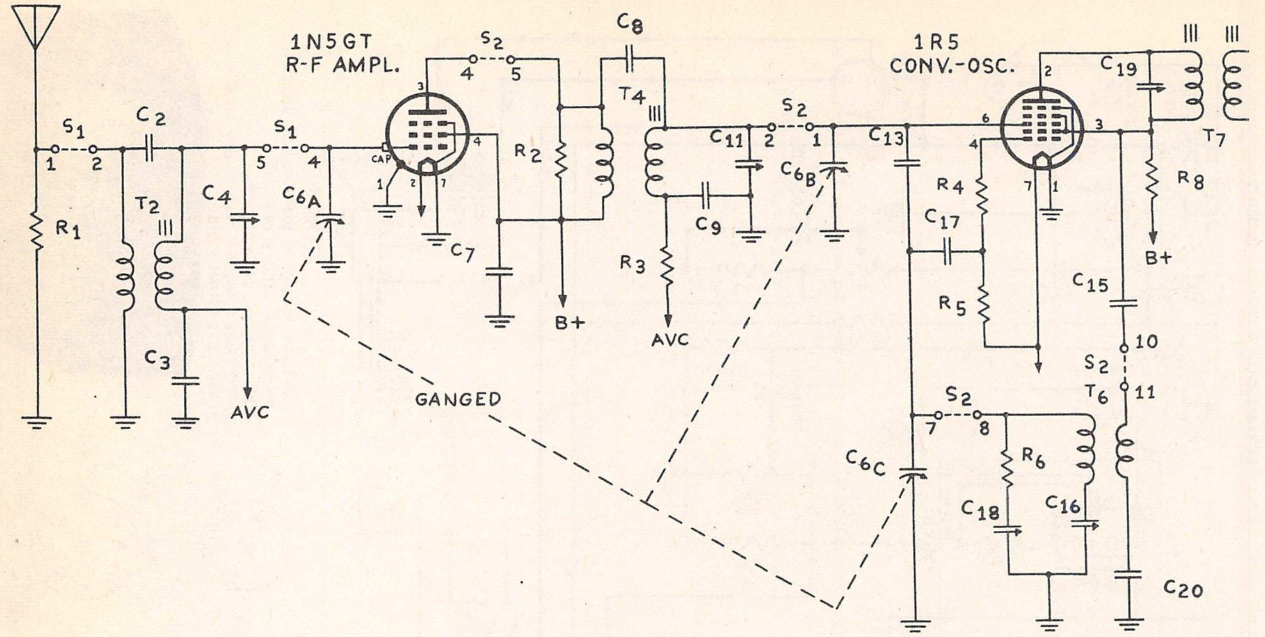

L8
GRID
TAP
T1
GRID
LOOP PRI.
T6
GRID
PLATE
B+
T13
GRID
LOOP PRI.
ANT.
DOTTED CIRCLES ARE DUMMY TERMINALS
T7
FM GRID
AM GRID
B+
PILOT HOLE
PLATE CONV.
T8
PILOT HOLE
PLATE 6SG7
B+
GRID 6SV7
T9
DIODE 6SV7
GRID
AM AUDIO
B+
PILOT HOLE
PLATE 6SV7
T10
HOLE
PLATE 6SH7
B+
CATHODE 6AQ7GT
FM AUDIO
DIODE (1) 6AQ7GT
DIODE (3) 6AQ7GT

BOTTOM VIEW OF COILS LOOKING FROM FRONT OF CHASSIS

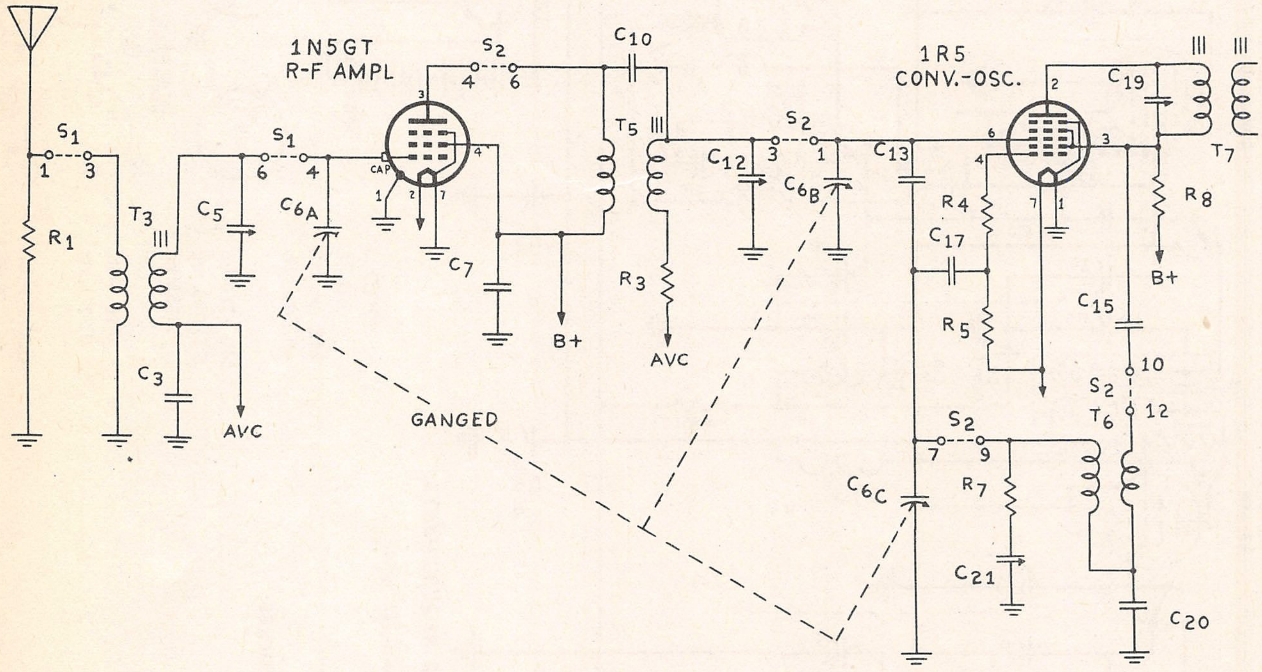
CAPACITY VALUES IN MMF UNLESS SPECIFIED.
RESISTANCE VALUES IN OHMS.
"K"=1000, i.e., 22K= 22,000.
RESISTANCE VALUES NOT SHOWN ON COILS ARE LESS THAN 1 OHM.



# GENERAL ELECTRIC CO.


1N5GT
R-F AMPL.
S1
1
2
C2
S1
5
4
C4
C6A
R1
T2
C3
AVC
CAP
C7
S2
4
5
R2
C8
T4
B+
C11
2
C9
R3
AVC
S2
1
C6B
GANGED
1R5
CONV.-OSC.
C13
R4
C17
R5
C19
T7
R8
B+
C15
10
S2
T6
11
S2
7
8
R6
C6C
C18
C16
C20

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1710 KC


1N5GT
R-F AMPL
S1
1
3
S1
6
4
T3
C5
C6A
R1
C3
AVC
CAP
C7
S2
4
6
C10
T5
B+
R3
AVC
C12
3
S2
1
C6B
GANGED
1R5
CONV.-OSC.
C13
R4
C17
R5
C19
T7
R8
B+
C15
10
S2
T6
12
S2
7
9
R7
C6C
C21
C20

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
5.8-18.3 MC

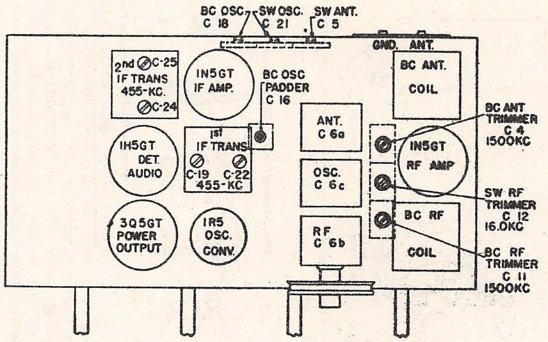
# GENERAL ELECTRIC CO.

## ELECTRICAL CIRCUIT ALIGNMENT

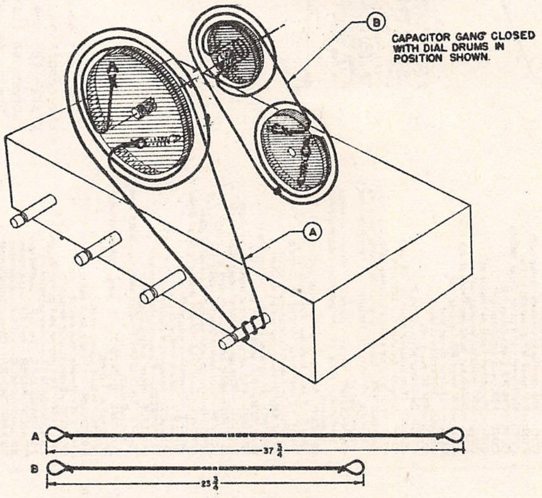
***PROCEDURE—GENERAL.*** 1. Connect output meter across loud speaker voice coil terminals.

2. Keep radio volume control at maximum and attenuate test oscillator signal output for low output meter reading.

3. All trimmer adjustments are made with the chassis removed from the cabinet.


BC OSC. C 18
SW OSC. C 21
SW ANT. C 5
GND.
ANT.
2nd IF TRANS 455-KC.
C-25
C-24
IN5GT IF AMP.
BC OSC PADDER C 16
BC ANT. COIL
IST IF TRANS
C-19
C-22
455-KC
IH5GT DET. AUDIO
ANT. C 6a
OSC. C 6c
RF C 6b
IN5GT RF AMP
BC ANT TRIMMER C 4 1500KC
SW RF TRIMMER C 12 16.0KC
BC RF TRIMMER C 11 1500KC
BC RF COIL
3Q5GT POWER OUTPUT
IR5 OSC. CONV.

*Tube and Trimmer Location*


B
CAPACITOR GANG CLOSED WITH DIAL DRUMS IN POSITION SHOWN.
A
A
37 3/4
B
23 3/4

*Dial Stringing*

## ALIGNMENT CHART

| Step | Connect Test Oscillator To | Test Oscillator Setting | Pointer Setting On Radio | Adjust For Max. Output |
|---|---|---|---|---|
| 1 | 1N5GT IF grid in series with .05 mfd. | 455 KC | "BC" Band 550 KC | 1st IF transformer trimmers |
| 2 | 1R5 conv. grid in series with .05 mfd. | 455 KC | "BC" Band 550 KC | 2nd IF transformer trimmers |
| 3 | 1N5GT RF grid in series with .05 mfd. | 1710 KC | HF End | C18 (osc.) |
| 4 | 1N5GT RF grid in series with .05 mfd. | 1500 KC | 1500 KC | C11 (conv.) |
| 5 | 1N5GT RF grid in series with .05 mfd. | 600 KC | 600 KC | *<br>**C16 (osc. padder) |
| 6 | Antenna Post in series with 200 mmf. | 1500 KC | 1500 KC | C4 (RF) |
| 7 | 1N5GT RF grid in series with .05 mfd. | 18.3 MC | HF End | C21 (osc.) |
| 8 | Antenna Post in series with 400 ohms | 16.0 MC | 16.0 MC | *<br>C12 and C5 (Conv. and R-F) |

*Rock Gang condenser when making alignment.
**Repeat steps 3 and 4 for best results.

## STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal input so that AVC is not effective.

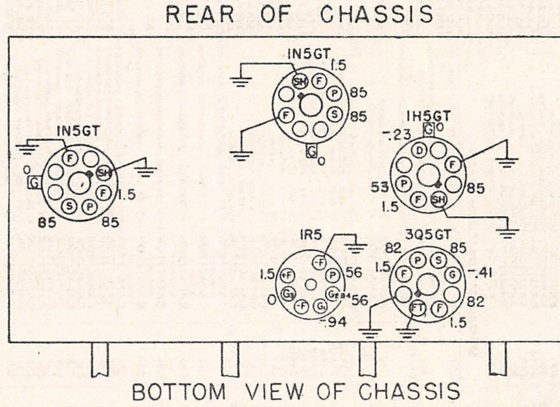
(1) R-F Stage Gains.

| | |
|---|---|
| Antenna post to 1N5GT r-f grid | 3 at 1000 kc |
| 1N5GT r-f grid to 1R5 | 10 at 1000 kc |
| 1R5 grid to 1N5GT i-f grid | 46 at 1000 kc |
| 1R5 grid to 1N5GT i-f grid | 60 at 455 kc |
| 1N5GT grid to 1H5GT i-f diode plates | 80 at 455 kc |

(2) Audio Gain.
.06 volt at 400 cycles across volume control (R12) with control set at maximum will give approximately .05 watts output across speaker voice coil.

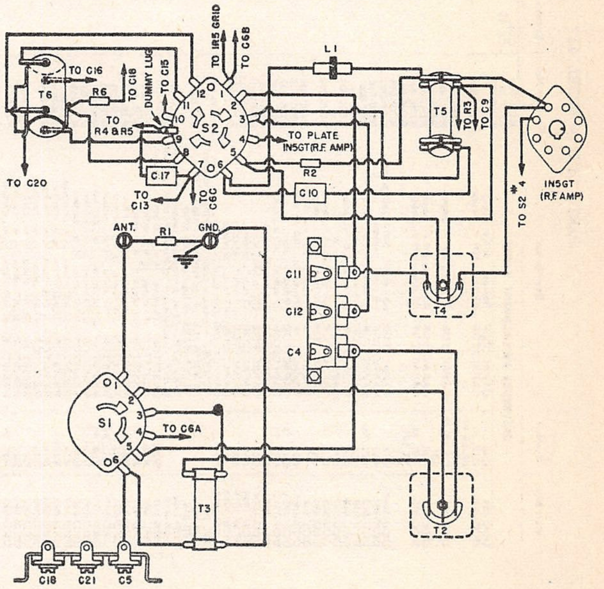
(3) D-C voltage developed across oscillator grid resistor (R5) averages 8 volts at 1000 kc.

(4) Socket Pin Voltages.
Figure 5 shows voltages from all tube pins to B-. Voltage readings much lower than those specified may help localize defective components or tubes.


REAR OF CHASSIS
IN5GT
1.5
SH
F
P
85
S
85
F
G
0
IN5GT
0
G
F
SH
F
1.5
S
P
85
85
IH5GT
G
0
-.23
D
F
P
53
85
1.5
F
SH
IR5
-F
P
56
+F
1.5
G3
0
G2&4
56
-F
G1
-.94
3Q5GT
82
85
P
S
1.5
F
G
-.41
82
FT
F
1.5
BOTTOM VIEW OF CHASSIS

MEASUREMENTS TAKEN ON 20,000 OHMS PER VOLT METER.
MEASURED FROM PIN TO CHASSIS.
1.5 V "A" — 90 V "B" BATTERY PACK. NO SIGNAL INPUT
VOLUME CONTROL AT MAXIMUM.

*Socket Voltages*


TO 1R5 GRID
TO C6B
L1
TO C16
T6
R6
TO C18
DUMMY LUG
TO C15
TO R4 & R5
S2
TO PLATE 1N5GT (R.F. AMP)
R2
C10
C17
TO C20
TO C13
TO C6C
T5
TO R3
TO C9
TO S2 #4
1N5GT (R.F. AMP)
ANT.
R1
GND.
C11
C12
C4
T4
S1
TO C6A
T3
T2
C18
C21
C5

*Switch Wiring*

**MODEL 280**
**MODEL 417**

# GENERAL ELECTRIC CO.

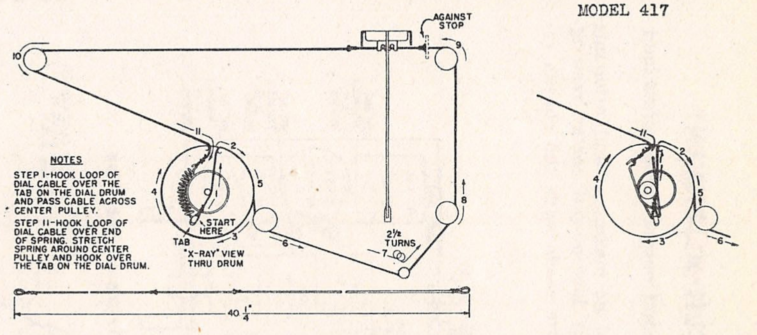
## PARTS LIST - MODEL 417

| Part No. | Symbol | Description |
|---|---|---|
| **UNIVERSAL REPLACEMENT PARTS** | | |
| UCC-039 | C43 | CAPACITOR—.005 md., 600 v. paper |
| UCC-040 | C17, 30 64, 69, 91, 103 | CAPACITOR—.01 mfd., 600 v., paper |
| UCC-041 | C9, 18, 74, 104 | CAPACITOR—.02 mfd., 600 v., paper |
| UCC-042 | C37 | CAPACITOR—.03 mfd., 600 v., paper |
| UCC-045 | C47, 66, 77, 101, 102 | CAPACITOR—.05 mfd., 600 v., paper |
| UCG-2048 | C76 | CAPACITOR—680 mmfd., 500 v., silver mica |
| UCN-506 | C52 | CAPACITOR—6.8 mmf., ceramic |
| UCU-020 | C21, 53 | CAPACITOR—47 mmf., 500 v., mica |
| UCU-028 | C68 | CAPACITOR—100 mmf., 500 v., mica |
| UCU-048 | C38 | CAPACITOR—680 mmf., 500 v., mica |
| UCU-520 | C10 | CAPACITOR—47 mmf., mica |
| UCU-528 | C70, 79 | CAPACITOR—100 mmf., 500 v., mica |
| UCU-536 | C85 | CAPACITOR—220 mmf., 500 v., mica |
| UCU-544 | C78 | CAPACITOR—470 mmf., 500 v., mica |
| UCU-1042 | C29 | CAPACITOR—390 mmfd., 500 v., mica |
| UCU-1054 | C42, 73 | CAPACITOR—10 mmfd., mica |
| UCU-1512 | C90, 72 | CAPACITOR—22 mmfd., 500 v., mica |
| UCU-1532 | C31 | CAPACITOR—150 mmfd., mica |
| UCU-1544 | C8 | CAPACITOR—470 mmfd., mica |
| UCW-1004 | C50 | CAPACITOR—10 mmf., ceramic |
| UCW-1014 | C22 | CAPACITOR—27 mmf., ceramic |
| UCW-1020 | C41 | CAPACITOR—47 mmf., ceramic |
| UCW-1028 | C34 | CAPACITOR—100 mmf., ceramic |
| UIC-001 | | CEMENT—Speaker cone replacement cement |
| UJB-014 | | TERMINALS—4 lug terminal strip |
| UJB-018 | | TERMINALS—2 lug terminal strip |
| UOP-1230 | | SPEAKER—12 in. permanent magnet speaker |
| UOX-002 | | CONE—Loudspeaker replacement cone assembly |
| URD-007 | R30 | RESISTOR—18 ohms, ½ w., carbon |
| URD-009 | R26 | RESISTOR—22 ohms, ½ w., carbon |
| URD-017 | R2 | RESISTOR—47 ohms, ½ w., carbon |
| URD-025 | R33 | RESISTOR—100 ohms, ½ w., carbon |
| URD-033 | R29 | RESISTOR—220 ohms, ½ w., carbon |
| URD-049 | R12, 34 | RESISTOR—1000 ohms, ½ w., carbon |
| URD-057 | R38, 46 | RESISTOR—2200 ohms, ½ w., carbon |
| URD-061 | R101 | RESISTOR—3300 ohms, ½ w., carbon |
| URD-065 | R20 | RESISTOR—4700 ohms, ½ w., carbon |
| URD-077 | R10 | RESISTOR—15,000 ohms, ½ w., carbon |
| URD-083 | R104 | RESISTOR—27,000 ohms, ½ w., carbon |
| URD-085 | R19 | RESISTOR—33,000 ohms, ½ w., carbon |
| URD-089 | R24 | RESISTOR—47,000 ohms, ½ w., carbon |
| URD-091 | R7 | RESISTOR—56,000 ohms, ½ w., carbon |
| URD-093 | R21 | RESISTOR—68,000 ohms, ½ w., carbon |
| URD-095 | R28, 39 | RESISTOR—82,000 ohms, ½ w., carbon |
| URD-097 | R9, 40 | RESISTOR—100,000 ohms, ½ w., carbon |
| URD-099 | R22, 23 | RESISTOR—120,000 ohms, ½ w., carbon |
| URD-103 | R6 | RESISTOR—180,000 ohms, ½ w., carbon |
| URD-105 | R13, 16, 27, 41 | RESISTOR—220,000 ohms, ½ w., carbon |
| URD-113 | R32 | RESISTOR—470,000 ohms, ½ w., carbon |
| URD-121 | R37 | RESISTOR—1.0 meg., ½ w., carbon |
| URD-125 | R1, 4, 8 | RESISTOR—1.5 meg., ½ w., carbon |
| URD-129 | R14, 18 | RESISTOR—2.2 meg., ½ w., carbon |
| URD-133 | R102, 103 | RESISTOR—3.3 meg., ½ w., carbon |
| URD-145 | R42 | RESISTOR—10.0 meg., ½ w., carbon |
| URD-1079 | R5 | RESISTOR—16,000 ohms, ½ w., carbon |
| URD-1104 | R105 | RESISTOR—200,000 ohms, ½ w., carbon |
| URE-035 | R31 | RESISTOR—270 ohms, 1 w., carbon |
| URE-073 | R3 | RESISTOR—10,000 ohms, 1 w., carbon |
| URE-083 | R15 | RESISTOR—27,000 ohms, 1 w., carbon |
| URE-085 | R17 | RESISTOR—33,000 ohms, 1 w., carbon |
| **SPECIALIZED REPLACEMENT PARTS** | | |
| RAB-021 | L17 | BEAM-A-SCOPE—Cabinet back and loop assembly |
| RAD-016 | | BRACKET—For band switch mounting at front |
| RAX-007 | R12, 13, 14, 15, 16 | COIL—Pushbutton coils mounted on bracket |
| RAX-008 | | BRACKET—Bracket and roller fork for elevator shaft |
| RCC-001 | C40 | CAPACITOR—.007 mfd., 600 v., paper |
| RCC-041 | C16, 19, 60, 62 | CAPACITOR—.02 mfd., 600 v., paper |
| RCC-056 | C51 | CAPACITOR—.002 mfd., 1000 v., paper |
| RCE-030 | C105A | CAPACITOR—15 mfd., 350 v., dry electrolytic |
| | C105B | CAPACITOR—15 mfd., 350 v., dry electrolytic |
| RCE-029 | C46A | CAPACITOR—30 mfd., 400 v., dry electrolytic |
| | C46B | CAPACITOR—30 mfd., 400 v., dry electrolytic |
| | C46C | CAPACITOR—15 mfd., 400 v., dry electrolytic |
| | C46D | CAPACITOR—20 mfd., 25 v., dry electrolytic |
| RCW-001 | C12 | CAPACITOR—47 mfd., ceramic |
| RCW-013 | C67 | CAPACITOR—10 mmf., ceramic |
| RCW-014 | C27, 44 | CAPACITOR—15 mmf., ceramic |
| RCW-015 | C87 | CAPACITOR—3.3 mmf., ceramic |
| RCW-060 | C71 | CAPACITOR—5.6 mmf., ceramic |
| RCW-1028 | C7, 11, 25 | CAPACITOR—100 mmf, ceramic |
| RCX-011 | C80 | CAPACITOR—5-80 mmf., pushbutton antenna trimmer |
| | C81 | CAPACITOR—9-180 mmf., pushbutton antenna trimmer |
| | C82 | CAPACITOR—45-380 mmf., pushbutton antenna trimmer |
| | C83 | CAPACITOR—45-380 mmf., pushbutton antenna trimmer |
| | C84 | CAPACITOR—45 380 mmf., pushbutton antenna trimmer |
| RCX-016 | C5 | CAPACITOR—200-250 mmf., trimmer capacitor |
| | C58 | CAPACITOR—280-380 mmf., trimmer capacitor |
| | C59 | CAPACITOR—475-575 mmf., trimmer capacitor |
| RCX-022 | C3 | CAPACITOR—2-20 mmf., trimmer capacitor |
| | C4 | CAPACITOR—34-70 mmf., trimmer capacitor |
| | C56 | CAPACITOR—475-575 mmf., trimmer capacitor |
| | C57 | CAPACITOR—280-380 mmf., trimmer capacitor |
| | C63 | CAPACITOR—45-80 mmf., trimmer capacitor |
| RCX-023 | C1 | CAPACITOR—34-70 mmf., trimmer capacitor |
| | C55 | CAPACITOR—4-50 mmf., trimmer capacitor |
| RCX-024 | C2 | CAPACITOR—3-30 mmf., trimmer capacitor |
| | C65 | CAPACITOR—80-130 mmf., trimmer capacitor |
| RCY-011 | C54 | CAPACITOR—3-30 mmf., trimmer for loop |
| RCY-017 | C6, 45 | CAPACITOR—3-30 mmf., air trimmer |
| RDB-001 | | PUSHBUTTON—Black pushbutton used at bottom of strip only |
| RDB-004 | | PUSHBUTTON—Black pushbuttons used in upper five positions only |
| RDC-019 | | CORD—Hoist cord 6½" long |
| RDC-021 | | CORD—Drive cord 40¼" |
| RDE-016 | | ESCUTCHEON—For dial scale and pushbuttons |
| RDG-003 | | BACK PLATE—Large metal panel plate |
| RDK-004 | | KNOB—Black knob, plain |
| RDK-032 | | KNOB—Black control knob with pointer |
| RDP-016 | | POINTER—Dial pointer and slide |
| RDP-022 | | POINTER—Dial pointer |
| RDS-018 | | SCALE—Tuning dial scale |
| REI-006 | | CORE—Iron core for broadcast antenna, r-f, and oscillator coils |
| REX-002 | | CORE—Iron core with glass tubing for broadcast antenna, r-f, and oscillator coils |
| RHC-007 | | PIN—Hairpin cotter for securing shaft through pushbuttons |
| RHC-009 | | PIN—Hairpin cotter for idler wheel |
| RHC-010 | | SPRING CLIP—Holds FM coil assembly |
| RHE-001 | | EYELET—For connecting FM coil links |
| RHG-005 | | GROMMET—For power cord |
| RHM-016 | | CLIP—Mounting clip for L1 and L7 |
| RHM-024 | | LINK—Hoist link holding end of hoist cord |
| RHM-025 | | RING—Retaining ring for flywheel |
| RHM-026 | | COIL LINK—Rectangular coil link for assembling FM coils T2 and T5 |
| RHM-027 | | COIL LINK—Rectangular coil link for assembling FM coil, T4 |
| RII-001 | | POST—Mycalex posts for assembling all FM coils |
| RJC-001 | | CONTACT PIN—For speaker connection |
| RJJ-004 | | RECEPTACLE—Pre-amp. and pushbutton receptacle |
| RJP-002 | | PLUG—Four-prong pre-amp. power plug |
| RJP-003 | | PLUG—Phono power male plug |
| RJP-004 | | PLUG—Male phono plug from pre-amplifier |
| RJP-005 | | PLUG—Plug and cover for pushbutton cable |
| RJP-010 | | SOCKET—Phono input socket |
| RJP-011 | | PLUG—Shipping screw hole plug |
| RJS-003 | | SOCKET—Octal socket for V5, V6, and V7 |
| RJS-012 | | PLATE—For mounting electrolytic |
| RJS-027 | | SOCKET—Dial light socket |
| RJS-030 | | SOCKET—Octal socket for V4, V8, and V9 |
| RJS-044 | | TUBE SOCKET—Tube socket for V1, V2, and V3 |
| RJS-049 | | SOCKET—Phono power female socket |
| RJS-051 | | RECEPTACLE—3 pin receptacle for Beam-a-scope |
| RJX-009 | | PLUG—Plug attached to Beam-a-scope |
| RLA-009 | T1 | COIL—Broadcast band antenna coil |
| RLA-011 | L6 | COIL—FM antenna choke coil |
| | L19 | COIL—FM oscillator cathode choke coil |
| | L20 | COIL—SW loop shunt coil |
| RLA-016 | T13 | COIL—Pushbutton antenna coil |
| RLB-005 | T2, 5 | COILS—FM antenna coil and FM RF coil |
| RLB-006 | T6 | COIL—Broadcast band RF coil |
| RLB-007 | L5 | COIL—FM oscillator cathode choke coil |
| RLB-008 | L3 | COIL—SW band RF plate choke coil |
| RLB-009 | L2 | COIL—Broadcast band plate choke dumm' |
| RLB-010 | L4 | COIL—FM RF plate choke coil |
| RLC-013 | T4 | COIL—FM band oscillator coil |
| RLC-014 | T3 | COIL—Broadcast band oscillator coil |
| RLC-015 | L1 | COIL—SW oscillator loading coil |
| RLC-016 | L8 | COIL—Broadcast band oscillator shunt coil |
| RLC-017 | L7 | COIL—SW band RF loading coil |
| RLF-003 | L9 | COIL—Filament choke coil |
| RLI-002 | L11 | CHOKE—Power line choke |
| RLP-004 | L10 | COIL—FM IF plate coil |
| RLP-006 | L18 | COIL—Oscillator plate choke coil |
| RMC-012 | | CLAMP—For holding cover on RF unit |
| RMC-013 | | CLIP—Support for clamp RMC-012 |
| RMC-014 | | CLIP—For holding shielded phono cable |
| RMK-001 | | CAPACITOR—Large bi-metallic strip forming moving element of temperature-compensating capacitor |
| RMK-002 | | CAPACITOR—Small metallic strip forming stationary plate of temperature-compensating capacitor |
| RMM-009 | | SPACER—Metal sleeve on hoist pulley shaft |
| RMM-010 | | VANE—Tuner vane for FM coils T2 and T5 |
| RMM-011 | | VANE—Tuner vane for FM oscillator coil, T4 |
| RMM-015 | | SUPPORT—Cabinet drop-leaf support |
| RMR-002 | | ROLLER—Presses against hoist shaft |
| RMS-032 | | SPRING—Maintains pushbutton tension |
| RMS-039 | | WASHER—"C" washer on idler pulley |
| RMS-040 | | SPRING—Flat spring against hoist pulley shaft |
| RMS-041 | | SPRING—Wire spring against hoist pulley shaft |
| RMS-042 | | SPRING—Hoist cord tension spring |
| RMS-043 | | SCREW—Iron core adjusting screw |
| RMS-044 | | SPRING—Guide wire spring in elevator plate |
| RMS-072 | | SPRING—Dial cord tension spring in large drum |
| RMU-016 | | SHAFT—Manual tuning shaft |
| RMW-016 | | PULLEY—Main tuning drum |
| RMW-017 | | PULLEY—Small idler pulley |
| RMX-018 | | FLYWHEEL—Flywheel with setscrew |
| RMX-019 | | PULLEY—Hoist pulley and shaft |
| RMX-021 | | PLATE AND SHAFT—Elevator top plate and vertical shaft |
| RRC-014 | R25 | VOLUME CONTROL—2 meg. potentiometer tapped at 1 meg. |
| RRC-031 | S2 | SWITCH—Bass tone switch |
| RRW-010 | R35, 36 | RESISTOR—1150 and 5000 ohm, w.w. |
| RSP-002 | S5 | SWITCH—Pushbutton switch |
| RSW-023 | S1 | SWITCH—Band change switch |
| RSX-003 | S3 | SWITCH—Treble tone and power switch |
| RTD-001 | T10 | TRANSFORMER—Discriminator |
| RTL-017 | T7 | TRANSFORMER—1st I-F transformer |
| RTL-018 | T8 | TRANSFORMER—2nd I-F transformer |
| RTL-019 | T9 | TRANSFORMER—3rd I-F transformer |
| RTO-012 | T11 | TRANSFORMER—Output transformer |
| RTP-020 | T12 | TRANSFORMER—Power transformer |
| RWL-004 | | CORD—Power cord |
| RWX-004 | | WIRE—Guide wire for pointer |

## PARTS LIST - MODEL 280

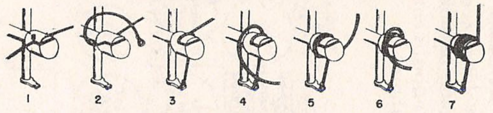
| PART NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| **UNIVERSAL REPLACEMENT PARTS** | | |
| UCC-011 | C3, 9, 23 | CAPACITOR—.05 mfd., 200 v., paper |
| UCC-028 | C7 | CAPACITOR—.05 mfd., 400 v., paper |
| UCC-035 | C30 | CAPACITOR—.001 mfd., 600 v., paper |
| UCC-037 | C31 | CAPACITOR—.003 mfd., 600 v., paper |
| UCC-039 | C15, 27, 28 | CAPACITOR—.005 mfd., 600 v., paper |
| UCC-041 | C26 | CAPACITOR—.02 mfd., 600 v., paper |
| UCU-1014 | C10 | CAPACITOR—27 mmf., mica |
| UCU-1020 | C17 | CAPACITOR—47 mmf., mica |
| UCU-1028 | C29 | CAPACITOR—100 mmf., mica |
| UCU-2065 | C20 | CAPACITOR—3600 mmf., mica |
| UOP-654 | SP | SPEAKER—6½ in. permanent magnet speaker |
| UOX-011 | | CONE—Speaker cone |
| URD-025 | R7 | RESISTOR—100 ohm, ⅓ w., carbon |
| URD-029 | R4 | RESISTOR—150 ohm, ⅓ w., carbon |
| URD-037 | R16 | RESISTOR—330 ohm, ⅓ w., carbon |
| URD-057 | R6 | RESISTOR—2200 ohm, ⅓ w., carbon |
| URD-073 | R1, 8 | RESISTOR—10,000 ohm, ⅓ w., carbon |
| URD-077 | R2 | RESISTOR—15,000 ohm, ⅓ w., carbon |
| URD-097 | R5 | RESISTOR—100,000 ohm, ⅓ w., carbon |
| URD-113 | R11 | RESISTOR—470,000 ohm, ⅓ w., carbon |
| URD-121 | R3, 14 | RESISTOR—1 meg., ⅓ w., carbon |
| URD-133 | R10 | RESISTOR—3.3 meg., ⅓ w., carbon |
| URD-137 | R9 | RESISTOR—4.7 meg., ⅓ w., carbon |
| URD-145 | R13 | RESISTOR—10 meg., ⅓ w., carbon |
| **SPECIALIZED REPLACEMENT PARTS** | | |
| RAB-5001 | | BACK—Cabinet back |
| RCE-5001 | C14 | CAPACITOR—8 mfd., 150 v., electrolytic |
| RCT-5000 | C6A, 6B, 6C | CONDENSER—Tuning condenser |
| RCU-5000 | C13 | CAPACITOR—3.3 mmfd., mica |
| **SPECIALIZED REPLACEMENT PARTS LIST (Cont'd)** | | |
| RCY-5000 | C5, 18, 21 | CAPACITOR—SW antenna trimmer, BC oscillator trimmer and SW oscillator trimmer |
| RHC-5001 | | CLIP—Off-On indicator retaining clip |
| RJS-5000 | | SOCKET—Miniature tube socket |
| RJS-5001 | | SOCKET—Octal tube socket |
| RJS-5002 | | SOCKET—Speaker socket |
| RLA-5000 | T2 | COIL ASSEMBLY—Broadcast antenna coil |
| RLA-5002 | T3 | COIL ASSEMBLY—Short wave antenna coil |
| RLB-5000 | T4 | COIL ASSEMBLY—Broadcast RF |
| RLB-5002 | T5 | COIL ASSEMBLY—Short wave RF |
| RLC-5000 | T6 | COIL ASSEMBLY—BC and SW oscillator |
| RLI-5000 | L1 | COIL ASSEMBLY—SW RF choke coil |
| RMB-5001 | | BEARING—Dial drive shaft supporting bearing |
| RMC-5000 | | CAM—Off-On indicator cam |
| RMU-5001 | | SHAFT—Dial drive shaft |
| RRC-5000 | R12 | VOLUME CONTROL—2 meg. volume control |
| RRC-5002 | R15, S3 | TONE CONTROL—1 meg. control and power switch |
| RSW-5000 | S1, 2 | SWITCH—Band change switch |
| RTO-5001 | T9 | TRANSFORMER—Output transformer |
| RTL-5000 | T8 | TRANSFORMER—2nd i-f transformer |
| RTL-5003 | T7 | TRANSFORMER—1st i-f transformer |
| RWX-5000 | | CABLE ASSEMBLY—Battery cable |
| RYM-5000 | | CHART—Dial calibration chart |
| RCY-5001 | C16 | CAPACITOR—BC oscillator padder |
| RDC-5001 | | CORD—Drive cord |
| RDE-5001 | | ESCUTCHEON—Dial scale escutcheon |
| RDF-5001 | | WASHER—Felt washer for knobs |
| RDK-5000 | | KNOB—Control knobs |
| RDM-5000 | | FLAG—Off-On indicator flag |
| RDP-5000 | | POINTER—Plastic dial pointer |
| RDX-5001 | | BRACKET—Dial bracket and pulley assembly |

## MODEL 417



NOTES
STEP I-HOOK LOOP OF DIAL CABLE OVER THE TAB ON THE DIAL DRUM AND PASS CABLE ACROSS CENTER PULLEY.
STEP II-HOOK LOOP OF DIAL CABLE OVER END OF SPRING. STRETCH SPRING AROUND CENTER PULLEY AND HOOK OVER THE TAB ON THE DIAL DRUM.

**Dial Stringing Diagram Showing Later Production Spring at Right**



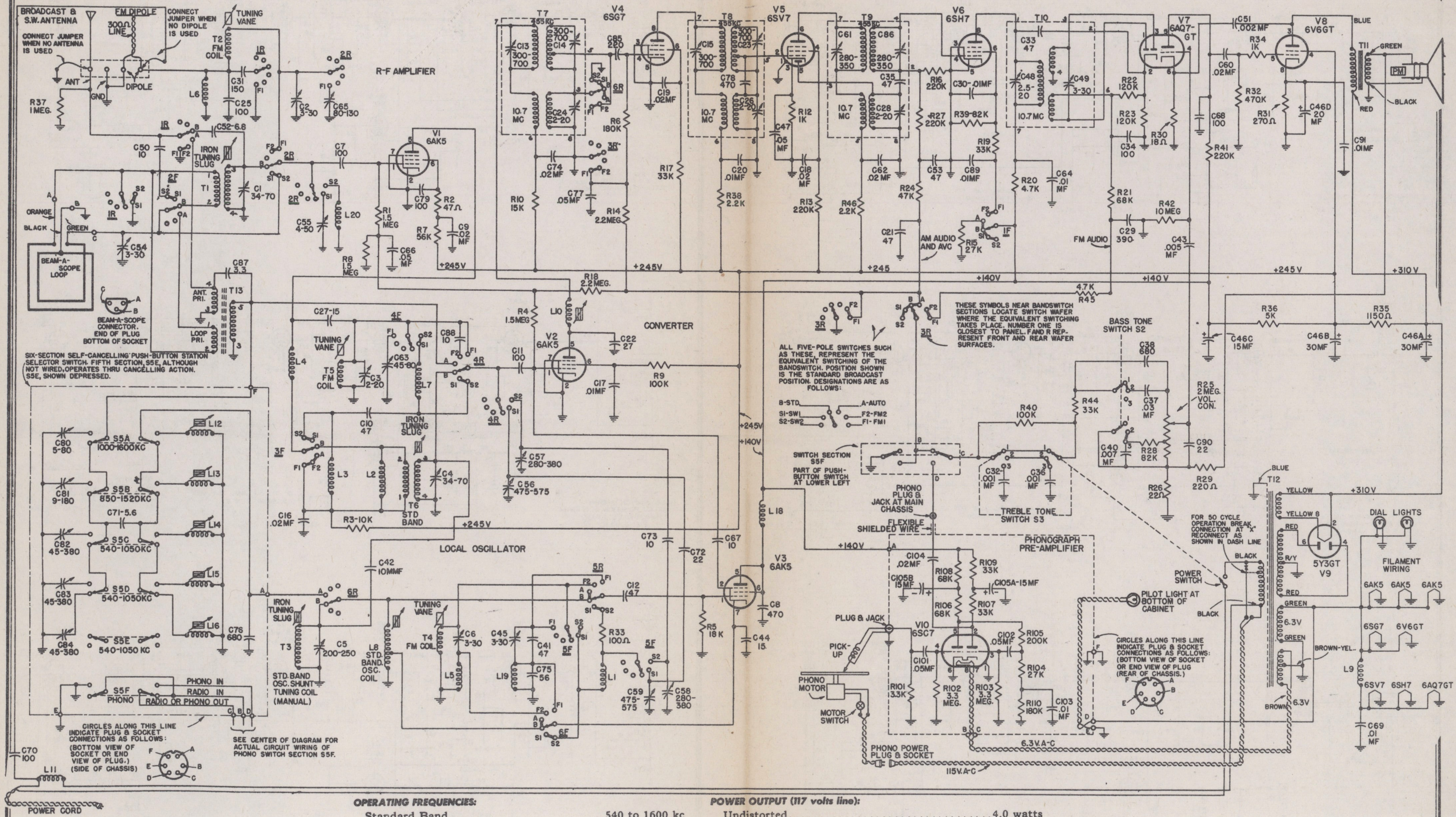
**—Elevator Windlass Stringing Procedure**

Model 417 -- Howl on FM Band

Howl may be caused by a microphonic 6AK5 converter tube. If this doesn't remedy the condition, the howl is possibly set up in the "guillotine" tuning unit. Apply Vistac to the moving vane of the "guillotine" tuning unit where it contacts the runners so that it is coated for its full length. Use only a small amount.

Vistac is obtainable from the Advance Solvent and Chemical Corp., Jersey City, New Jersey.

# GENERAL ELECTRIC CO.


BROADCAST & S.W. ANTENNA
FM DIPOLE
CONNECT JUMPER WHEN NO DIPOLE IS USED
CONNECT JUMPER WHEN NO ANTENNA IS USED
300Ω LINE
TUNING VANE
T2 FM COIL
R-F AMPLIFIER
ANT
GND
DIPOLE
R37 1MEG.
IRON TUNING SLUG
T1
C1 34-70
V1 6AK5
BEAM-A-SCOPE LOOP
BEAM-A-SCOPE CONNECTOR. END OF PLUG BOTTOM OF SOCKET
ORANGE
BLACK
GREEN
T13
ANT. PRI.
LOOP PRI.
SIX-SECTION SELF-CANCELLING PUSH-BUTTON STATION SELECTOR SWITCH. FIFTH SECTION, S5E, ALTHOUGH NOT WIRED, OPERATES THRU CANCELLING ACTION. S5E, SHOWN DEPRESSED.
S5A 1000-1600KC
S5B 850-1520KC
S5C 540-1050KC
S5D 540-1050KC
S5E 540-1050 KC
S5F
PHONO IN
RADIO IN
RADIO OR PHONO OUT
CIRCLES ALONG THIS LINE INDICATE PLUG & SOCKET CONNECTIONS AS FOLLOWS: (BOTTOM VIEW OF SOCKET OR END VIEW OF PLUG.) (SIDE OF CHASSIS)
SEE CENTER OF DIAGRAM FOR ACTUAL CIRCUIT WIRING OF PHONO SWITCH SECTION S5F.
POWER CORD
LOCAL OSCILLATOR
T5 FM COIL
T6 STD BAND
T3
STD. BAND OSC. SHUNT TUNING COIL (MANUAL)
L8 STD. BAND. OSC. COIL
T4 FM COIL
CONVERTER
V2 6AK5
V3 6AK5
V4 6SG7
V5 6SV7
V6 6SH7
V7 6AQ7-GT
V8 6V6GT
V9 5Y3GT
V10 6SC7
T7 455KC
T8 455KC
T9 455KC
T10
10.7 MC
+245V
+140V
+310V
AM AUDIO AND AVC
FM AUDIO
THESE SYMBOLS NEAR BANDSWITCH SECTIONS LOCATE SWITCH WAFER WHERE THE EQUIVALENT SWITCHING TAKES PLACE. NUMBER ONE IS CLOSEST TO PANEL. F AND R REPRESENT FRONT AND REAR WAFER SURFACES.
ALL FIVE-POLE SWITCHES SUCH AS THESE, REPRESENT THE EQUIVALENT SWITCHING OF THE BANDSWITCH. POSITION SHOWN IS THE STANDARD BROADCAST POSITION. DESIGNATIONS ARE AS FOLLOWS:
B-STD. A-AUTO
S1-SW1 F2-FM2
S2-SW2 F1-FM1
SWITCH SECTION S5F
PART OF PUSH-BUTTON SWITCH AT LOWER LEFT
PHONO PLUG & JACK AT MAIN CHASSIS
FLEXIBLE SHIELDED WIRE
BASS TONE SWITCH S2
TREBLE TONE SWITCH S3
R25 2MEG. VOL. CON.
PHONOGRAPH PRE-AMPLIFIER
PLUG & JACK
PICK-UP
PHONO MOTOR
MOTOR SWITCH
PHONO POWER PLUG & SOCKET
115V.A-C
6.3V.A-C
PILOT LIGHT AT BOTTOM OF CABINET
CIRCLES ALONG THIS LINE INDICATE PLUG & SOCKET CONNECTIONS AS FOLLOWS: (BOTTOM VIEW OF SOCKET OR END VIEW OF PLUG (REAR OF CHASSIS.)
FOR 50 CYCLE OPERATION BREAK CONNECTION AT "X" RECONNECT AS SHOWN IN DASH LINE
POWER SWITCH
T11
T12
PM
BLUE
GREEN
RED
BLACK
YELLOW
BROWN
BROWN-YEL.
6.3V
DIAL LIGHTS
FILAMENT WIRING
6AK5 6AK5 6AK5
6SG7 6V6GT
6SV7 6SH7 6AQ7GT
L9
C69 .01 MF
C70 100
L11

**ELECTRICAL RATING (INPUT):**

| | Rating A5 | Rating A6 |
|---|---|---|
| Voltage | 100–125 | 100–125 |
| Frequency | 50 cycles | 60 cycles |
| Wattage | 105 | 105 |

**OPERATING FREQUENCIES:**

| | |
|---|---|
| Standard Band | 540 to 1600 kc |
| Short Wave 1 | 9.4 to 9.9 mc |
| Short Wave 2 | 11.6 to 12.1 mc |
| Frequency Modulation 1 | 42 to 50 mc |
| Frequency Modulation 2 | 88 to 108 mc |
| AM I-F Frequency | 455 kc |
| FM I-F Frequency | 10.7 mc |

**POWER OUTPUT (117 volts line):**

| | |
|---|---|
| Undistorted | 4.0 watts |
| Maximum | 5.5 watts |

**LOUDSPEAKER:**

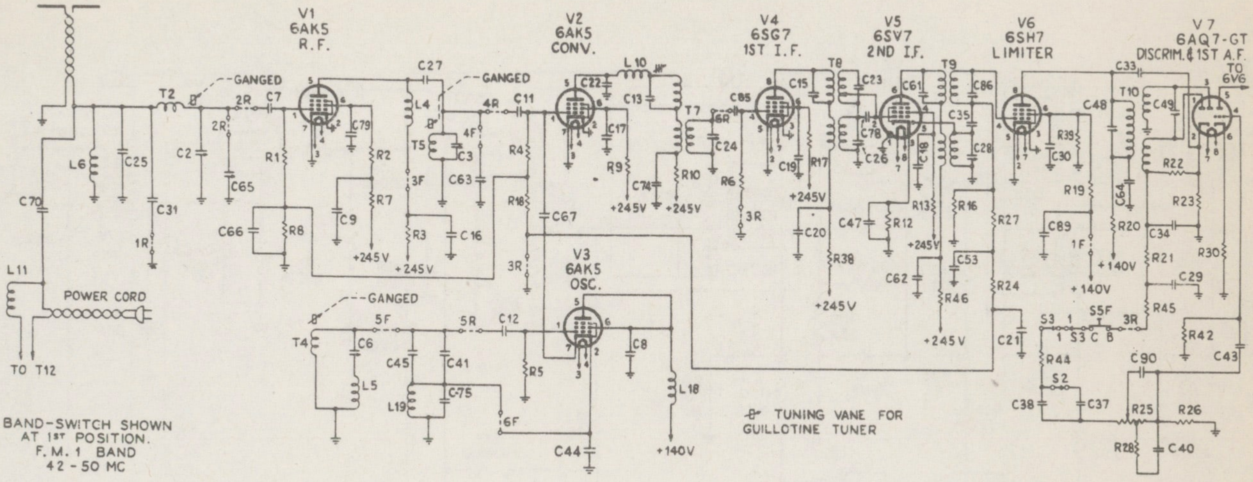
| | |
|---|---|
| Type | Alnico PM |
| Size | 12 inches |
| Voice Coil Impedance (400 cps) | 8 ohms |

**PHONOGRAPH PICK-UP:**

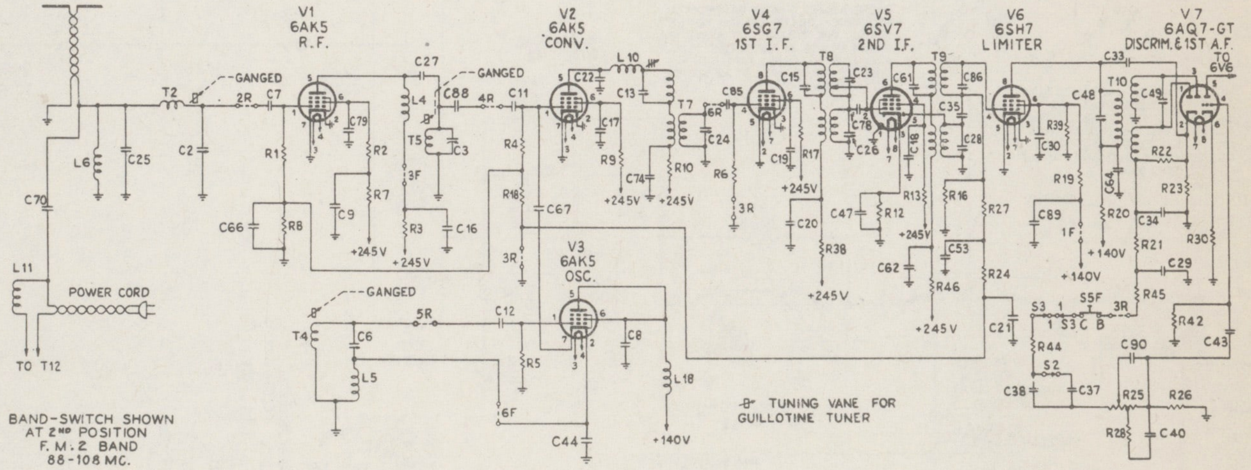
| | |
|---|---|
| Type | Variable Reluctance |
| D-C Resistance | 250 ohms |

**MODEL 417**

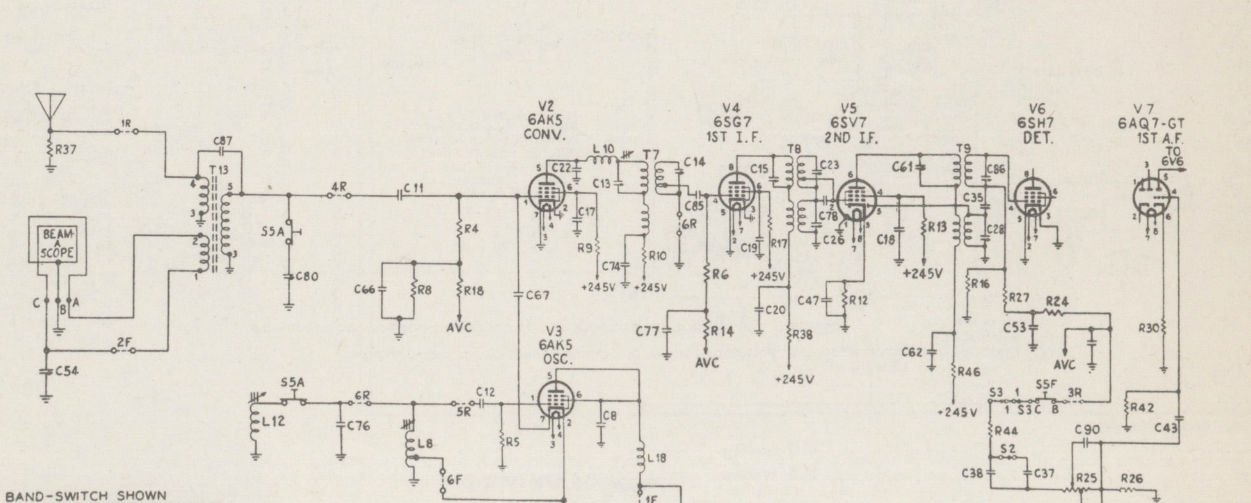
# GENERAL ELECTRIC CO.


V1
6AK5
R.F.
V2
6AK5
CONV.
V4
6SG7
1ST I.F.
V5
6SV7
2ND I.F.
V6
6SH7
LIMITER
V7
6AQ7-GT
DISCRIM. & 1ST A.F.
TO 6V6
V3
6AK5
OSC.
GANGED
POWER CORD
TO T12
+245V
+140V
TUNING VANE FOR GUILLOTINE TUNER

BAND-SWITCH SHOWN
AT 1ST POSITION.
F.M. 1 BAND
42 - 50 MC


V1
6AK5
R.F.
V2
6AK5
CONV.
V4
6SG7
1ST I.F.
V5
6SV7
2ND I.F.
V6
6SH7
LIMITER
V7
6AQ7-GT
DISCRIM. & 1ST A.F.
TO 6V6
V3
6AK5
OSC.
GANGED
POWER CORD
TO T12
+245V
+140V
TUNING VANE FOR GUILLOTINE TUNER

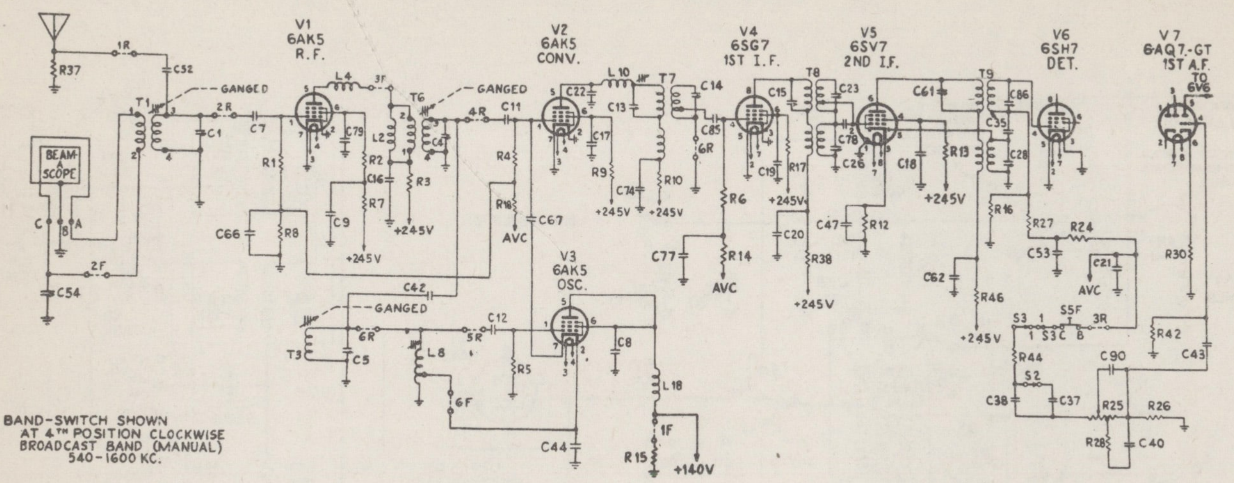
BAND-SWITCH SHOWN
AT 2ND POSITION
F.M. 2 BAND
88-108 MC.


V2
6AK5
CONV.
V4
6SG7
1ST I.F.
V5
6SV7
2ND I.F.
V6
6SH7
DET.
V7
6AQ7-GT
1ST A.F.
TO 6V6
V3
6AK5
OSC.
BEAM A SCOPE
AVC
+245V
+140V

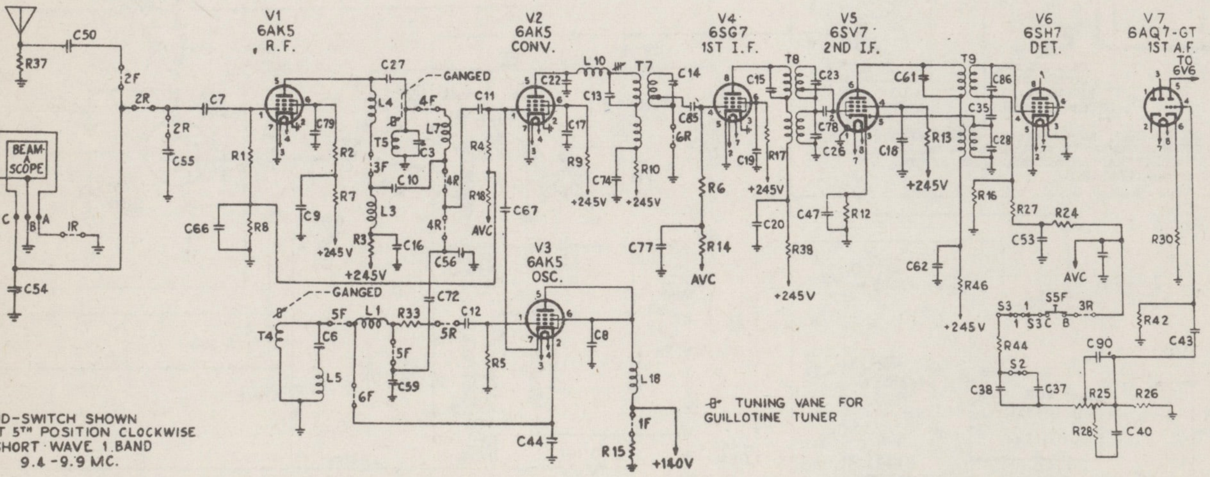
BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
BROADCAST BAND (AUTOMATIC)
PUSH BUTTON S5A DEPRESSED
1000-1600 KC.

**MODEL 417**

# GENERAL ELECTRIC CO.

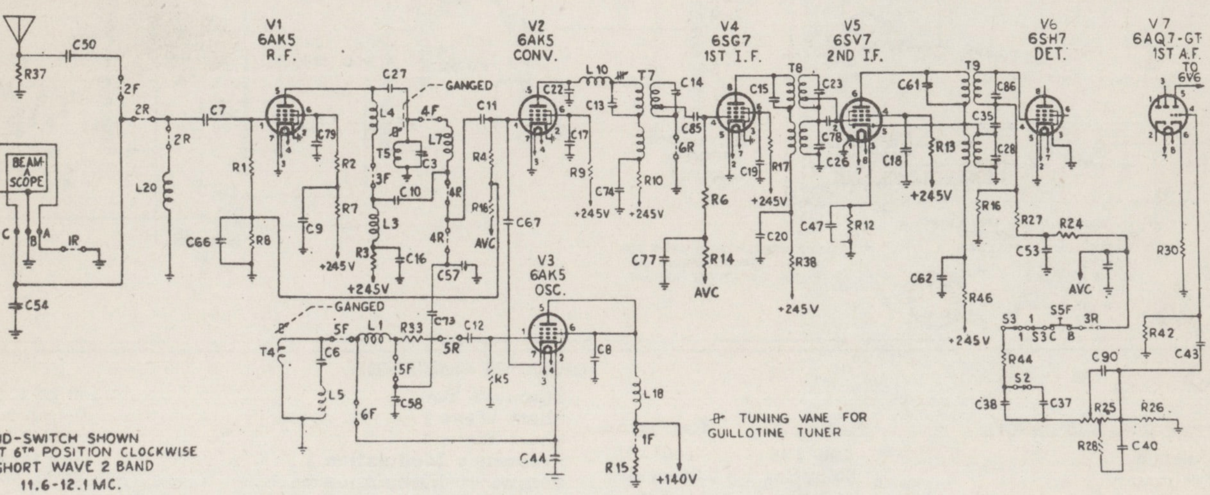

V1
6AK5
R.F.
V2
6AK5
CONV.
V4
6SG7
1ST I.F.
V5
6SV7
2ND I.F.
V6
6SH7
DET.
V7
6AQ7-GT
1ST A.F.
TO
6V6
V3
6AK5
OSC.
GANGED
BEAM-A-SCOPE
T1
T6
T3
T7
T8
T9
L4
L2
L8
L10
L18
AVC
+245V
+140V
S3
S3C
S5F
S2

BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE
BROADCAST BAND (MANUAL)
540-1600 KC.


V1
6AK5
R.F.
V2
6AK5
CONV.
V4
6SG7
1ST I.F.
V5
6SV7
2ND I.F.
V6
6SH7
DET.
V7
6AQ7-GT
1ST A.F.
TO
6V6
V3
6AK5
OSC.
GANGED
BEAM-A-SCOPE
T4
T5
T7
T8
T9
L1
L3
L4
L5
L7
L10
L18
AVC
+245V
+140V
S3
S3C
S5F
S2

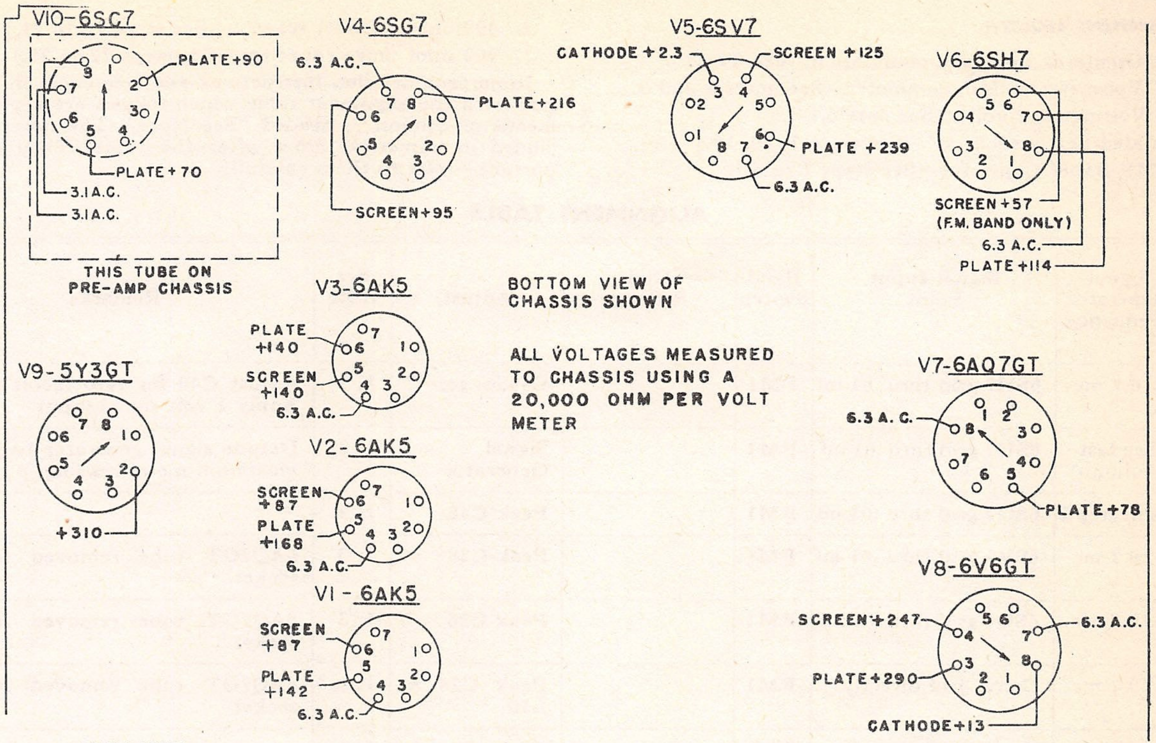
-8- TUNING VANE FOR
GUILLOTINE TUNER

BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE
SHORT WAVE 1 BAND
9.4-9.9 MC.


V1
6AK5
R.F.
V2
6AK5
CONV.
V4
6SG7
1ST I.F.
V5
6SV7
2ND I.F.
V6
6SH7
DET.
V7
6AQ7-GT
1ST A.F.
TO
6V6
V3
6AK5
OSC.
GANGED
BEAM-A-SCOPE
T4
T5
T7
T8
T9
L1
L3
L4
L5
L7
L10
L18
L20
AVC
+245V
+140V
S3
S3C
S5F
S2

-8- TUNING VANE FOR
GUILLOTINE TUNER

BAND-SWITCH SHOWN
AT 6TH POSITION CLOCKWISE
SHORT WAVE 2 BAND
11.6-12.1 MC.


V10-6SC7
PLATE+90
PLATE+70
3.1A.C.
3.1A.C.
THIS TUBE ON PRE-AMP CHASSIS
V4-6SG7
6.3 A.C.
PLATE+216
SCREEN+95
V5-6SV7
CATHODE+2.3
SCREEN +125
PLATE +239
6.3 A.C.
V6-6SH7
SCREEN+57 (F.M. BAND ONLY)
6.3 A.C.
PLATE+114
V3-6AK5
PLATE +140
SCREEN +140
6.3 A.C.
BOTTOM VIEW OF CHASSIS SHOWN
ALL VOLTAGES MEASURED TO CHASSIS USING A 20,000 OHM PER VOLT METER
V9-5Y3GT
+310
V2-6AK5
SCREEN +87
PLATE +168
6.3 A.C.
V1-6AK5
SCREEN +87
PLATE +142
6.3 A.C.
V7-6AQ7GT
6.3 A.C.
PLATE+78
V8-6V6GT
SCREEN+247
6.3 A.C.
PLATE+290
CATHODE+13

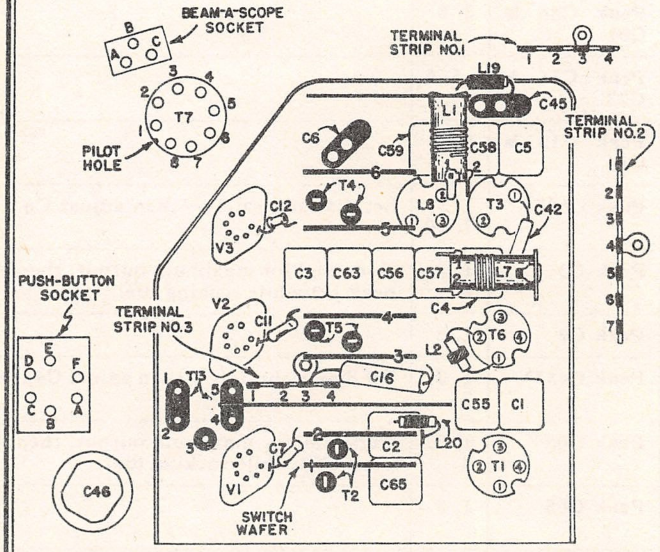
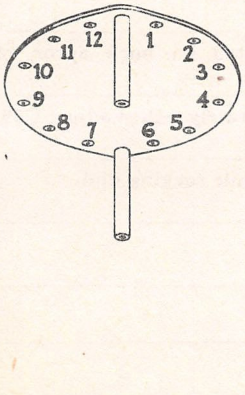

BEAM-A-SCOPE SOCKET
TERMINAL STRIP NO.1
T7
PILOT HOLE
L19
C45
L1
TERMINAL STRIP NO.2
C6
C59
C58
C5
T4
L8
T3
C42
C12
V3
C3
C63
C56
C57
L7
PUSH-BUTTON SOCKET
TERMINAL STRIP NO.3
V2
C11
C4
T5
T6
L2
T13
C16
C55
C1
C2
L20
V1
C7
T1
T2
C65
C46
SWITCH WAFER

Figure 4—Physical Location of Components Listed in Band Switch Wiring Table



—Identification of Switch Lugs —Set Inverted and Viewed from Panel

## STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings taken with low signal so that AVC is not effective.

**(1) *R-F and I-F Stage Gains***

Signal applied through IRE dummy antenna:

| | |
|---|---|
| Antenna post to V1 grid | 4 @ 1000 kc |
| Antenna post to V1 grid | 2 @ 9.6 mc |
| Antenna post to V1 grid | 2 @ 11.8 mc |

Signal applied through 300-ohms, including signal generator impedance:

| | |
|---|---|
| Dipole terminals to V1 grid | 1.5 @ 45 mc |
| Dipole terminals to V1 grid | 2 @ 98 mc |

These checks with oscillator tube (V3) removed:

| | |
|---|---|
| V1 grid to V2 grid | 13 @ 1000 kc |
| V1 grid to V2 grid | 6 @ 9.6 mc |
| V1 grid to V2 grid | 9 @ 11.8 mc |
| V1 grid to V2 grid | 13 @ 45 mc |
| V1 grid to V2 grid | 10 @ 98 mc |

These checks with oscillator tube (V3) removed:

| | |
|---|---|
| V2 grid to V4 grid | 23 @ 455 kc |
| V2 grid to V4 grid | 37 @ 10.7 mc |
| V4 grid to V5 grid | 23 @ 455 kc |
| V4 grid to V5 grid | 58 @ 10.7 mc |
| V5 grid to V6 grid | 40 @ 455 kc |
| V5 grid to V6 grid | 17 @ 10.7 mc |

**(2) *Audio Gain***

.07 volts at 400 cps across volume control with control set at maximum will give approximately ½ watt output across the speaker voice coil.

**(3) *Oscillator Grid Bias***

D-c voltage developed across R5 (average):

13 v. @ 1000 kc 2.7 v. @ 11.8 mc
2.7 v. @ 9.6 mc 5.5 v. @ 45 mc
7 v. @ 98 mc

**(4) *Socket Pin Voltages***

Fig. 8 shows typical tube pin voltages. All readings should be made from the pins to ground unless otherwise indicated.

# GENERAL ELECTRIC CO.

## ALIGNMENT

**EQUIPMENT REQUIRED:**

1. Test Oscillator with tone modulation. (See Table.)
2. D-C Voltmeter or Microammeter. (See notes 2 and 3.)
3. A-C Voltmeter, 2-volts. (See note 6.)
4. Insulated hex wrench, ¼". (See steps 1, 10, 13.)
5. 01 MF Paper Capacitor. (See steps 1 to 5.)
7. 400-ohm, ½ watt resistor. (See steps 16 to 21.)
7. 200 mmf. mica capacitor. (See steps 22 to 28.)

Important detailed instructions and references in connection with the alignment table which follows are keyed in by means of column 7, headed "See Note." The notes are included in numerical order after the table. They are important—refer to them carefully.

## ALIGNMENT TABLE

| Step | Signal Generator Frequency | Signal Input Point | Band Switch | Dial Setting | Adjust | See Note | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | 10.7 mc | 6SH7 grid thru .01 mf | FM1 | ............ | C49 for zero** | 1, 2 | Adjust C49 for *zero* meter reading. Apply 1 volt signal input. |
| 2 | See last column | 6SH7 grid thru .01 mf | FM1 | ............ | Signal Generator | 1, 2, | Detune signal generator to point of *maximum* meter reading. |
| 3 | As in step 2 | 6SG7 grid thru .01 mf | FM1 | ............ | Peak C48 | 1, 2 | |
| 4 | 10.7 mc | 6SV7 grid thru .01 mf | FM1 | ............ | Peak C28 | 1, 3 | 6AQ7GT tube removed from its socket. |
| 5 | 10.7 mc | 6SG7 grid thru .01 mf | FM1 | ............ | Peak C26 | 1, 3 | 6AQ7GT tube removed from its socket. |
| 6 | 10.7 mc | Conv. grid directly | FM1 | ............ | Peak C24 & L10 | 1, 3, 4 | 6AQ7GT tube removed from its socket. |
| 7 | 455 kc | Conv. grid directly | STD | ............ | Peak C86 & C61 | 5, 6 | |
| 8 | 455 kc | Conv. grid directly | STD | ............ | Peak C15 & C23 | 5, 6 | |
| 9 | 455 kc | Conv. grid directly | STD | ............ | Peak C13 & C14 | 5, 6 | |
| 10 | 88 mc | DIPOLE terminals | FM2 | 88 mc—6.8 to 6.9 in.* | Peak C6** | 1, 3, 7, 10 | Set dial accurately—then adjust C6. |
| 11 | 98 mc | DIPOLE terminals | FM2 | For max. output | Peak C3 | 1, 3, 8 | Tune dial for maximum output, then peak C3 while rocking dial. |
| 12 | 98 mc | DIPOLE terminals | FM2 | Do not change | Peak C2 | 1, 3 | |
| 13 | 43 mc | DIPOLE terminals | FM1 | 43 mc—6 to 6.1 in.* | Peak C45** | 1, 3, 7 | Set dial accurately—then adjust C45. |
| 14 | 46 mc | DIPOLE terminals | FM1 | For max. output | Peak C63 | 1, 3, 8 | Tune dial for maximum output, then peak C63 while rocking dial. |
| 15 | 46 mc | DIPOLE terminals | FM1 | Do not change | Peak C65 | 1, 3 | |
| 16 | 11.8 mc | Antenna thru 400-ohms | SW2 | 11.8 mc—4.5 to 4.6 in.* | Peak C58 | 5, 6, 7, 10 | Set dial accurately—then adjust C58. |
| 17 | 11.8 mc | Antenna thru 400-ohms | SW2 | Do not change | Peak C57 | 5, 6, 8 | Peak C57 while rocking dial. |
| 18 | 11.8 mc | Antenna thru 400-ohms | SW2 | Do not change | Peak C54 | 5, 6 | C54 is located on back apron of chassis. |
| 19 | 9.6 mc | Antenna thru 400-ohms | SW1 | 9.6 mc—4.5 to 4.6 in.* | Peak C59 | 5, 6, 7, 10 | Set dial accurately—then adjust C59. |
| 20 | 9.6 mc | Antenna thru 400-ohms | SW1 | Do not change | Peak C56 | 5, 6, 8 | Peak C56 while rocking dial. |
| 21 | 9.6 mc | Antenna thru 400-ohms | SW1 | Do not change | Peak C55 | 5, 6 | |
| 22 | 1620 kc | Antenna via 200 mmf | STD | Extreme right-hand position | Peak C5 | 5, 6 | |

* Important! See Note 7.
** Use insulated hex wrench, ¼"

# GENERAL ELECTRIC CO.

## ALIGNMENT TABLE (Cont'd)

| Step | Signal Generator Frequency | Signal Input Point | Band Switch | Dial Setting | Adjust | See Note | Remarks |
|---|---|---|---|---|---|---|---|
| 23 | 1620 kc | Antenna via 200 mmf | STD | Extreme right-hand position | Peak C4 | 5, 6 | |
| 24 | 1620 kc | Antenna via 200 mmf | STD | Extreme right-hand position | Peak C1 | 5, 6 | |
| 25 | 1500 kc | Antenna via 200 mmf | STD | 1500 kc—1.4 to 1.5 in.* | Osc. Coil T3 iron slug | 5, 6, 7, 9 | T3 iron slug is the rear one on the left side. Adjust for peak. |
| 26 | 1000 kc | Antenna via 200 mmf | STD | For max. output | Conv. coil T6 iron slug | 5, 6, 9 | T6 iron slug is the center one on the left side. Adjust for peak. |
| 27 | 1000 kc | Antenna via 200 mmf | STD | Do not change | R-F coil T1 iron slug | 5, 6, 9 | T1 iron slug is the front one on the left side. Adjust for peak. |
| 28 | 580 kc | Antenna via 200 mmf | STD | For max. output | Peak L8 | 5, 6, 8 | Peak L8 while rocking dial. |
| 29 | | | | | | | Repeat steps 22 to 28. |

* Important! See Note 7.

***Notes in Connection with Alignment Table***

1. Use *unmodulated* signal.
2. Connect 20,000-ohm-per-volt meter from junction of R21 and C29 to chassis. Use ten-volt scale. (Steps 1-3.)
3. Connect 20,000-ohm-per-volt meter from grid pin 4 of 6SH7 to chassis with a 200,000-ohm resistor in series. The resistor must be connected directly to the grid so that capacity loading will be negligible and so that the meter is isolated from the i-f signal voltage. Keep signal generator output down so that the meter indicates not more than one volt at the grid (5 micro-amperes through 200,000-ohms). (Alignment steps 4 to 6, 10 to 15.)
4. Connect signal generator directly to the converter grid at some convenient point. The generator lead must be shielded up to this connection so that not more than 1/16 inch of exposed lead exists. Ground the shield solidly by clamping it firmly to the chassis or a shield as close to the connection as possible. (Steps 6-9.)
5. Use 400-cycle modulation. (Steps 7 to 9, 16 to 28.)
6. Connect a standard output meter across speaker voice coil. Turn volume control fully on. Keep signal generator output down so that the meter indicates not more than ½ watt output (2 volts) during alignment. (Steps 7 to 9, 16 to 28.)
7. If dial scale is not available, index pointer as follows: Turn pointer to right-hand limit of travel. Mark the dial back plate at a reference edge of the pointer slider. Then set pointer by turning dial knob until the indicated dimension exists between the reference edge and the mark.
8. "Rocking" consists of adjusting the indicated adjuster while turning the dial a small amount back and forth through peak output. The object is to find the maximum peak. Rocking is necessary and is permissible only when interlocking circuits are being adjusted.
9. The main tuning iron slugs are suspended from the left side of the tuning "elevator." They are individually adjustable by loosening the locknut and turning the supporting screw into which the suspending wire is soldered.
10. *Two* oscillator settings will give response. The higher frequency response point is the correct one; the other is the image. If in doubt, start with the trimmer screw loosened completely and adjust for the *first* response.

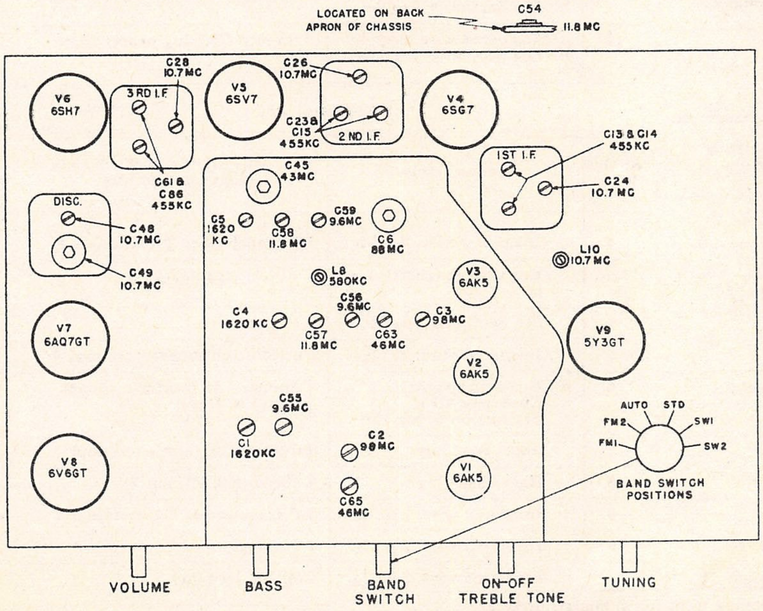
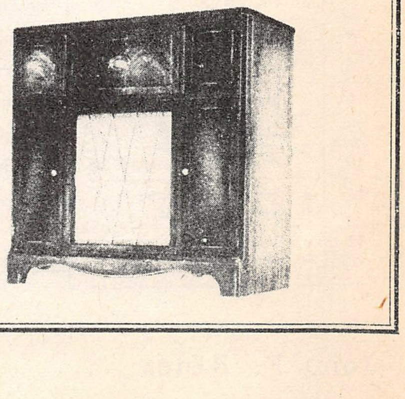

LOCATED ON BACK APRON OF CHASSIS
C54
11.8 MC
V6 6SH7
3 RD I.F.
C28 10.7MC
C61 & C86 455KC
V5 6SV7
C26 10.7MC
C238 C15 455KC
2 ND I.F.
V4 6SG7
C13 & C14 455KC
1ST I.F.
C24 10.7 MC
DISC.
C48 10.7MC
C49 10.7MC
C45 43MC
C5 1620 KC
C58 11.8 MC
C59 9.6MC
C6 88MC
L10 10.7 MC
L8 580KC
V3 6AK5
C4 1620 KC
C56 9.6MC
C57 11.8MC
C63 46MC
C3 98MC
V7 6AQ7GT
V9 5Y3GT
V2 6AK5
C55 9.6MC
C1 1620KC
C2 98MC
C65 46MC
V1 6AK5
V8 6V6GT
AUTO
STD
FM2
SW1
FM1
SW2
BAND SWITCH POSITIONS
VOLUME
BASS
BAND SWITCH
ON-OFF TREBLE TONE
TUNING

Figure 7—Location of Tubes and Adjusters

***TUBE COMPLEMENT:***

| | |
|---|---|
| R-F Amplifier | 6AK5 |
| Converter | 6AK5 |
| Oscillator | 6AK5 |
| 1st I-F Amplifier | 6SG7 |
| 2nd I-F Amplifier | 6SV7 |
| FM Limiter—AM Detector | 6SH7 |
| Discriminator—1st A-F Amplifier | 6AQ7-GT |
| Power Amplifier | 6V6GT |
| Phono Pre-Amplifier | 6SC7 |
| Rectifier | 5Y3GT |
| Dial Lamp (2) | GE No. 44 |
| Pilot Lamp (bottom of cabinet) | GE No. 47 |



## WIRING OF BAND SWITCH

(Wire length given from end to end before stripping)

### SECTION 1

| At this lug— | —connect this— | —the other end of which is connected to this— |
|---|---|---|
| 1 | Insulated wire, 5″ lg. | Antenna transformer T13, terminal 4 |
| 2 | a. Insulated wire, 11½″ lg.<br>b. Insulated wire, 2″ lg.<br>c. Capacitor C50 | Antenna terminal at rear of chassis<br>Switch section 1, lug 6<br>Switch section 2, lug 1 |
| 3 | Capacitor C52 | Switch section 2, lug 3 |
| 4 | a. Insulated wire, 1¼″ lg.<br>b. Insulated wire, 14″ lg.<br>c. Insulated wire, 5½″ lg. | Antenna transformer T1, terminal 1<br>Beam-a-scope plug, terminal A<br>Antenna transformer T13, terminal 2 |
| 5 | a. Short bare bus<br>b. Resistor R15 | Ground lug on C65<br>Switch section 1, lug 11 |
| 6 | See lug 2b, above | |
| 7 | Insulated wire, 11″ lg. | Terminal strip 1, lug 4 |
| 8 | Capacitor C31 | Front terminal of T2 |
| 9 | a. Insulated wire, 9″ lg.<br>b. Insulated wire, 7″ lg. | Terminal strip 2, lug 5<br>Filter capacitor, C46C |
| 11 | See lug 5b, above | |

### SECTION 2

| At this lug— | —connect this— | —the other end of which is connected to this— |
|---|---|---|
| 1 | See section 1, lug 2c | |
| 3 | a. Insulated wire, 2½″ lg.<br>b. See section 1, lug 3 | Trimmer C1, lug nearer T1 |
| 4 | Insulated wire, 1½″ lg. | Trimmer C55, lug nearer T1 |
| 5 | Coil L20 | Ground lug on trimmer C2 |
| 6 | Short bare bus | Trimmer C65, left-hand terminal* |
| 7 | Short bare bus | Trimmer C2, left-hand terminal* |
| 8 | Capacitor C7 | Tube socket V1, pin 1 |
| 9 | Insulated wire, 4″ lg. | Antenna transformer T13, terminal 1 |
| 10 | Insulated wire, 3½″ lg. | Antenna transformer T1, terminal 2 |
| 11** | Insulated wire, 11½″ lg. | Beam-a-scope plug, terminal C |

### SECTION 3

| At this lug— | —connect this— | —the other end of which is connected to this— |
|---|---|---|
| 1 | Shielded wire, 8¾″ lg. | Terminal strip 2, lug 6 |
| 2 | Insulated wire, 1½″ lg. | Switch section 3, lug 12 |
| 3 | a. Insulated wire, 2½″ lg.<br>b. Capacitor C16<br>c. Choke L3 | Converter coil T6, terminal 1<br>Ground lug on terminal strip 3<br>Switch section 3, lug 11 |
| 4 | Insulated wire, 7½″ lg. | Terminal strip 2, lug 3 |
| 5 | Insulated wire, 1⅜″ lg. | Converter coil T6, terminal 2 |
| 6 | Short bus with spaghetti | Chassis |
| 7 | Short bare bus | Terminal strip 3, lug 4 |
| 10 | Shielded wire, 10½″ lg. | Terminal strip 2, lug 2 |
| 11 | a. See lug 3c, above<br>b. Capacitor C10 | Switch section 4, lug 3 |
| 12 | a. See lug 2, above<br>b. Shielded wire, 7¾″ lg. | Push-button socket, Terminal B |

### SECTION 4

| At this lug— | —connect this— | —the other end of which is connected to this— |
|---|---|---|
| 1 | a. Insulated wire, 5½″ lg.<br>b. Insulated wire, 7¼″ lg. | Antenna transformer T13, terminal 5<br>Push-button socket, terminal F |
| 2 | Insulated wire, 2½″ lg. | Trimmer C4, lug nearer T6 |
| 3 | a. See Section 3, lug 11b<br>b. Short bus with spaghetti<br>c. Short jumper | Coil L7, terminal 2 (toward front)<br>Switch Section 4, lug 4 (adjacent) |
| 4 | See lug 3c, directly above | |
| 5** | Short bare bus | Trimmer C63, lug nearer front |
| 6 | Capacitor C88 | Tuner T5, left-hand terminal* |
| 7 | Short bare bus | Tuner T5, left-hand terminal |
| 8 | Capacitor C11 | Tube socket V2, pin 1 |
| 9 | a. Capacitor C72<br>b. Insulated wire, 2½″ lg. | Section 5, lug 11<br>Trimmer C56, front terminal |
| 10 | a. Capacitor C73<br>b. Insulated wire, 2½″ lg. | Section 5, lug 12<br>Trimmer C57, front terminal |
| 12 | Bus with spaghetti, 2½″ lg. | Coil L7, terminal 1 |

### SECTION 5

| At this lug— | —connect this— | —the other end of which is connected to this— |
|---|---|---|
| 1 | a. Bus with spaghetti, 1¾″ lg.<br>b. Resistor R33 | Coil L1, terminal 1<br>Section 5, lug 4 |
| 2 | a. Insulated wire, 3″ lg.<br>b. Insulated wire, 1⅜″ | Coil L8, terminal 1<br>Section 6, lug 4 |
| 4 | See Section 5, lug 1b | |
| 5 | Bus with spaghetti, 3″ lg. | Coil L1, terminal 2 |
| 6 | a. Bus with spaghetti, 3″ lg.<br>b. Bus with spaghetti, 1½″ lg. | Capacitor C45, left-hand terminal*<br>Section 5, lug 10 |
| 7** | Short bare bus | Tuner T4, left-hand terminal* |
| 8 | Capacitor C12 | Tube socket V3, pin 1 |
| 9 | Insulated wire, 4″ lg. | Trimmer C5, lug nearer T3 |
| 10 | a. See Section 5, lug 6b<br>b. Capacitor C41 | Section 6, lug 6 |
| 11 | a. Insulated wire, 3¾″ lg.<br>b. See Section 4, lug 9a | Trimmer C59, lug nearer front |
| 12 | a. Insulated wire, 3½″ lg.<br>b. See Section 4, lug 10a | Trimmer C58, lug nearer front |

### SECTION 6

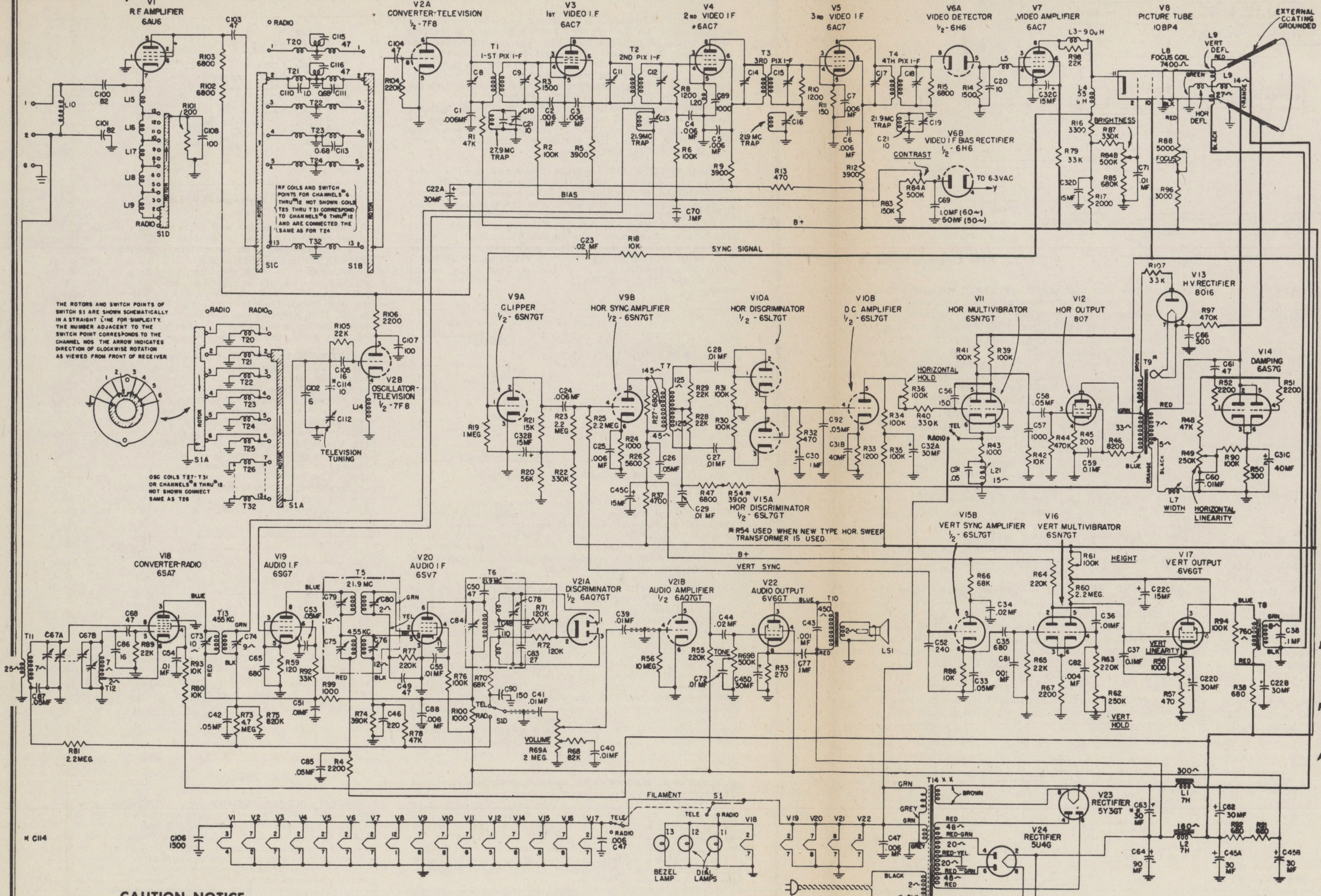
| At this lug— | —connect this— | —the other end of which is connected to this— |
|---|---|---|
| 1 | Insulated wire, 4½″ lg. | I-F transformer T7, terminal 8 |
| 2 | Bus with spaghetti, 1½″ lg. | Coil L1, terminal 2 |
| 4 | See Section 5, lug 2b | |
| 5 | Insulated wire, 12″ lg. | Push-button socket, terminal A |
| 6 | a. Bus with spaghetti, 2″ lg.<br>b. Capacitor C75<br>c. See section 5, lug 10b | Trimmer C45, center terminal<br>Ground at C59 |
| 7 | Short bare bus | Trimmer C6, center terminal |
| 8 | Bare bus, 1″ lg. | Tube socket V3, pin 7 |
| 9 | Insulated wire, 2¼″ lg. | I-F transformer T7, terminal 5 |
| 10 | Insulated wire, 2¾″ lg. | I-F transformer T7, terminal 3 |
| 12 | Insulated wire, 3½″ lg. | Coil L8, terminal 3 |

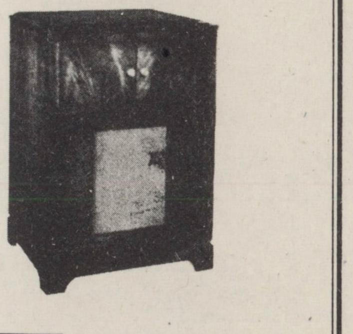
* Looking from front, chassis inverted.
** Double lug (front and rear) soldered together.

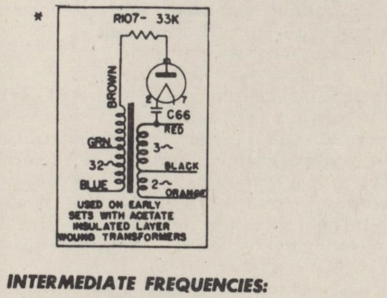
# GENERAL ELECTRIC CO.

MODEL 801

| | | |
|---|---|---|
| Frequency | 50/60 cps | 60 cps |
| Voltage | 105-125 v. | 105-125 v. |
| Wattage (Radio) | 85 | 85 |
| Wattage (Television) | 215 | 215 |


V1 R.F AMPLIFIER 6AU6
V2A CONVERTER-TELEVISION ½-7F8
V3 1st VIDEO I.F 6AC7
V4 2nd VIDEO I F *6AC7
V5 3rd VIDEO I F 6AC7
V6A VIDEO DETECTOR ½-6H6
V7 VIDEO AMPLIFIER 6AC7
V8 PICTURE TUBE 10BP4
EXTERNAL COATING GROUNDED
V6B VIDEO I F BIAS RECTIFIER ½-6H6
CONTRAST
BRIGHTNESS
FOCUS
BIAS
B+
SYNC SIGNAL
RF COILS AND SWITCH POINTS FOR CHANNELS 6 THRU 12 NOT SHOWN. COILS T25 THRU T31 CORRESPOND TO CHANNELS 6 THRU 12 AND ARE CONNECTED THE SAME AS FOR T24
THE ROTORS AND SWITCH POINTS OF SWITCH S1 ARE SHOWN SCHEMATICALLY IN A STRAIGHT LINE FOR SIMPLICITY. THE NUMBER ADJACENT TO THE SWITCH POINT CORRESPONDS TO THE CHANNEL NOS. THE ARROW INDICATES DIRECTION OF CLOCKWISE ROTATION AS VIEWED FROM FRONT OF RECEIVER
OSC COILS T27-T31 OR CHANNELS 8 THRU 12 NOT SHOWN CONNECT SAME AS T26
V2B OSCILLATOR-TELEVISION ½-7F8
TELEVISION TUNING
V9A CLIPPER ½-6SN7GT
V9B HOR SYNC AMPLIFIER ½-6SN7GT
V10A HOR DISCRIMINATOR ½-6SL7GT
V10B D.C AMPLIFIER ½-6SL7GT
V11 HOR MULTIVIBRATOR 6SN7GT
V12 HOR OUTPUT 807
V13 H.V RECTIFIER 8016
V14 DAMPING 6AS7G
HORIZONTAL HOLD
WIDTH
HORIZONTAL LINEARITY
V15A HOR DISCRIMINATOR ½-6SL7GT
*R54 USED WHEN NEW TYPE HOR. SWEEP TRANSFORMER IS USED.
VERT SYNC
V15B VERT SYNC AMPLIFIER ½-6SL7GT
V16 VERT MULTIVIBRATOR 6SN7GT
V17 VERT OUTPUT 6V6GT
HEIGHT
VERT LINEARITY
VERT HOLD
V18 CONVERTER-RADIO 6SA7
V19 AUDIO I.F 6SG7
V20 AUDIO I.F 6SV7
V21A DISCRIMINATOR ½ 6AQ7GT
V21B AUDIO AMPLIFIER ½ 6AQ7GT
V22 AUDIO OUTPUT 6V6GT
VOLUME
TONE
LS1
FILAMENT
S1
TELE
RADIO
BEZEL LAMP
DIAL LAMPS
* C114
115V 60~
S2 (COMBINED WITH TONE CONTROL, R69B)
V23 RECTIFIER 5Y3GT
V24 RECTIFIER 5U4G
** EARLY SETS-THIS WILL BE A 5V4G. SETS USING 5V4G WILL USE PT.1 OF POWER TRANSFORMER SETS USING 5Y3GT WILL USE PT.2 OF POWER TRANSFORMER




R107-33K
C66
BROWN
GRN
RED
32~
BLACK
3~
BLUE
2~
ORANGE
USED ON EARLY SETS WITH ACETATE INSULATED LAYER WOUND TRANSFORMERS

**INTERMEDIATE FREQUENCIES:**

Television Video (carrier freq. equivalent) ........26.4 mc

Television Audio.... ........21.9 mc

Radio............... ........ 455 kc

**AUDIO POWER OUTPUT:**

Undistorted................ 3 watts

Maximum...................4.5 watts

**LOUDSPEAKER:**

Type............Alnico "PM" Dynamic

Size..........................12 inches

Voice Coil Impedance (400 cycles) .....3.2 ohms

**PICTURE SIZE:**

Height.........................6 inches

Width..........................8 inches

**ANTENNA REQUIREMENTS:**

Type...................Folded Dipole

Impedance...................300 ohms

## CAUTION NOTICE

THE REGULAR B+ VOLTAGES ARE DANGEROUS AND PRECAUTIONS SHOULD BE OBSERVED WHEN THE CHASSIS IS REMOVED FROM THE CABINET FOR SERVICE PURPOSES. THE HIGH VOLTAGE SUPPLY (8000 v.) AT THE PICTURE TUBE ANODE WILL GIVE AN UNPLEASANT SHOCK BUT DOES NOT SUPPLY ENOUGH CURRENT TO GIVE A FATAL BURN OR SHOCK. HOWEVER, SECONDARY HUMAN REACTIONS TO OTHERWISE HARMLESS SHOCKS HAVE BEEN KNOWN TO CAUSE INJURY. SINCE THE HIGH VOLTAGE IS OBTAINED FROM THE B+ VOLTAGE, CERTAIN PORTIONS OF THE HIGH VOLTAGE GENERATING CIRCUIT ARE DANGEROUS AND EXTREME PRECAUTIONS SHOULD BE OBSERVED.

THE PICTURE TUBE IS HIGHLY EVACUATED AND IF BROKEN, GLASS FRAGMENTS WILL BE VIOLENTLY EXPELLED. IF IT IS NECESSARY TO CHANGE THE PICTURE TUBE, USE SAFETY GOGGLES AND GLOVES.

**R-F FREQUENCY RANGE:**

| Selector Switch Position | Freq. Range | Picture Carrier | Sound Carrier |
|---|---|---|---|
| Radio | 540–1600 kc | .... | .... |
| No. 1 | 44– 50 mc | 45.25 | 49.75 |
| No. 2 | 54– 60 mc | 55.25 | 59.75 |
| No. 3 | 60– 66 mc | 61.25 | 65.75 |
| No. 4 | 66– 72 mc | 67.25 | 71.75 |
| No. 5 | 76– 82 mc | 77.25 | 81.75 |
| No. 6 | 82– 88 mc | 83.25 | 87.75 |
| No. 7 | 174– 180 mc | 175.25 | 179.75 |
| No. 8 | 180– 186 mc | 181.25 | 185.75 |
| No. 9 | 186– 192 mc | 187.25 | 191.75 |
| No. 10 | 192– 198 mc | 193.25 | 197.75 |
| No. 11 | 198– 204 mc | 199.25 | 203.75 |
| No. 12 | 204– 210 mc | 205.25 | 209.75 |
| No. 13 | 210– 216 mc | 211.25 | 215.75 |

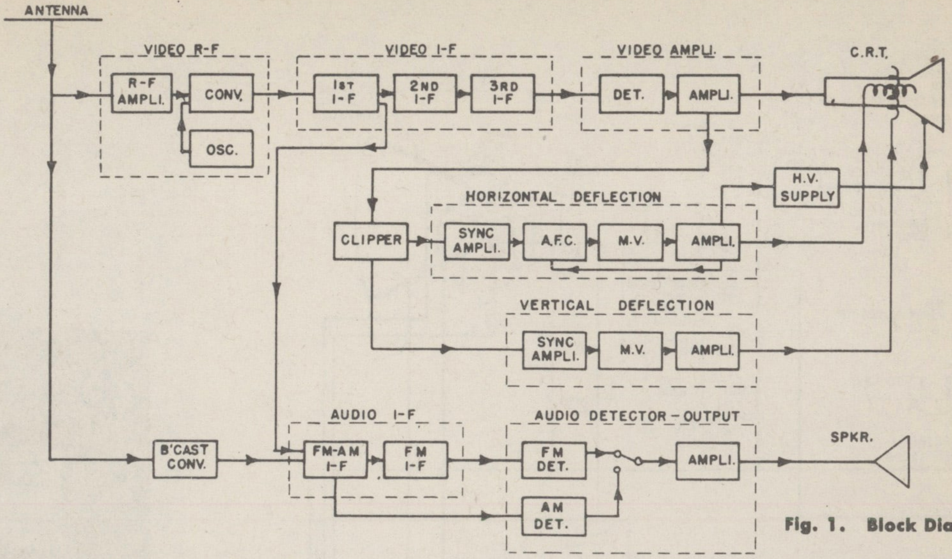

ANTENNA
VIDEO R-F
R-F AMPLI.
CONV.
OSC.
VIDEO I-F
1ST I-F
2ND I-F
3RD I-F
VIDEO AMPLI.
DET.
AMPLI.
C.R.T.
H.V. SUPPLY
HORIZONTAL DEFLECTION
CLIPPER
SYNC AMPLI.
A.F.C.
M.V.
AMPLI.
VERTICAL DEFLECTION
SYNC AMPLI.
M.V.
AMPLI.
AUDIO I-F
AUDIO DETECTOR-OUTPUT
B'CAST CONV.
FM-AM I-F
FM I-F
FM DET.
AM DET.
AMPLI.
SPKR.

**Fig. 1. Block Diagram, Model 801**

## DESCRIPTION—TELEVISION CIRCUITS

The television receiver circuits are divided into the following sections:

1. R-f amplifier, converter and oscillator
2. Video and audio i-f amplifier
3. Video detector and amplifier
4. Sync pulse clipper-amplifier
5. Horizontal multivibrator and AFC sync.
6. Horizontal sweep output
7. Vertical multivibrator and sweep output
8. High voltage power supply (H.V. supply)
9. Low voltage power supply (L.V. supply)

A brief description of the operation of each section is described in the following paragraphs. This is supplemented by a comprehensive television training course in the publication, RSM-4-TV.

A block diagram of the complete receiver is shown in Figure 1 to assist in signal tracing and to better visualize the operation of the receiver as a whole.

***1. R-F AMPLIFIER, CONVERTER & OSCILLATOR (See Figure 2)***—The r-f amplifier makes use of a Type 6AU6 tube connected as a triode grounded-grid amplifier. The antenna is connected into the cathode circuit so as to provide a substantially constant input impedance of 300 ohms to the antenna at all frequencies. With a 300-ohm antenna and transmission line system, this coupling arrangement permits optimum transfer of signal from antenna to r-f amplifier for all 13 channels. R101 is the normal bias resistor. A choke, $L_K$, is placed in series with this cathode resistor to prevent the input impedance from being lowered by the shunting effect of the total stray capacity to ground of the cathode of the tube. The choke value is changed with frequency.

The r-f amplifier is coupled to the converter tube by a wide band transformer consisting of windings $L_p$ and $L_s$. The windings are self-tuned by the distributed and tube capacities to provide optimum gain. On channels No. 1 and No. 2 the transformer is triple tuned to prevent the image frequencies of the 88-108 mc FM band from interfering with these two channels. The triode converter is one section of a Type 7F8 dual triode, V2A. Bias for this tube is provided by the oscillator voltage appearing in the grid of V2A causing grid rectification charging the grid resistor-condenser combination, R104 and C104.

The oscillator makes use of the remaining half of the Type 7F8 tube, V2B, and is inductively coupled to the converter grid by locating the oscillator grid coil, T22, on the same coil form as the converter grid coil, $L_s$. The oscillator is a modified Colpits oscillator, oscillation being produced by the cathode-to-grid, $C_g$, and cathode-to-plate, $C_k$, interelectrode capacities of the oscillator tube. The choke $L_f$ provides a d-c ground to the cathode of the oscillator but maintains the cathode off-ground at the r-f frequencies. The oscillator operates on the high frequency side of the r-f signal on all bands.

The r-f amplifier, converter and oscillator is constructed as a complete unit sub-assembly which can readily be demounted from the main chassis.

***2. VIDEO AND AUDIO I-F AMPLIFIERS (See Figure 3)***—The video i-f amplifier makes use of a three-stage band-pass amplifier using three Type 6AC7 tubes. The transformers, T1, T2, T3, and T4, are overcoupled and then loaded with resistance, $R_L$, to give an adequate (approx. 4 mc) band-pass frequency characteristic. A third winding is added to each video transformer and tuned to trap out the adjacent audio and associated audio interference. The trap on T1 is tuned to 27.9 mc to provide rejection of the adjacent channel audio i-f, while the traps at T2, T3, and T4 are tuned to 21.9 mc to provide rejection of the same channel audio.

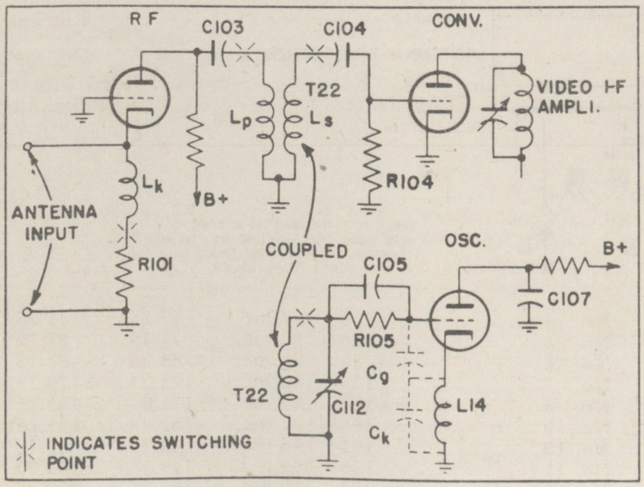

RF
C103
C104
CONV.
VIDEO I-F AMPLI.
Lp
T22
Ls
Lk
B+
R104
ANTENNA INPUT
R101
COUPLED
OSC.
C105
B+
C107
R105
Cg
T22
C112
L14
Ck
INDICATES SWITCHING POINT

**Fig. 2. R-f Amplifier, Converter & Oscillator**

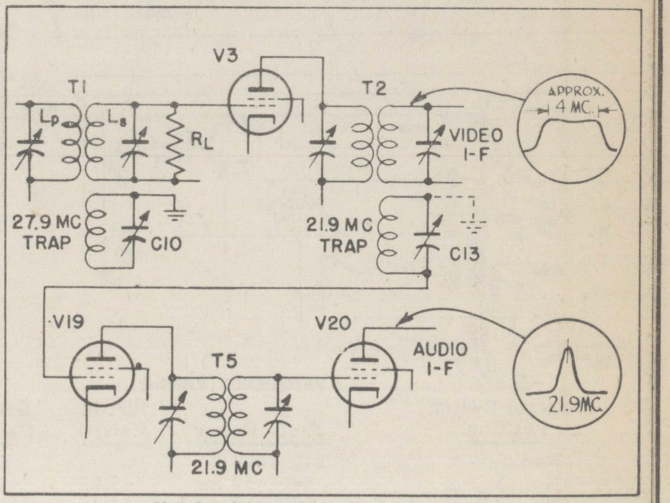
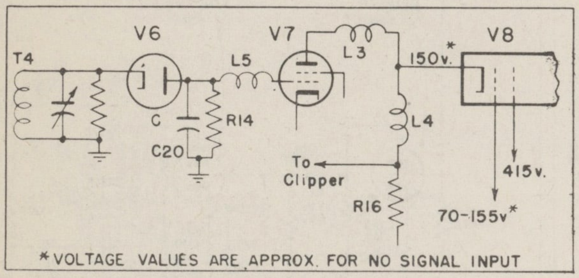

V3
T1
Lp
Ls
RL
T2
VIDEO I-F
APPROX. 4 MC.
27.9 MC TRAP
C10
21.9 MC TRAP
C13
V19
V20
AUDIO I-F
T5
21.9 MC
21.9MC.

**Fig. 3. Video & Audio I-f Amplifier**

The audio i-f frequency is developed by taking the 21.9 mc signal from across the trap on T2 and applying it to the grid of the audio i-f amplifier tube V19. The ground return side of the trap is effectively connected to ground at 21.9 mc through the low impedance circuit offered by the capacitors C74 and C42. Since the audio channel of the television is frequency-modulated, the transformer T6 functions with the diode sections of V21 as the discriminator.

Bias voltage, derived by rectifying 6.3 volts a-c through the diode V6B, is applied to the grid circuits of the video i-f amplifier tubes, V3 and V4. A variable potentiometer contrast control, permits this voltage to be changed so as to vary the gain of the i-f amplifier.

***3. VIDEO DETECTOR AND AMPLIFIER (See Figure 4)***—The video i-f amplifier output is applied to a diode rectifier, V6, and the diode load, R14, is connected so as to develop a negative-going signal voltage at this point. The signal is amplified by tube V7 and then applied directly to the cathode of the picture tube, V8. This provides direct coupling so that d-c reinsertion is unnecessary. The chokes L5 and L3 are series peaking chokes, while L4 is a shunt peaking choke. These are used to obtain good high frequency response. L5 also prevents harmonics of the i-f frequency from being passed through the video amplifier. R16 is the V7 tube plate load resistor.



*VOLTAGE VALUES ARE APPROX. FOR NO SIGNAL INPUT

**Fig. 4. Video Detector & Amplifier**

With the cathode of V8 coupled directly into the plate circuit of V7, it is necessary to apply a variable positive voltage to the control grid of the picture tube in order to control the beam current and, therefore, the brightness of the picture. In late production receivers where the rectifier V23 is a Type 5Y3G tube, the cathode and control grid voltages of V8 will be approximately 25 volts less.

***4. CLIPPER AND SYNC AMPLIFIER***—The triode section, V9A, of a Type 6SN7GT tube is used to separate the sync pulses from the video signal taken off at the load resistor, R16, see Figure 4. This is accomplished by applying very low plate voltage to V9A, then the resulting grid rectification causes negative bias to be developed at the grid of V9A so that conduction occurs only during the sync pulse intervals which are the most positive component of the video signal.

Tube V9B is a horizontal synchronizing amplifier which rejects the vertical pulse at the transformer, T7, by virtue of its low inductance to the vertical synchronizing pulse. The cathode impedance is required to raise the control grid to a positive voltage with respect to chassis for proper operation of V15B. The tube V15B is operated as a cathode follower vertical synchronizing amplifier. Integration of the vertical signal is provided in both the grid and cathode circuits.

***5. HORIZONTAL MULTIVIBRATOR AND AFC SYNC (See Figure 5)***—The horizontal sawtooth oscillator makes use of a Type 6SN7GT tube, V11, in a conventional cathode-coupled multivibrator circuit. Instead of its frequency being controlled directly by the horizontal sync pulses, it is controlled by a d-c voltage on its grid, which is the resultant of the phase error between the incoming sync signal and a sawtooth voltage derived from the output of the horizontal sweep amplifier. This voltage is called an automatic frequency control (AFC) voltage.

The AFC voltage is developed by the diode-connected triodes V10A and V15A by mixing the horizontal sync pulse at the secondary of transformer T7 with a sawtooth waveform derived at the output of the sweep amplifier. When the sync pulse occurs at the time "a" shown in the sawtooth waveform drawing in Figure 5, no voltage will be developed at the output of the filter. However if the multivibrator runs faster or slower so that the pulse falls at a point other than at "a," a positive or negative voltage will appear at the filter, which will be amplified by the d-c amplifier V10B and then applied to the grid of the multivibrator. This change in d-c voltage on the grid of the multivibrator will cause it to speed up or slow down so as to cause the sawtooth wave to combine with the incoming sync pulses until the correction voltage becomes zero. With the filter, consisting of C92, R32, and C30, the change is relatively slow in controlling the speed, permitting a synchronizing system which is relatively free from random noise triggering. The Horizontal Hold control, R36, controls the speed of the multivibrator, permitting the free-running speed of it to be set near the correct frequency during the time when no sync pulses are available.

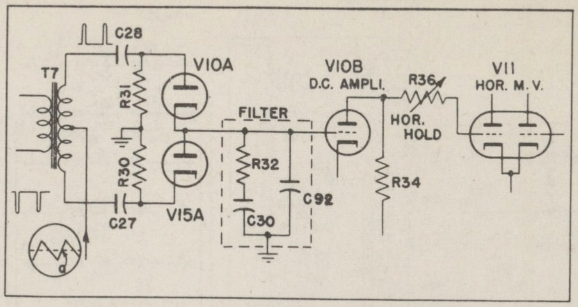


**Fig. 5. Horizontal M.V. & Sync Circuit**

***6. HORIZONTAL SWEEP OUTPUT (See Figure 6)***—The horizontal sawtooth voltage generated by the multivibrator, V11, is shaped and then amplified by a Type 807 tube, V12. The output of this tube is coupled to the horizontal deflection yoke through an impedance matching transformer, T9. An oscillatory voltage, as shown in the dotted line in the wave shape at the upper left of Figure 6, which results from the rapid retrace in transformer T9, is removed by the damping tube, V14. This tube is a triode Type 6AS7 and by its use the transient may be dampened, linearity controlled and the positive overshoot voltage retained for use in the high voltage supply. The linearity of the horizontal trace is controlled by varying the voltage wave shape applied to the grid of V14 by potentiometer R49. The horizontal size is varied by the adjustable iron core inductance, L7, which is in series with the output to the yoke.

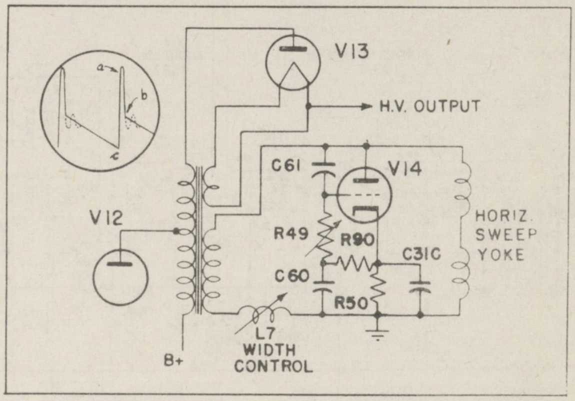


**Fig. 6. Horizontal Sweep Output**

***7. VERTICAL MULTIVIBRATOR AND SWEEP OUTPUT (See Figure 7)***—The vertical sawtooth voltage is generated by a Type 6SN7-GT tube, V16, connected as a multivibrator. This voltage is coupled directly to a Type 6V6G vertical sweep output tube, V17, and then to the vertical sweep yoke through the impedance matching transformer, T8. Vertical speed is controlled by changing the time constant of the multivibrator grid circuit by the potentiometer, R62. Sweep size is changed by the potentiometer, R61, which changes the B+ voltage applied to the charging network of tube V16 simultaneously with the screen voltage on tube V17. Vertical linearity is controlled by feeding back voltage through C37 from the cathode to grid of the output tube. The amount of the voltage is varied by the variable cathode resistor, R58.

***8. HIGH VOLTAGE SUPPLY (See Figure 6)***—The high voltage is derived by making use of the inductive "kick" voltage produced during retrace in the horizontal output transformer.

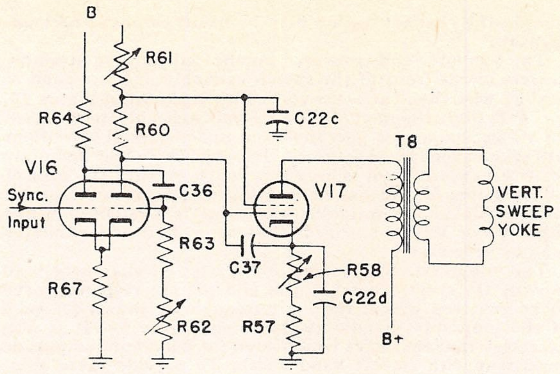


**Fig. 7. Vertical Sweep Output**

This "kick" voltage is shown in the wave shape shown as a-b in Figure 6. This voltage is generated in the primary winding and is further increased by an additional winding added to the transformer which connects to the rectifier tube plate of V13. The rectifier tube, V13, is a Type 8016 which derives its filament voltage from the horizontal sweep transformer T9 by a single turn around the transformer. Because of the high frequency which is rectified, a 500 mmf capacitor is more than sufficient for filtering purposes.

**9. LOW VOLTAGE POWER SUPPLY**—Two rectifiers are used to supply the required plate current for the television and radio receiver. A Type 5U4G tube, V24, supplies the bulk of the current and makes use of combination inductive and resistance type filter. A Type 5V4G or 5Y3G tube, V23, is used to supply higher voltage to the horizontal output, horizontal multivibrator, and the cathode ray tube 1st anode. This is followed by a choke filter. All filament supply leads except for tubes V19, V20, V21, V22 and the rectifier filaments pass through the band switch so that tubes may be switched ON or OFF when switching from radio to television.

## CIRCUIT ALIGNMENT

**GENERAL**—A complete alignment of the Model 801 television receiver consists of the following individual alignment procedures. These are listed below in the correct sequence of alignment. However, any one alignment may be performed without the necessity of realignment of any one of the other sectional alignments.

1. Broadcast i-f amplifier
2. Broadcast r-f amplifier
3. Television i-f traps
4. Television sound i-f amplifier
5. Video i-f amplifier
6. Oscillator adjustments
7. Television r-f amplifier

The alignment procedure is in table form on pages 8 through 11. The following paragraphs are important suggestions to be followed when attempting alignment and should be read thoroughly before alignment is attempted.

**TEST EQUIPMENT REQUIREMENTS**—To provide the over-all alignment as outlined above, the following test equipment is required.

*1. Cathode Ray Oscilloscope*—This scope should preferably have a 5-inch screen and should preferably have good high frequency response, which will be useful in making waveform voltage measurements on pages 20 and 21.

*2. Signal Generator*—This signal generator must have good frequency stability and be accurately calibrated. It should be capable of covering the following frequency ranges with tone modulation where desired.

(a) 455 kc for broadcast
(b) 550-1600 kc for broadcast
(c) 21.9 mc for video i-f trap
(d) 27.9 mc for video i-f trap
(e) 23.0 mc for video i-f marker
(f) 25.65 mc for video i-f marker
(g) 26.4 mc for video i-f marker
(h) 44-110 mc and 174-238 mc for oscillator adjustment and markers for the r-f channel bandwidth measurements.

*3. R-F Sweep Generator*—This should give approximately 0.1-volt output with adjustable attenuation of the output. The output should be flat over wide frequency variations. The frequency coverage should be:

(a) 20 to 30 mc, with 10 mc sweep width
(b) 40 to 90 mc, with 25 mc sweep width
(c) 170 to 220 mc, with 25 mc sweep width

*4. Output Meter*—An output meter with a voltage range 0-2.5 volts a-c.

**ALIGNMENT SUGGESTIONS**—With the exception of the broadcast i-f and r-f trimmers and the FM sound i-f discriminator trimmers, all alignment adjustments are performed from the underside of the chassis. Remove the chassis from the cabinet and turn it on its side with the power transformer down. This is the only safe position in which the chassis will rest and leave all adjustments accessible. The following suggestions apply to each individual alignment procedure.

*1. Broadcast I-F Alignment*—(a) Although the oscilloscope is recommended in the table for indicating the output voltage during alignment, an output meter may be connected across the speaker voice coil as an alternate output indicating device. When this is used, the volume control should be set for maximum volume and then attenuate the signal generator output so as not to cause audio overload.

(b) Use a 200 mmf mica capacitor or standard RMA dummy between the high side of the signal generator and the signal input point, as indicated in the Alignment Table.

*2. Broadcast R-F Alignment*—Apply signal generator input to one of dipole input terminals through a 200 mmf mica capacitor as in (1) above. An output meter may be used in place of the oscilloscope for indicating output. First adjust oscillator trimmer by tuning gang condenser to minimum capacity and aligning oscillator trimmer for maximum with a 1620 kc input signal. Next with 1500 kc input signal, tune in signal, set pointer to 1500 kc calibration then align r-f trimmer for maximum output.

*3. Video I-F Trap Alignment*—The video i-f traps are used to attenuate the sound i-f of the same and adjacent channels from being detected and reproduced as sound bar interference on the picture tube. Misalignment of these traps results in the interference pattern, as shown in Figure 31.

Set the contrast control about half-way up. Turn the Station Selector to channel 13. Connect the oscilloscope through a 10,000-ohm resistor, to the top of the 3300-ohm video load resistor, R16.

Connect the output of an accurately calibrated signal generator with tone modulation to the grid of the converter tube, V2A, through a 200 mmf mica capacitor. The alignment frequencies are:

T1 (C10)—27.9 mc
T2 (C13)—21.9 mc
T3 (C16)—21.9 mc
T4 (C19)—21.9 mc

The trimmers should be aligned for minimum output, care being taken to get the lowest possible indication at the output. The input signal should be attenuated below saturation of the i-f amplifier tubes at start, then raised as signal is attenuated during alignment.

*4. Television Sound I-F Alignment*—Since the television sound i-f amplifier transformer is slightly overcoupled, alignment by a sweep generator is recommended. Connect the generator through a 200 mmf capacitor to grid (4) of V3. For alignment, connect the oscilloscope through a 100,000 ohm isolating resistor across capacitor C49.

For step 1, insert a 21.9 mc marker signal from an unmodulated signal generator into the same point of input as the sweep generator. This input from the signal generator should be very loosely coupled by clipping the signal generator through insulation to the grid (4) of V3.

Keep the input of the sweep generator low enough so that the sound i-f amplifier does not overload. Check by increasing the output of the sweep; the response curve on the scope should increase in size proportionally. Set Contrast Control to half-advanced position.

The response curve of the amplifier at the grid return of V20 should appear as in Figure 8A.

For discriminator alignment the secondary trimmer, C78, of T6 is aligned by using a tone modulated 21.9 mc signal and listening to the tone at the loudspeaker. The trimmer is adjusted for minimum tone signal output. If the sweep is used for the secondary trimmer alignment, the cross-over should be symmetrical about a 21.9 mc marker and should be a straight line between the alternate peaks, as shown in Figure 8B. Reconnect oscilloscope across the top of the volume control.

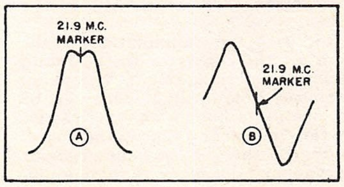


**Fig. 8. T-V Audio I-F Curves**

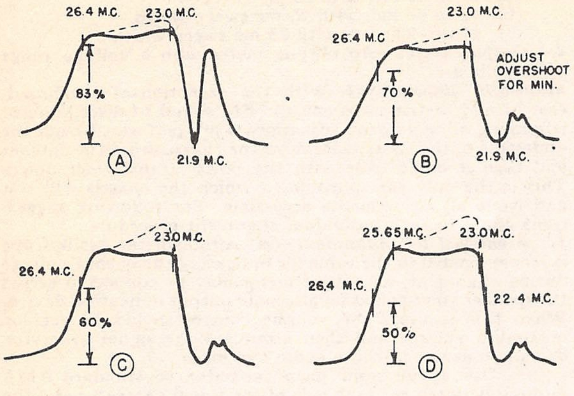


Fig. 9. Video I-F Alignment Curves

With the same sweep input as in step 1, adjust the primary trimmer, C84, of T6 for maximum peak-to-peak amplitude of the positive and negative peaks as shown in Figure 8B.

5. *Video I-F Alignment*—The video i-f amplifier uses transformers which are coupled and loaded to give the proper band-pass characteristic. Before attempting alignment of the video i-f, the sound i-f traps should be aligned as in (3), then do not touch these trimmers when making the video i-f alignment.

Stage-by-stage alignment should be performed so as to duplicate the curves, as shown in Figures 9A, B, C, and D. The markers are used to establish the correct bandwidth and frequency limits.

The trap formed by L20 and C89 in the cathode of V4 is used to reduce the overshoot of the 21.9 mc traps. Adjust the spacing of turns comprising L20 by either pushing them together or separating them so as to give a minimum amplitude to the overshoot.

Connect the sweep generator to the tube grid preceding the transformer to be aligned. Adjust the sweep width for a minimum of 10 mc about the center frequency of the video i-f. The marker frequencies are supplied by a signal generator and sufficient marker signal may be supplied in most cases by merely connecting the high side of the signal generator to the television chassis.

The primary of the transformer preceding the grid where the signal is applied will act as a trap putting a hole in the alignment curves as viewed on the scope unless it is short circuited or detuned. It may be detuned readily by connecting a 100 to 200 mmf capacitor across the primary trimmer or place a temporary short circuit across the primary trimmer. *Be sure to remove this capacitor after the stage is aligned.*

Keep the input of the sweep generator low so as not to overload the video i-f amplifier.

The response curves shown are obtained on an oscilloscope at the junction of L4 and R16. Use a 10,000 resistor in series with the input lead to the oscilloscope.

The contrast control should be advanced approximately to its half-advanced position.

The Selector Switch should be turned to radio position and a temporary jumper put across filament switch wafer so as to keep the television tube filaments lit while in this radio position. If a television position is used, the i-f curve will be affected by the interaction from the r-f coil in the converter tube grid. NOTE—When jumper is used, remove B+ from r-f assembly by disconnecting external lead to terminal (2) of r-f assembly, see Fig. 12.

6. *Oscillator Adjustment*—The oscillator coil must be adjusted so that the Television Tuning Condenser, C112, will tune the sound carrier of the television signal at the middle of its range. Set the condenser, C112, to mid-position. Then adjust oscillator coil for channels No. 1 through No. 6 by spreading turns to raise frequency or compressing turns to lower frequency. For channels No. 7 through No. 13, the oscillator coil consists of a single turn. Adjust these coils by spreading the gap to lower frequency or closing the gap to raise frequency in the leads of the coil which run to the terminals.

Apply the signal generator with tone modulation to the antenna input terminals and set the generator to the sound carrier frequency for the channel under alignment. The signal generator must be very accurately calibrated. This can be done by beating its output against a known channel carrier or use a station operating on the channel and tune in the sound.

For output indication, advance the volume control about to mid-position so that the tone modulation or audio modulation on the channel station may be heard through the loudspeaker.

The oscillator coil is located on the coil form or assembly nearest to the front of the switch assembly and is wound of heavier wire than the other coils. This is shown in Figure 10.

7. *R-F Coil Alignment*—The r-f coil assembly is designed for stable, band-pass operation and under normal conditions will seldom require adjustment. In cases where it is definitely known that alignment is necessary (such as when the present coil is damaged and has been changed), do not attempt the adjustment unless suitable equipment is available. When tubes V1 or V2 are changed, alignment of r-f and oscillator may be necessary.

The minimum requirements for correct r-f alignment is to provide the correct band width, and for the response curve to be centered within the limit frequencies shown for each of the individual bands, as shown in Figure 11. It is also necessary that the curve be adjusted for maximum amplitude consistent with correct band width. To provide these minimum requirements, the r-f coils are overcoupled in a very similar manner to the video i-f transformers. However, instead of adjusting capacity to tune the coils, the inductance is varied by moving a few turns. Coupling is also adjustable by moving the entire coil either away from or toward the adjacent coil on the form.

The physical assembly of the coils in the band switch locates the r-f amplifier plate coil at the rear of the switch and the oscillator coil towards the front end. Two types of coils are used—the Channel No. 1 and No. 2 coils have an additional link circuit between the grid and plate coils to provide better image rejection of the FM band (88 to 108 mc) signals on these two channels. These links are tuned by means of two copper rings which are moved along the coil forms for adjustments.

The input sweep signal is applied to the antenna terminal board at the r-f unit. The 300-ohm cable between the antenna terminal board and r-f amplifier input must be disconnected at the r-f unit when making r-f alignment. The marker signal generator may be coupled loosely to the antenna input terminals.

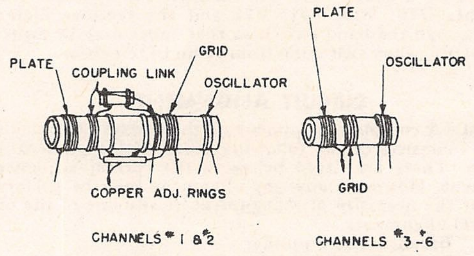


Fig. 10. R-F Coil Assembly

The output r-f response curve is taken off at the junction of R1 and C1. The Contrast Control should be set for minimum for all r-f alignment.

For channels No. 1 and No. 2, the r-f coil should be aligned to give approximately the curve shown in Figure 11A. The high frequency end of curve (at S marker) may be peaked slightly higher than the low frequency end of curve, but the low frequency end should never be aligned with more amplitude than the high frequency end. The markers should be located on the inside of the humps of the curves, the video marker (P) preferably being inside slightly farther than the sound marker (S). Adjustment of the bandwidth is made by moving the plate coil closer to the grid coil or vice-versa. In most cases the sliding of the copper rings will give both the required bandwidth and frequency adjustment. Spread

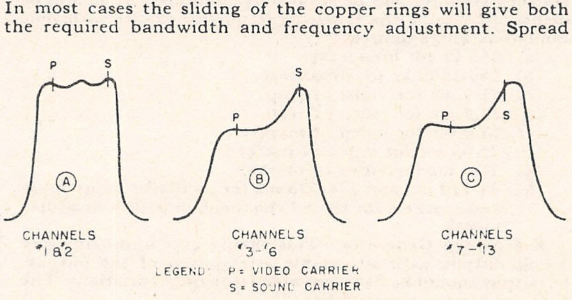
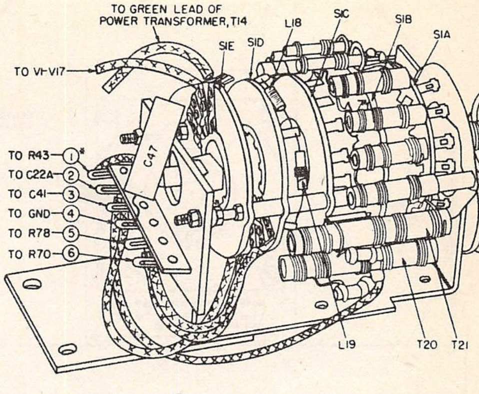


Fig. 11. R-F Alignment Curves

or squeeze turns in plate and grid coils if the frequency cannot be obtained by sliding the rings. Spreading turns results in a raising of the frequency; while squeezing turns lowers the frequency.

For the remainder of the channels, the adjustment of the plate coil in relation to the grid coil changes the bandwidth while the spreading or squeezing of the plate and grid coil turns results in the raising or lowering of frequency. Only when the plate and grid coils are tuned to the same frequency will the amplitude be greatest with the correct bandwidth. The outside peaks of the r-f response curve should be aligned to the carrier markers. In general it is desirable to have a slight rise on the high frequency (sound carrier) side of the curve, however the rise should not exceed approximately 30 per cent of the low frequency side. A low frequency rise in the response curve is not desirable and must be avoided, as a picture with poor definition will result if this is done.

The upper channel coils (No. 11, No. 12, and No. 13) may have the plate winding reversed from the winding direction of the plate coil of the other transformers. If this is the case, the bandwidth will be increased by separating the plate and grid coils and vice-versa. This condition can be determined by inspection or by the effect on the curve when making the alignment.



* TERMINAL ① NOT USED ON EARLY PRODUCTION RECEIVERS

**Fig. 12. R-F Coil & Switch Assembly**

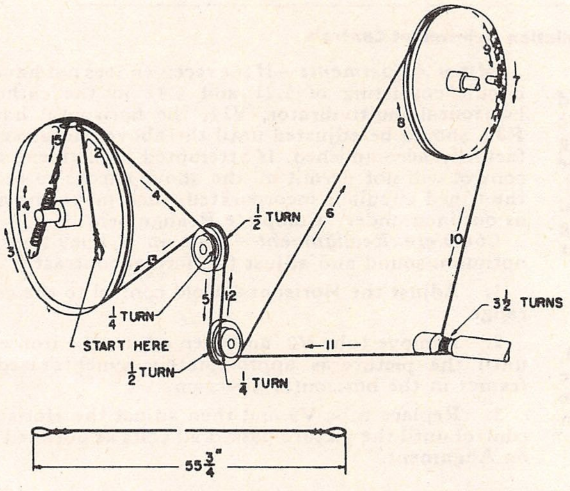


**Fig. 15. Radio Tuning, Dial Drive Stringing**

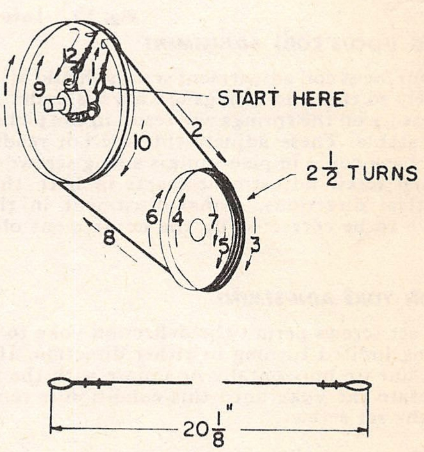


**Fig. 16. Television Tuning, Drive Stringing**

## MISCELLANEOUS INSTALLATION AND SERVICE ADJUSTMENTS

### *REPLACEMENT OF PICTURE TUBE*

To remove the picture tube from the television chassis, remove the picture tube socket and then untape and slide off the ion trap adjustment assembly. The ion trap can be removed readily, if the gap in the assembly is pulled apart slightly with the fingers while attempting to slide it. Loosen the two set screws partially that clamp the left side of the picture tube mounting strap, then slide the strap backward from the top-front rim of the picture tube until the rim of the tube is free from the strap. Carefully pull the tube out through the focus and deflection coils.

To replace a picture tube the reverse procedure should be followed, being careful never to force the picture tube if it sticks or fails to slip into place readily. Investigate and remove the source of the trouble. The picture tube should be oriented so that the anode cap is adjacent to the H.V. rectifier, V13, and the high voltage lead.

Wipe the screen surface of the tube to remove finger marks and dust. *PRECAUTION—Do not handle, remove, or install a picture tube unless shatterproof goggles and heavy gloves are worn.*

### *ION TRAP ADJUSTMENT*

The ion trap may be approximately located as shown in Figure 17; however its final adjustment must be made with the television receiver operating.

The approximate adjustment requires that the gaps in the two magnets be lined up with the break in the rubber holder. NOTE—Some ion traps have been magnetized so that it is necessary to rotate the small magnet at 180 degrees to this normal position. Then slide the assembly onto the picture tube neck so that the ion trap assembly slit is at the bottom or top (dependent upon picture tube) and lines up with pin #12 or #6. Slide the assembly forward on the picture tube until it is about the position shown in the illustration. NOTE—The wider of the two magnets should be located at the rear or the base end of the picture tube. The final following steps should be taken with the television receiver operating:

1. With Brilliance control advanced, turn ion trap assembly so that gap in rubber holder is faced up or down and lines up with either pin #6 or pin #12. Whichever way gives some illumination, is the correct approximate orientation of assembly. If the tube V16 is removed, it will be found much easier to adjust for maximum illumination since the resultant thin line will illuminate even though the magnets are considerably out of adjustment.
2. Move assembly back and forth and rotating it while viewing screen, adjust for maximum brightness.
3. If illuminated area gets very bright, reduce brightness with control and repeat step 2. If tube V16 was removed as suggested in Step 1, replace it before proceeding with step 4.
4. If any shadowing of the tube neck is present after completing step 3, rotate the small (front) magnet to correct shadow and repeat step 2 and 3. NOTE—Badly out-of-line focus coils can also cause neck shadowing. The focus coil should be symmetrical and straight before starting the ion trap adjustment.

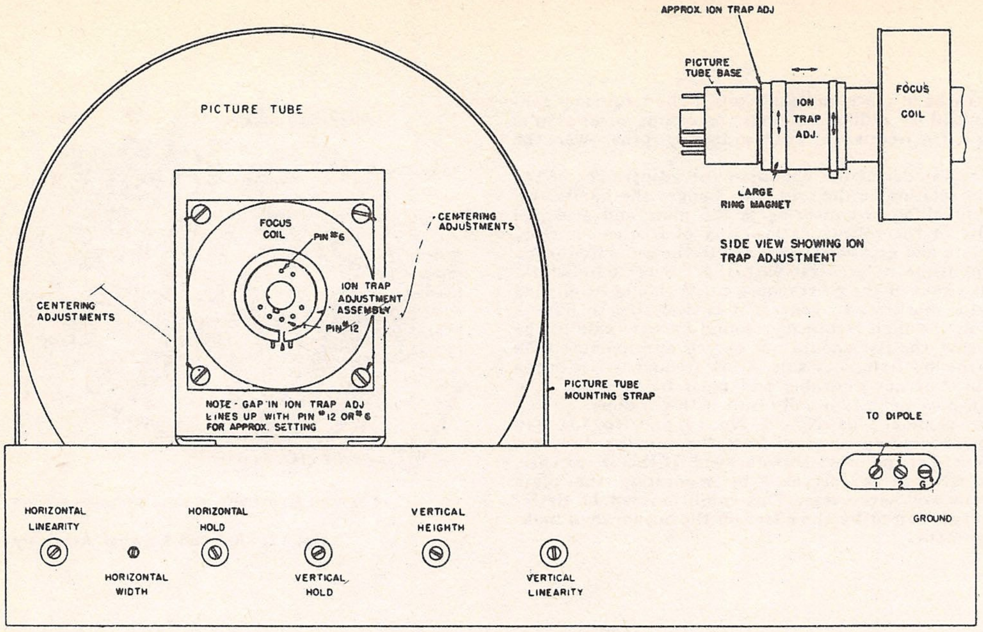


**Fig. 17. Location of Installation Adjustment Controls**

### CENTERING (FOCUS COIL) ADJUSTMENT

The four focus coil adjustment screws should all be tightened sufficiently so that the springs are always under tension. Too loose pressure on the springs will result in the picture centering being unstable. These adjustments are not readily available with the back cover in place unless a long screwdriver is used. Since each screw adjustment reacts in both the horizontal and vertical directions, a maladjustment in the centering may have to be corrected by the adjustment of one to four screws.

### DEFLECTION YOKE ADJUSTMENT

Three set screws permit the deflection yoke to be loosened, permitting limited turning in either direction. If the picture does not line up horizontally or square with the picture tube mask, rotate the yoke until this condition is remedied, then tighten the set screws.

### HORIZONTAL (HOLD) OSCILLATOR SPEED ADJUSTMENT

The horizontal hold control is a preset adjustment on the rear of the chassis which is used to adjust the speed. In late production receivers, a tuned circuit consisting of L21 and C91 was added to the horizontal oscillator cathode circuit to stabilize the horizontal hold operation. For complete alignment both controls must be adjusted. Check operation first as follows:

*Check on Alignment*—With a normal television signal being received, free from excessive noise, turn the horizontal hold control to the position where the picture locks in horizontally and passes the following tests:

1. With a picture being received, switch the Station Selector to a channel having no program and then back to the desired channel. The picture should immediately lock into position.

2. With a picture being received, turn the television receiver power "off" for two or three seconds and then turn it back "on" again. The picture should come into synchronization within ten seconds after the picture tube has been illuminated.

3. Turn the Station Selector to the "radio" position and allow the television receiver to transfer for two or three minutes to Broadcast reception, and then return to the television channel transmitting a picture. The picture should synchronize within ten seconds after the picture tube becomes illuminated with receivers not equipped with L21. Receivers with L21 should sync immediately upon showing raster.

4. Turn power off for three or four minutes and then turn "ON." The picture should lock-in horizontally within ten seconds after the raster becomes illuminated.

*Minor Adjustments*—If the receiver does not have the tuned circuit consisting of L21 and C91 in the cathode of the horizontal multivibrator, V11, the horizontal hold control, R36, should be adjusted until the above checks can be satisfactorily accomplished. If attempted adjustment of the hold control will not permit all the above checks to be met when the tuned circuit is incorporated, then make the adjustment as outlined under "Complete Realignment."

*Complete Realignment*—Tune in a television signal for optimum sound and adjust for normal contrast.

1. Adjust the Horizontal Hold control to the center of its range.

2. Remove tube V9, and then adjust the iron core of L21 until the picture is approximately synchronized (held in frame) in the horizontal direction.

3. Replace tube V9 and then adjust the Horizontal Hold control until the picture passed all tests as outlined in "Check on Alignment."

### VERTICAL (HOLD) OSCILLATOR SPEED ADJUSTMENT

This control, R62, is used to lock the picture in synchronism with the transmitted picture in the vertical direction. When the control is maladjusted the picture will slide vertically out-of-frame or lock out-of-frame, giving overlapping vertical images or even double images in the vertical direction. After the picture is locked in vertically on a normal picture, reduce the contrast control until the picture is barely visible, then readjust the control until the picture holds in frame.

### HORIZONTAL LINEARITY AND WIDTH CONTROL

These controls react on each other so that when one control is adjusted the other may have to be. The adjustment of the linearity control should only be made on a test pattern signal. First, obtain the correct width by adjusting the width control, L7, until the picture extends approximately 1/8-inch outside the edge of the mask on both sides. Next, adjust the Horizontal Linearity control, R49, until the test pattern is symmetrical in the left and right direction. A slight readjustment of the Width control may now be necessary, as well as touching up of the centering adjusting screws.

### VERTICAL LINEARITY AND HEIGHT CONTROL

The Height control, R61, is adjusted until the picture extends approximately 1/8 inch outside the edge of the mask on both top and bottom. Next, adjust the Vertical Linearity control, R58, until the test pattern is symmetrical from top to bottom. Readjustment of the Height and Vertical Hold controls as well as the centering adjustments may be necessary.

## PRODUCTION CHANGES

The following production changes have taken place up to the time that this service data was compiled. In most cases the change can not be accurately identified with the serial number of the chassis. The order of listing below does not indicate the chronological order of the change.

1. *Power Transformer, T14 and V23*—The original transformer, T14, supplied, gave insufficient B+ voltage (385 volts) when using a Type 5Y3GT rectifier tube, V23. This resulted in a low anode voltage of 7500 volts for the picture tube. To increase this voltage, a Type 5V4G tube was substituted for the 5Y3G tube, V23. At approximately serial number 2500, a new transformer T14 having Stock No. RTP-040 was substituted, which gave the correct B+ voltage of 415 volts when a Type 5Y3G tube was used as V23. This B+ voltage gives an anode voltage to the picture tube of 8500 volts.

2. *Television Tuning Trimmer C112*—For approximately the first 2000 receivers, the tuning trimmer C112 did not quite have the correct tuning range, making it necessary to add a fixed 10 mmf. capacitor C114 in series with it. The shunt capacitor C102 had a value of 4.7 mmf. Later production trimmer, C114, has the correct range. With this new value of trimmer, the shunt capacitor C112 was changed to 6.0 mmf. This shunt capacitor in a few receivers was merely a 5.0 mmf., while in most it will consist of two capacitors; a 5 mmf. and a 1.0 mmf. capacitor in parallel. The early production trimmer has a ¼-in. O.D. shaft, while the late production trimmer is slightly larger and has a $\frac{3}{16}$-in. O.D. shaft.

3. *Tone Control, R69B*—The tone control R69B, on early production receivers was connected in series between the Volume Control R69A, movable arm, and C39. C72 was a 680 mmf. capacitor from C39 to ground. Hum in the audio dependent upon the tone control setting necessitated a revision as shown in the schematic.

4. *Tuned Circuit, L20 and C89*—The capacitor, C89, was originally 240 mmf. and the coil, L20, was fixed-tuned and wound on a resistor form. This was later changed to 1000 mmf. and the coil turns were reduced and made variable, resulting in a higher Q circuit. This change permitted adjustment of the trap as described in the alignment procedure.

5. *Resistor, R87*—This resistor was changed from 100,000 ohms to 330,000 ohms to prevent excessive beam current in the picture tube, V8. This excessive beam current caused the high voltage to be reduced when the Brilliance control was advanced to maximum with the result that the control reduced brightness at end of its clockwise travel instead of increasing brightness.

6. *Resistor, R47*—This resistor has been changed from ½-watt to a 1-watt size. In some cases, the original ½-watt resistor dissipation is exceeded, especially if the Width control iron core is nearly all the way in the coil, resulting in a reduction in the resistance value. This reduced resistance changes the waveshape across C29 so much that the horizontal multivibrator may lock in at half frequency or not lock at all. It may also result in the resistor burning out.

7. *Change in Horizontal Output Transformer, T9*—A new design horizontal output transformer, T9, was used in late production receivers. This may be identified by the fact that it has two windings instead of the single winding design, as characterized the early production receivers. When the late production transformer is used, a 3900-ohm, 1-watt resistor must be added in series to the existing 6800-ohm, 1-watt resistor, R47. *Do not use a single 1-watt resistor for this.* The capacitor, C66, should be returned to ground when the new type transformer is used.

8. *Horizontal Multivibrator Cathode Switching*—After the first 150 receivers were built, a shorting contact was added to the filament wafer of the Station Selector switch so as to stop the horizontal multivibrator as soon as the Station Selector was switched to "Radio" position. This connects the multivibrator cathode to ground through the filament circuit when switching to "Radio" so that "birdies" are not heard on the broadcast band as the television tubes cool off after switching from television to radio reception.

9. *Screen Resistor, R79*—This resistor was changed from an original 47,000 ohms to 33,000 ohms. This reduces the operating d-c voltage on the plate of V7, and gives greater brightness.

10. *Addition of C21*—A fixed 10 mmf. mica capacitor, C21, was added across C10 so that the trimmer C10 would peak at the center of its range.

11. *Change in R63*—The 330,000 ohm resistor, R63, was changed to 220,000 ohms so that the Vertical Hold control will operate near its mid-adjustment position.

12. *Removal of R95*—To correct a transient which appeared in the vertical retrace as a white line at the top of the picture, the 2200 ohm resistor, R95, in series with capacitor, C37, was removed. The potentiometer, R58, was reconnected as a variable resistance as shown on the schematic.

13. *Value Change of C52*—The original capacity of C52 was 47 mmf. To improve vertical interlace, this capacitor was changed to 240 mmf.

14. *Addition of Tuned Circuit, L21 and C91*—A 15.75 kc tuned circuit was added to the cathode of the horizontal multivibrator, V11. This stabilizes the horizontal AFC circuit to the extent that it prevents picture wiggles on noise pulses and echoes. With this addition, the 240 $\mu\mu f$ capacitor, C56, should be changed to 150 mmf. and the 150,000 ohm resistor, R40, should be increased to 330,000 ohms. This prevents a white line at the left-center of the picture which may result with installation of L21-C91. With addition of L21, the capacitor, C30, was changed from a 40 mfd to a 1.0 mfd, and C92 was changed from 1.0 mfd to a .05 mfd.

15. *Connection of Primary of T11*—On early production receivers the primary of T11 was connected to a mid-tap on choke L10. This connection caused a resonant condition to develop which affected the lower television bands. This was corrected temporarily by shunting a 47 mmf. capacitor between the midtap of L10 and ground. Later the primary of T11 was connected to the junction of L10 and C101 as shown on the schematic.

## 50-CYCLE OPERATION

The supplement schematic diagram, Figure 18, shows the wiring of the power transformer, T14, through the special terminal board installed. Also, it shows the addition of capacitors C98 and C99 required for additional filtering. The changes involved in changing from 60-cycle to 50-cycle operation are listed below:

1. The 50-cycle power transformer, T14, is separated from the chassis and installed on a mounting plate at the base of the cabinet.

2. All filament and high voltage leads are extended on the transformer and terminated at the chassis proper in a terminal board. The connection of these leads through this terminal board is shown in Figure 18. All leads are twisted.

3. A 90 mfd. capacitor, C98, is shunted across C62. A 90 mfd. capacitor, C99, is shunted across C45-A.

4. The bias supply filter capacitor, C69, is changed to a 50 mfd. capacitor.

5. Filament leads to V6, V7, V9, V10, V11, V12, V14, V15, V16, and V17 are twisted. The ground connection is made at one point only for this series of tubes, and the high side is connected through the filament wafer of the band switch.

## TROUBLE SHOOTING

The following is a listing of possible troubles and their cures. This is not intended as a comprehensive coverage of all possible failures but serves to point out some of the more difficult troubles that may be experienced. From time to time this information will be expanded as information becomes available.

### *1. NO RASTER ON PICTURE TUBE*

(a) Ion trap adjustment incorrectly made. Assembly on backward or improperly oriented. See ion trap adjustment under "Miscellaneous Preset and Service Adjustments."

(b) Check for waveform at output of T9. If present, the trouble is probably in the Type 8016 rectifier tube or filter circuit. Check for open in high voltage winding of T9. If the V13 tube filament glows yellow, high-voltage is being generated and the trouble will possibly exist in the picture tube, V8.

(c) If there is no waveform at output of T9, check operation of 807, V12, V7, and multivibrator V11 by oscilloscope waveform measurement.

(d) Check that high voltage anode cap is contacting the anode terminal of V8.

**1. NO RASTER ON PICTURE TUBE (Cont'd)**

(e) Open Brightness control R84B, R87, or R85.
(f) No. B+ voltage at junction L4 and L3.
(g) If only two or three thousand volts are generated, check deflection yoke, L9, and Width control, L7, for continuity.

**2. RASTER NORMAL, NO PICTURE OR SOUND**

(a) Oscillator V2B defective, or oscillator coil resonates out of band.
(b) Defective antenna or lead-in.
(c) Converter, r-f amplifier, or first video i-f amplifier stage defective.

**3. PICTURE NORMAL, NO SOUND**

(a) 21.9 mc audio i-f amplifier, discriminator, or audio amplifier defective.
(b) Oscillator V2B off frequency.
(c) Defective speaker.

**4. RASTER NORMAL, SOUND NORMAL, NO PICTURE**

(a) Video i-f amplifier (after 1st i-f) inoperative.
(b) Resistor R83 in contrast control defective or open.
(c) Screen by-pass C32C open or shorted.

**5. NORMAL PICTURE AND SOUND, NO HORIZONTAL OR VERTICAL SYNC.**

(a) Check for signal input waveform at grid (1) of V9A.
(b) Defective V9A or plate circuit components.
(c) Operation of receiver with Contrast control advanced too far.

**6. PICTURE NORMAL, NO VERTICAL SYNC.**

(a) Check grid of V15B for normal waveform.
(b) Check speed of vertical multivibrator. Should be capable of free running speed less than 60 cps.
(c) Check V15B circuit components.

**7. PICTURE NORMAL, NO HORIZONTAL SYNC.**

(a) Check AFC transformer, T7.
(b) Check alignment of L21 and C91.
(c) Check socket voltages and waveforms of V10B and V11.
(d) Check resistor R47 for correct value.

**8. NO VERTICAL OR NO HORIZONTAL DEFLECTION**

(a) Check waveform and socket voltages of output and multivibrator tubes of respective sweep circuits.
(b) Check output transformer and yoke for continuity.

**9. ONE OR MORE HORIZONTAL WHITE LINES AT TOP OF PICTURE**

(a) Check for Production Change #12.

**10. RIPPLE ON EDGE OF PICTURE**

(a) Reflections on antenna lead-in.
(b) Instability of horizontal AFC circuit. See Production Change #14.
(c) Defective capacitor, C30.

**11. RASTER EDGE NOT STRAIGHT—KEYSTONING**

(a) Defective yoke.
(b) Defective sweep transformer.
(c) Improperly adjusted ion trap adjustment assembly.

**12. PICTURE JUMPY**

(a) Operation at too high contrast control setting.
(b) If picture moves at regular rate sideways, check capacitor C30, R32 and C92. Put in change #14.
(c) If left of picture jitters, change 807 sweep tube, V12.
(d) Noisy sweep or sync circuit tubes.

**13. POOR INTERLACE OF VERTICAL SWEEP**

(a) Check Production Change #13.

**14. POOR PICTURE DETAIL**

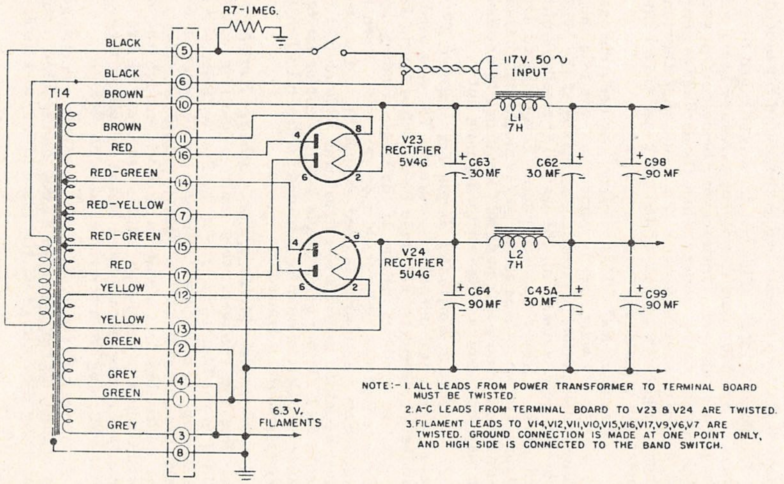
(a) Mismatch in antenna or lead-in.
(b) Misalignment of i-f or r-f circuits.
(c) Defective chokes L3, L4 or L5 in video amplifier.
(d) Make sure that focus control operates on both sides of proper focus point.
(e) Overload of video amplifier, check contrast control operation.

**15. PICTURE CANNOT BE CENTERED**

(a) Move focus coil back by loosening all four adjustment screws.

**16. FOCUS CONTROL AT END OF TRAVEL**

(a) Short out resistor R96.
(b) Check for correct B+ voltages.



NOTE:- 1 ALL LEADS FROM POWER TRANSFORMER TO TERMINAL BOARD MUST BE TWISTED.
2 A-C LEADS FROM TERMINAL BOARD TO V23 & V24 ARE TWISTED.
3 FILAMENT LEADS TO V14,V12,V11,V10,V15,V16,V17,V9,V6,V7 ARE TWISTED. GROUND CONNECTION IS MADE AT ONE POINT ONLY, AND HIGH SIDE IS CONNECTED TO THE BAND SWITCH.

**Fig. 18. Schematic Changes for 50-cycle Operation**

## SOCKET VOLTAGE CHART

NOTE—All d-c measurements taken by a 20,000 ohm/volt meter. Station selector switch at Channel No. 1 unless noted. Contrast control at maximum, Brilliance at minimum.

| SYM-BOL | TUBE TYPE | PLATE | | SCREEN | | CATHODE | | GRID | | PLATE M.A. | SCREEN M.A. | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PIN | VOLTS | PIN | VOLTS | PIN | VOLTS | PIN | VOLTS | | | |
| V1 | 6AU6 | 5 | 140 | 6 | 140 | 7 | 1.3 | 1 | 0 | 7.2 | — | |
| V2A | 7F8 | 6 | 115 | — | — | 5 | 0 | 8 | −4.5* | 2.5 | — | * Measured with V.T.V.M. |
| V2B | | 3 | 180 | — | — | 4 | 0 | 1 | 0 | 10 | — | |
| V3 | 6AC7 | 8 | 150 | 6 | 150 | 5 | 0 | 4 | −2* | 14 | 3 | * Measured on 50 v scale |
| V4 | 6AC7 | 8 | 160 | 6 | 160 | 5 | 0 | 4 | −2* | 15 | 3.2 | * Measured on 50 v scale |
| V5 | 6AC7 | 8 | 170 | 6 | 170 | 5 | 2 | 4 | 0 | 14 | 3 | |
| V6A | 6H6 | 5 | 0 | — | — | 8 | 0 | — | — | 4 | — | |
| V6B | | 3 | −8.5 | — | — | 4 | 6.3AC | — | — | 0 | — | |
| V7 | 6AC7 | 8 | 150 | 6 | 125 | 5 | 0 | 4 | 0 | 15 | 3.7 | |
| V8 | 10BP4 | CAP | 8300* | 10 | 415 | 11 | 150 | 2 | 90 | — | — | * Use multiplier with 1000 v scale |
| V9A | 6SN7GT | 2 | 12.5 | — | — | 3 | 0 | 1 | −1 | .2 | — | |
| V9B | | 5 | 110* | — | — | 6 | 11 | 4 | 6 | 10 | — | |
| V10A | 6SL7GT | 2 | −95 | — | — | 3 | 0.5 | 1 | −9.5 | 0 | — | |
| V10B | | 5 | 42.5 | — | — | 6 | 0.5 | 4 | 0.5 | 1 | — | |
| V11A | 6SN7GT | 5 | 170 | — | — | 6 | 6 | 4 | −25 | 2.5 | — | |
| V11B | | 2 | 135 | — | — | 3 | 6 | 1 | 0 | 2.9 | — | |
| V12 | 807 | CAP | 415 | 2 | 345 | 4 | 22 | 3 | −10 | 76 | 13 | |
| V13 | 8016 | CAP | — | — | — | 2 | 8300* | — | — | — | — | * Use multiplier with 1000 v scale |
| V14 | 6AS7GT | 2 & 5 | 0 | — | — | 3 & 6 | 10 | 1 & 4 | −15 | — | — | |
| V15A | 6SL7GT | 2 | 0.5 | — | — | 3 | 7.5 | 1 | 0.5 | 0 | — | |
| V15B | | 5 | 105 | — | — | 6 | 10 | 4 | 4 | 1 | — | |
| V16A | 6SN7GT | 2 | 30 | — | — | 3 | 1.5 | 1 | 0 | .7 | — | |
| V16B | | 5 | 14.5 | — | — | 6 | 1.5 | 4 | 4.5 | .1 | — | |
| V17 | 6V6GT | 3 | 195 | 4 | 135 | 8 | 23.5 | 5 | 14.5 | 20 | 1.85 | |
| V18* | 6SA7 | 3 | 200 | 4 | 80 | 8 | 0 | 6 | 0 | 3 | 8.5 | |
| V19 | 6SG7 | 8 | 200 | 6 | 110 | 5 | 1 | 4 | 0 | 10 | 4 | |
| V20 | 6SV7 | 6 | 195 | 4 | 88 | 2 | −0.5 | 3 | 0 | 9.7 | 1.7 | |
| V21A | 6AQ7GT | 1 & 3 | 0 | — | — | 2 | 0 | — | — | 0 | — | |
| V21B | | 5 | 75 | — | — | 6 | 0 | 4 | 0 | 1 | — | |
| V22 | 6V6GT | 3 | 230 | 4 | 200 | 8 | 10 | 5 | 0 | 41.5 | 4.5 | |
| V23 | 5Y3GT | 4 & 6 | 315AC | — | — | 2 | 425 | — | — | 85* | — | * Cathode current |
| V24 | 5U4G | 4 & 6 | 240AC | — | — | 2 | 250 | — | — | 160* | — | * Cathode current. |

## ALIGNMENT TABLE

Before attempting the following tabular alignment procedure, read the preceding section "ALIGNMENT SUGGESTIONS"

| STEP NO. | SIGNAL GENERATOR FREQUENCY | SWEEP GENERATOR FREQUENCY | SIGNAL INPUT POINT | CONNECT OSCILLOSCOPE TO CHASSIS & | STATION SELECTOR SWITCH | DIAL SETTING | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| **(1) BROADCAST I-F ALIGNMENT** | | | | | | | | |
| 1 | 455 kc with tone modulation | Not Used | Grid (4) of V19 thru 200 mmf | Junction C41 & R69A | Radio | 550 kc | C75 & C76 for max. output | |
| 2 | 455 kc with tone modulation | Not Used | Grid (5) of V18 thru 200 mmf | Junction C41 & R69A | Radio | 550 kc | C73 & C74 for max. output | |
| **(2) BROADCAST R-F ALIGNMENT** | | | | | | | | |
| 1 | 1500 kc with tone modulation | Not Used | Ant. terminal thru 200 mmf | Junction C41 & R69A | Radio | * | C67B osc. trimmer for maximum output | * Tune gang condenser to minimum capacity setting. |
| 2 | 1500 kc with tone modulation | Not Used | Ant. terminals thru 200 mmf | Junction C41 & R69A | Radio | 1500 kc** | C67A r-f trimmer for maximum output | ** If pointer does not fall on the 1500 kc calibration when 1500 kc signal is tuned in, slip pointer drum on dial cord until it does. |
| **(3) TELEVISION I-F TRAP ALIGNMENT** | | | | | | | | |
| 1 | 21.9 mc with tone modulation | Not Used | Grid (8) of V2A thru 200 mmf | Junction L4 & R16 | Channel #13 | — | C19 on T4 for minimum output | Connect 10,000 ohms in series with oscilloscope input lead. |
| 2 | 21.9 mc with tone modulation | Not Used | Grid (8) of V2A thru 200 mmf | Junction L4 & R16 | Channel #13 | — | C16 on T3 for minimum output | |
| 3 | 21.9 mc with tone modulation | Not Used | Grid (8) of V2A thru 200 mmf | Junction L4 & R16 | Channel #13 | — | C13 on T2 for minimum output | |
| 4 | 27.9 mc with tone modulation | Not Used | Grid (8) of V2A thru 200 mmf | Junction L4 & R16 | Channel #13 | — | C10 on T1 for minimum output | |
| **(4) TELEVISION SOUND I-F AMPLIFIER ALIGNMENT** | | | | | | | | |
| 1 | 21.9 mc unmodulated | 21.9 mc with 2 mc sweep width | Grid (4) of V3 | Junction of R77 & C49 | Channel #13 | — | C79 & C80 for max. amplitude and symmetry at 21.9 mc | Detune C84 on T6; then adjust trimmers C79 and C80. Adjust for max. amplitude and symmetry about 21.9 mc marker as shown in Fig. 8A. |
| 2 | 21.9 mc with tone modulation | Not Used | Grid (4) of V3 | | Channel #13 | — | C78 for minimum tone output | With volume control halfway up and speaker connected, adjust C78 for minimum tone output. |
| 3 | Not Used | 21.9 mc with 2 mc sweep width | Grid (4) of V3 | Junction of C41 and R69A | Channel #13 | — | C84 for max. peak to peak amplitude | Peak trimmer so that the positive and negative peaks have max. peak to peak amplitude. See Fig. 8B. |
| 4 | Repeat steps 2 and 3. | | | | | | | |

## ALIGNMENT TABLE (CONT'D)

| STEP NO. | SIGNAL GENERATOR FREQUENCY | SWEEP GENERATOR FREQUENCY | SIGNAL INPUT POINT | CONNECT OSCILLOSCOPE TO CHASSIS & | STATION SELECTOR SWITCH | DIAL SETTING | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| **(5) VIDEO I-F AMPLIFIER ALIGNMENT** | | | | | | | | |
| 1 | 23.0 mc & 26.4 mc marker | 20-30 mc sweep | Grid (4) of V5 | Junction of L4 and R16 | Channel #13 | — | C17 and C18 for max. amplitude, bandwidth, and correct positioning of markers. | Shunt C14, T3 primary trimmer with a 100 mmf capacitor. See Fig. 9A. |
| 2 | 23.0 mc & 26.4 mc marker | 20-30 mc sweep | Grid (4) of V4 | Junction of L4 and R16 | Channel #13 | — | C14 and C15 for max. amplitude, bandwidth, and correct positioning of markers. | Remove 100 mmf capacitor from C14, and shunt C11, T2 primary trimmer, with it. See Fig. 9B. |
| 3 | 23.0 mc & 26.4 mc marker | 20-30 mc sweep | Grid (4) of V4 | Junction of L4 and R16 | Channel #13 | — | Adjust L20 for minimum overshoot | See Fig. 9B. Either spread or squeeze turns together to give minimum amplitude of overshoot. |
| 4 | 23.0 mc & 26.4 mc | 20-30 mc sweep | Grid (4) of V3 | Junction of L4 and R16 | Channel #13 | — | C11 and C12 for max. amplitude, bandwidth, and correct position of markers | Remove 100 mmf capacitor from C11 and shunt C8, T1 primary trimmer, with it. See Fig. 9C. |
| 5 | 23.0 mc & 26.4 mc | 20-30 mc sweep | Grid (4) of V3 | Junction of L4 and R16 | Channel #13 | — | Readjust L20 for minimum overshoot | See Fig. 9 C. Repeat procedure as in step 3, except for point of signal input. |
| 6 | 23.0 mc, 26.4 mc, & 25.65 mc | 20-30 mc sweep | Grid (8) of V2A | Junction of L4 and R16 | Radio* | — | C8 and C9 for max. amplitude, bandwidth, and correct position of markers | Remove 100 mmf. capacitor from C8. See Fig. 9D.<br>* Jump filament wafer switch with clip lead so that tube filaments will be lit. Remove B+ from r-f assembly. |
| **(6) OSCILLATOR COIL ADJUSTMENT** | | | | | | | | |
| 1 | 49.75 mc with tone modulation | — | Antenna terminals | — | Channel #1 | — | Turns of osc. coil, T20. | Make sure that C112 is at mid-position of travel. Use sound output as indicator. |
| 2 | 59.75 mc with tone modulation | — | Antenna terminals | — | Channel #2 | — | Turns of osc. coil, T21. | Same as for Step #1. |
| 3 | 65.75 mc with tone modulation | — | Antenna terminals | — | Channel #3 | — | Turns of osc. coil, T22. | Same as for Step #1. |
| 4 | 71.75 mc with tone modulation | — | Antenna terminals | — | Channel #4 | — | Turns of osc. coil, T23. | Same as for Step #1. |
| 5 | 81.75 mc with tone modulation | — | Antenna terminals | — | Channel #5 | — | Turns of osc. coil, T24. | Same as for Step #1. |
| 6 | 87.75 mc with tone modulation | — | Antenna terminals | — | Channel #6 | — | Turns of osc. coil, T25. | Same as for Step #1. |
| 7 | 179.75 mc with tone modulation | — | Antenna terminals | — | Channel #7 | — | Lead gap of oscillator coil, T26. | Same as for Step #1. |

## ALIGNMENT TABLE (CONT'D)

**(6) OSCILLATOR COIL ADJUSTMENT (Cont'd)**

| STEP NO. | SIGNAL GENERATOR FREQUENCY | SWEEP GENERATOR FREQUENCY | SIGNAL INPUT POINT | CONNECT OSCILLOSCOPE TO CHASSIS & | STATION SELECTOR SWITCH | DIAL SETTING | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 8 | 185.75 mc with tone modulation | — | Antenna terminals | — | Channel #8 | — | Lead gap of oscillator coil, T27. | Same as for Step #1. |
| 9 | 191.75 mc with tone modulation | — | Antenna terminals | — | Channel #9 | — | Lead gap of oscillator coil, T28. | Same as for Step #1. |
| 10 | 197.75 mc with tone modulation | — | Antenna terminals | — | Channel #10 | — | Lead gap of oscillator coil, T29. | Same as for Step #1. |
| 11 | 203.75 mc with tone modulation | — | Antenna terminals | — | Channel #11 | — | Lead gap of oscillator coil, T30 | Same as for Step #1 |
| 12 | 209.75 mc with tone modulation | — | Antenna terminals | — | Channel #12 | — | Lead gap of oscillator coil, T31. | Same as for Step #1 |
| 13 | 215.75 mc with tone modulation | — | Antenna terminals | — | Channel #13 | — | Lead gap of oscillator coil, T32. | Same as for Step #1 |

**(7) R-F COIL ALIGNMENT**

| STEP NO. | SIGNAL GENERATOR FREQUENCY | SWEEP GENERATOR FREQUENCY | SIGNAL INPUT POINT | CONNECT OSCILLOSCOPE TO CHASSIS & | STATION SELECTOR SWITCH | DIAL SETTING | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | Markers 45.25 mc & 49.75 mc | Channel #1 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #1 | — | For max. amplitude and for recommended response | See Fig. 11A for resultant alignment curve. |
| 2 | Markers 55.25 mc & 59.75 mc | Channel #2 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #2 | — | For max. amplitude and for recommended response | See Fig. 11A for resultant alignment curve. |
| 3 | Markers 61.25 mc & 65.75 mc | Channel #3 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #3 | — | For max. amplitude and for recommended response | See Fig. 11B. |
| 4 | Markers 67.25 mc & 71.75 mc | Channel #4 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #4 | — | For max. amplitude and for recommended response | See Fig. 11B for resultant alignment curve. |

## ALIGNMENT TABLE (CONT'D)

**(7) R-F COIL ALIGNMENT (Cont'd)**

| STEP NO. | SIGNAL GENERATOR FREQUENCY | SWEEP GENERATOR FREQUENCY | SIGNAL INPUT POINT | CONNECT OSCILLOSCOPE TO CHASSIS & | STATION SELECTOR SWITCH | DIAL SETTING | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 5 | Markers 77.25 mc & 81.75 mc | Channel #5 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #5 | — | For max. amplitude and for recommended response | See Fig. 11B for resultant alignment curve. |
| 6 | Markers 83.25 mc & 87.75 mc | Channel #6 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #6 | — | For max. amplitude and for recommended response | See Fig. 11B for resultant alignment curve. |
| 7 | Markers 175.25 mc & 179.75 mc | Channel #7 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #7 | — | For max. amplitude and for recommended response | See Fig. 11C for resultant alignment curve. |
| 8 | Markers 181.25 mc & 185.75 mc | Channel #8 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #8 | — | For max. amplitude and for recommended response | See Fig. 11C for resultant alignment curve. |
| 9 | Markers 187.25 mc & 191.75 mc | Channel #9 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #9 | — | For max. amplitude and for recommended response | See Fig. 11C for resultant alignment curve. |
| 10 | Markers 193.25 mc & 197.75 mc | Channel #10 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #10 | — | For max. amplitude and for recommended response | See Fig. 11C for resultant alignment curve. |
| 11 | Markers 199.25 mc & 203.75 mc | Channel #11 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #11 | — | For max. amplitude and for recommended response | See Fig. 11C for resultant alignment curve. |
| 12 | Markers 205.25 mc & 209.75 mc | Channel #12 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #12 | — | For max. amplitude and for recommended response | See Fig. 11C for resultant alignment curve. |
| 13 | Markers 211.25 mc & 215.75 mc | Channel #13 with 25 mc sweep | Antenna terminals at r-f amplifier | Junction R1 and C1 | Channel #13 | — | For max. amplitude and for recommended response | See Fig. 11C for resultant alignment curve. |

## WAVEFORM MEASUREMENTS

The waveforms shown in Figures 35 through 55 represent measurements on an average receiver wherein the controls have been adjusted for a normal picture with correct Contrast, Height, Width and Linearity. Most measurements must be made when a signal is being received.

An oscilloscope where the vertical deflection amplifier has been pre-calibrated is used to take measurements at the point indicated in the waveform boxes. The oscilloscope sweep frequency is indicated in the waveform title.

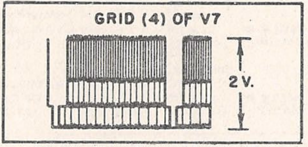


Fig. 35. Video Output of Detector (Osc. Synced at Half of Vert. Speed)

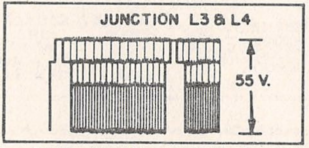


Fig. 36. Video Output of V7. (Osc. Synced at Half of Vert. Sweep Speed)

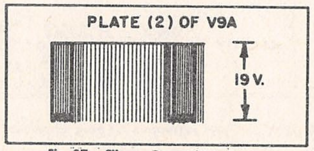


Fig. 37. Clipper Output (Osc. Synced at Half of Vert. Sweep Speed)

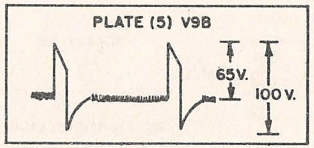


Fig. 38. Sync Amplifier Output (Osc. Synced at Half of Hor. Sweep Speed)

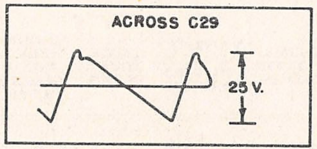


Fig. 39. A.F.C. Sawtooth (Osc. Synced at Half of Hor. Sweep Speed)

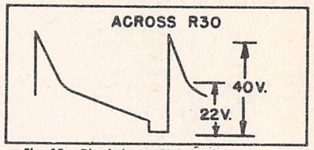


Fig. 40. Discriminator Voltage (Osc. Synced at Half of Hor. Sweep Speed)

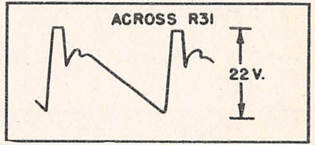


Fig. 41. Discriminator Voltage (Synced at Half of Hor. Sweep Speed)

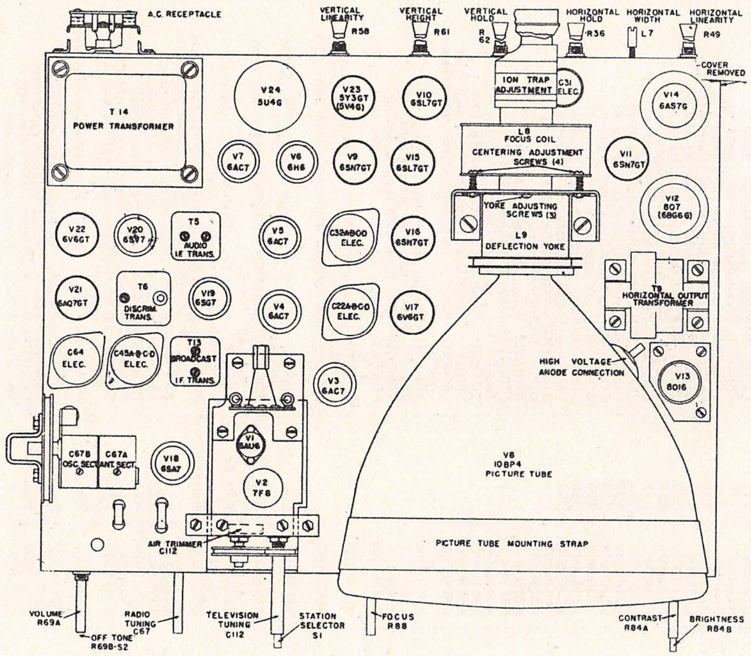

A.C. RECEPTACLE
VERTICAL LINEARITY R58
VERTICAL HEIGHT R61
VERTICAL HOLD R 62
HORIZONTAL HOLD R36
HORIZONTAL WIDTH L7
HORIZONTAL LINEARITY R49
COVER REMOVED
T 14 POWER TRANSFORMER
V24 5U4G
V23 5Y3GT (5V4G)
V10 6SL7GT
ION TRAP ADJUSTMENT
C31 ELEC.
V14 6AS7G
L8 FOCUS COIL
CENTERING ADJUSTMENT SCREWS (4)
V7 6AC7
V6 6H6
V9 6SN7GT
V15 6SL7GT
V11 6SN7GT
YOKE ADJUSTING SCREWS (3)
L9 DEFLECTION YOKE
V12 807 (6BG6G)
V22 6V6GT
V20 6SV7
T5 AUDIO I.F. TRANS.
V5 6AC7
C32A-B-C-D ELEC.
V16 6SN7GT
V21 6AQ7GT
T6 DISCRIM. TRANS.
V19 6SG7
V4 6AC7
C22A-B-C-D ELEC.
V17 6V6GT
T9 HORIZONTAL OUTPUT TRANSFORMER
C64 ELEC.
C45A-B-C-D ELEC.
T13 BROADCAST I.F. TRANS.
V3 6AC7
HIGH VOLTAGE ANODE CONNECTION
V13 8016
C67B OSC. SECT.
C67A ANT. SECT.
V18 6SA7
V1 6AU6
V2 7F8
V8 10BP4 PICTURE TUBE
AIR TRIMMER C112
PICTURE TUBE MOUNTING STRAP
VOLUME R69A
OFF TONE R69B-S2
RADIO TUNING C67
TELEVISION TUNING C112
STATION SELECTOR S1
FOCUS R88
CONTRAST R84A
BRIGHTNESS R84B

Fig. 13. Component Location, Top View of Chassis

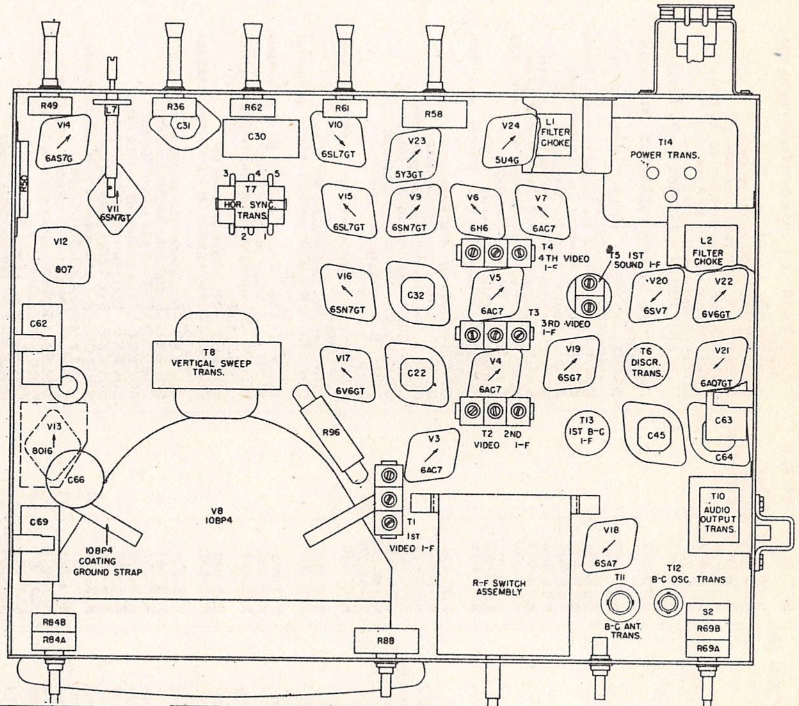

R49
L7
R36
R62
R61
R58
V14 6AS7G
C31
C30
V10 6SL7GT
V23 5Y3GT
V24 5U4G
L1 FILTER CHOKE
T14 POWER TRANS.
R50
V11 6SN7GT
T7 HOR. SYNC. TRANS.
3 4 5 2 1
V15 6SL7GT
V9 6SN7GT
V6 6H6
V7 6AC7
V12 807
T4 4TH VIDEO I-F
T5 1ST SOUND I-F
L2 FILTER CHOKE
V16 6SN7GT
C32
V5 6AC7
T3 3RD VIDEO I-F
V20 6SV7
V22 6V6GT
C62
T8 VERTICAL SWEEP TRANS.
V17 6V6GT
C22
V4 6AC7
V19 6SG7
T6 DISCR. TRANS.
V21 6AQ7GT
V13 8016
C66
R96
T2 2ND VIDEO I-F
T13 1ST B-C I-F
C45
C63
C64
V3 6AC7
V8 10BP4
C69
10BP4 COATING GROUND STRAP
T1 1ST VIDEO I-F
T10 AUDIO OUTPUT TRANS.
V18 6SA7
R-F SWITCH ASSEMBLY
T11 B-C ANT. TRANS.
T12 B-C OSC. TRANS.
S2
R69B
R69A
R84B
R84A
R88

Fig. 14. Component Location, Bottom View of Chassis

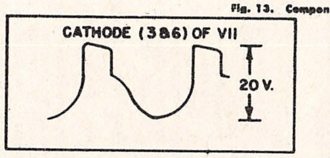


Fig. 42. Hor. M-V Cathode (Osc. Synced at Half of Hor. Sweep Speed)

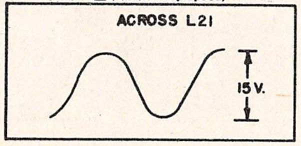


Fig. 43. Cathode Tuned Circuit (Synced at Half of Hor. Sweep Speed)

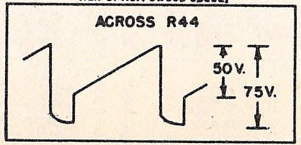


Fig. 44. Hor. M-V Output (Osc. Synced at Half of Hor. Sweep Speed)

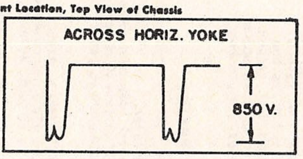


Fig. 45. Hor. Yoke Input (Osc. Synced at Half of Hor. Sweep Speed)

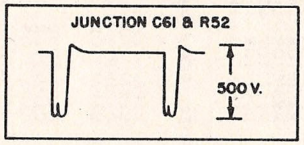


Fig. 46. V14 Control Voltage (Osc. Synced at Half of Hor. Sweep Speed)

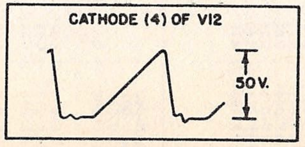


Fig. 47. 807 Cathode (Osc. Synced at Half of Hor. Sweep Speed)

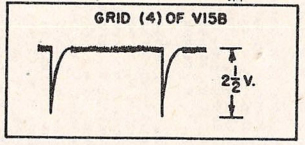


Fig. 48. Vert. Sync at V15B. (Osc. Synced at Half of Vert. Sweep Speed)

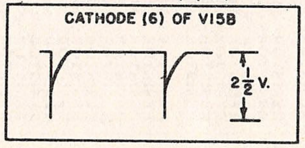


Fig. 49. Vertical Sync at Cathode V15B (Osc Synced at Half of Vert. Sweep Speed)

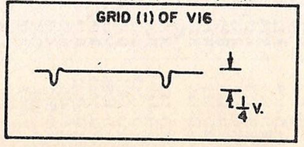


Fig. 50. Vert. Sync at Grid of M-V. (Osc. Synced at Half of Vert. Sweep Speed)

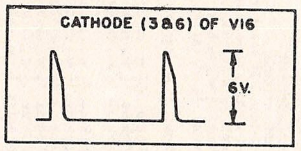


Fig. 51. Vert. M-V Cathode (Osc. Synced at Half of Vert. Sweep Speed)

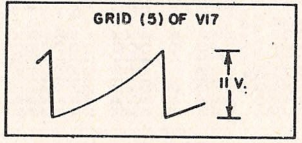


Fig. 52. Vert. M-V Output. (Osc. Synced at Half of Vert. Sweep Speed)

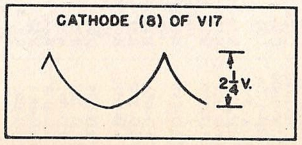


Fig. 53. 'Vert. Output Cathode (Osc. Synced at Half of Vert. Sweep Speed)

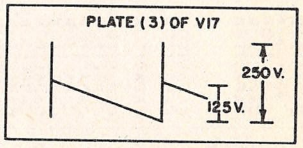


Fig. 54. Vert. Output of V17 (Osc. Synced at Half of Vert. Sweep Speed)

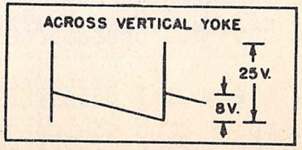


Fig. 55. Vert. Yoke Input (Osc. Synced at Half of Vert. Sweep Speed)

## UNIVERSAL REPLACEMENT PARTS

| | | |
|---|---|---|
| UCC-011 | C42, 87 | CAPACITOR—.05 mfd., 200 v., paper |
| UCC-017 | C30, 69 | CAPACITOR—1.0 mfd., 200 v., paper (C69 for 60-cycle receiver only) |
| UCC-025 | C27, 28 | CAPACITOR—.01 mfd., 400 v., paper |
| UCC-035 | C43, 81 | CAPACITOR—.001 mfd., 600 v., paper |
| UCC-040 | C36, 39, 40, 41, 51, 54, 55, 60, 71, 29, 72 | CAPACITOR—.01 mfd., 600 v., paper |
| UCC-041 | C23, 34, 44 | CAPACITOR—.02 mfd., 600 v., paper |
| UCC-045 | C26, 33, 53, 58, 85, 92 | CAPACITOR—.05 mfd., 600 v., paper |
| UCC-048 | C37, 38, 59, 70, 77 | CAPACITOR—.10 mfd., 600 v., paper |
| UCU-520 | C50 | CAPACITOR—47 mmf., mica |
| UCU-1014 | C83 | CAPACITOR—27 mmf., mica |
| UCU-1048 | C35, 65 | CAPACITOR—680 mmf., mica |
| UCU-1052 | C57, 89 | CAPACITOR—1000 mmf., mica |
| UCU-1504 | C20, 21 | CAPACITOR—10 mmf., mica |
| UCU-1520 | C49, 61, 68 | CAPACITOR—47 mmf., mica |
| UCU-1526 | C100, 101 | CAPACITOR—82 mmf., mica |
| UCU-1532 | C90, 56 | CAPACITOR—150 mmf., mica |
| UCU-1536 | C46 | CAPACITOR—220 mmf., mica |
| UCU-2538 | C52 | CAPACITOR—240 mmf., mica |
| UCW-1020 | C103, 104 | CAPACITOR—47 mmf., ceramic |
| UCW-2009 | C86, 105 | CAPACITOR—16 mmf., ceramic |
| UOP-1206 | LS1 | LOUDSPEAKER—12-inch PM speaker |
| UOX-005 | | CONE—Replacement speaker cone assembly |
| URD-027 | R59 | RESISTOR—120 ohms, ½ w., carbon |
| URD-029 | R11 | RESISTOR—150 ohms, ½ w., carbon |
| URD-049 | R24, 43, 99, 100 | RESISTOR—1000 ohms, ½ w., carbon |
| URD-057 | R4, 51, 52, 67 | RESISTOR—2200 ohms, ½ w., carbon |
| URD-073 | R18, 42, 86 | RESISTOR—10,000 ohms, ½ w., carbon |
| URD-077 | R21 | RESISTOR—15,000 ohms, ½ w., carbon |
| URD-081 | R65, 89, 28, 29 | RESISTOR—22,000 ohms, ½ w., carbon |
| URD-085 | R92 | RESISTOR—33,000 ohms, ½ w., carbon |
| URD-089 | R78, 79 | RESISTOR—47,000 ohms, ½ w., carbon |
| URD-091 | R20 | RESISTOR—56,000 ohms, ½ w., carbon |
| URD-093 | R66, 70 | RESISTOR—68,000 ohms, ½ w., carbon |
| URD-095 | R68 | RESISTOR—82,000 ohms, ½ w., carbon |
| URD-097 | R2, 6, 94, 39, 41, 76 | RESISTOR—100,000 ohms, ½ w., carbon |
| URD-099 | R71, 72 | RESISTOR—120,000 ohms, ½ w., carbon |
| URD-101 | R83 | RESISTOR—150,000 ohms, ½ w., carbon |
| URD-105 | R55, 77, 63, 64 | RESISTOR—220,000 ohms, ½ w., carbon |
| URD-109 | R22, 87, 40 | RESISTOR—330,000 ohms, ½ w., carbon |
| URD-111 | R74 | RESISTOR—390,000 ohms, ½ w., carbon |
| URD-113 | R44, 97 | RESISTOR—470,000 ohms, ½ w., carbon |
| URD-117 | R85 | RESISTOR—680,000 ohms, ½ w., carbon |
| URD-119 | R75 | RESISTOR—820,000 ohms, ½ w., carbon |
| URD-121 | R7, 19 | RESISTOR—1.0 meg., ½ w., carbon |
| URD-129 | R23, 25, 81, 60 | RESISTOR—2.2 meg., ½ w., carbon |
| URD-137 | R73 | RESISTOR—4.7 meg., ½ w., carbon |
| URD-145 | R56 | RESISTOR—10.0 meg., ½ w., carbon |
| URD-1041 | R32, 57 | RESISTOR—470 ohms, ½ w., carbon |
| URD-1051 | R33, 8, 10 | RESISTOR—1200 ohms, ½ w., carbon |
| URD-1053 | R14, 3 | RESISTOR—1500 ohms, ½ w., carbon |
| URD-1069 | R15, 27 | RESISTOR—6800 ohms, ½ w., carbon |
| URD-1097 | R34, 35 | RESISTOR—100,000 ohms, ½ w., carbon |
| URE-035 | R53 | RESISTOR—270 ohms, 1 w., carbon |
| URE-045 | R38 | RESISTOR—680 ohms, 1 w., carbon |
| URE-065 | R37 | RESISTOR—4700 ohms, 1 w., carbon |
| URE-067 | R26 | RESISTOR—5600 ohms, 1 w., carbon |
| URE-089 | R1, 48 | RESISTOR—47,000 ohms, 1 w., carbon |
| URE-097 | R90 | RESISTOR—100,000 ohms, 1 w., carbon |
| URE-1056 | R17 | RESISTOR—2000 ohms, 1 w., carbon |
| URE-1063 | R5, 9, 12, 54 | RESISTOR—3900 ohms, 1 w., carbon |
| URF-041 | R13 | RESISTOR—470 ohms, 2 w., carbon |
| URF-045 | R82, 91 | RESISTOR—680 ohms, 2 w., carbon |
| URF-071 | R46 | RESISTOR—8200 ohms, 2 w., carbon |
| URF-073 | R80, 93 | RESISTOR—10,000 ohms, 2 w., carbon |
| URF-1061 | R16 | RESISTOR—3300 ohms, 2 w., carbon |

## SPECIALIZED REPLACEMENT PARTS

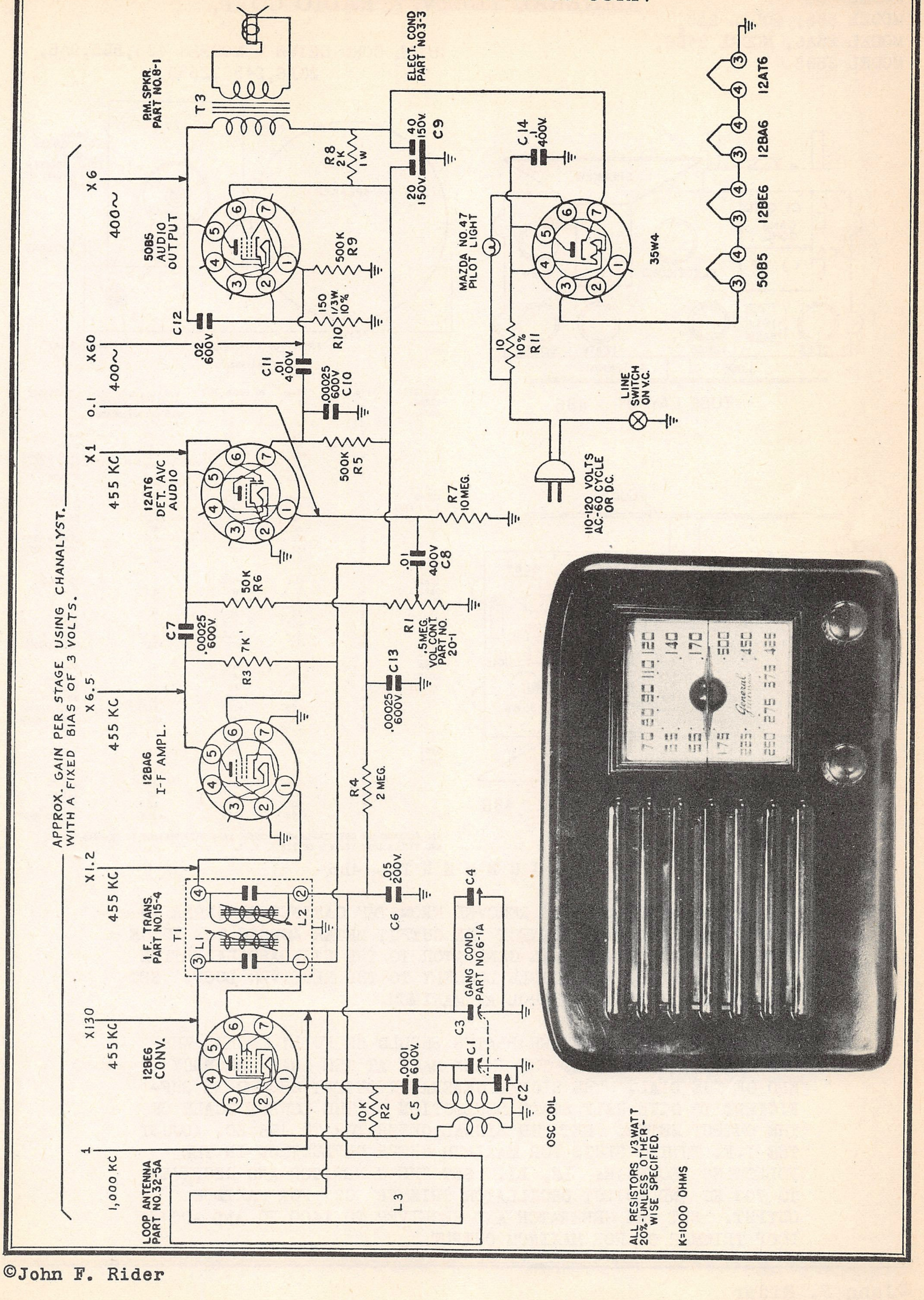
| | | |
|---|---|---|
| RAB-040 | | BACK—Cabinet back cover |
| RAL-001 | | BEZEL—Pilot light bezel, bottom of cabinet |
| RAV-033 | | CABINET—Model 801 cabinet (less hardware) |
| RCC-002 | C1, 2, 3, 4, 5, 6, 7, 24, 25, 47, 88 | CAPACITOR—.006 mfd., 600 v., paper |
| RCC-038 | C82 | CAPACITOR—.004 mfd., 600 v., paper |
| RCE-017 | C64 | CAPACITOR—90 mfd., 450 v., electrolytic |
| RCE-018 | C31A, B, C | CAPACITOR—40 mfd., 40 mfd., 40 mfd., 25 v., electrolytic |
| RCE-019 | C45A, B, C, D; 22A, B, C, D | CAPACITOR—30 mfd., 30 mfd., 15 mfd., 450 v.; 30 mfd., 15 v., electrolytic |
| RCE-020 | C32A, B, C, D | CAPACITOR—30 mfd., 15 mfd., 15 mfd., 15 mfd., 450 v., electrolytic |
| RCE-021 | C62, 63 | CAPACITOR—30 mfd., 300 v., electrolytic |
| RCE-048 | C69 | CAPACITOR—50 mfd., 25 v., electrolytic (used on 50-cycle receivers only) |
| RCN-001 | C110 | CAPACITOR—1 mmf., miniature |
| RCN-002 | C111, 113 | CAPACITOR—0.68 mmf., miniature |
| RCN-003 | C66 | CAPACITOR—500 mmf., lectrofilm |
| RCS-001 | C9L | CAPACITOR—.05 mfd., 200 v., paper |
| RRC-023 | R84A, B | POTENTIOMETER—500,000 ohms, ½ w., (Brightness control); 500,000 ohms, ½ w., (Contrast control) |
| RRC-024 | R58 | POTENTIOMETER—1000 ohms, 2 w., w.w., (Vertical Linearity) |
| RRC-025 | R88 | POTENTIOMETER—5000 ohms, 4 w., w.w., (Focus control) |
| RRC-034 | L7 | CHOKE—Variable choke (Horizontal size) |
| RRD-1032 | R101 | RESISTOR—200 ohms, ½ w., carbon |
| RRD-1057 | R106 | RESISTOR—2200 ohms, ½ w., carbon |
| RRD-1081 | R105 | RESISTOR—22,000 ohms, ½ w., carbon |
| RRD-1097 | R30, 31 | RESISTOR—100,000 ohms, ½ w., carbon |
| RRD-1105 | R104 | RESISTOR—220,000 ohms, ½ w., carbon |
| RRE-1069 | R102, 103, 47 | RESISTOR—6800 ohms, 1 w., carbon |
| RRW-011 | R50 | RESISTOR—300 ohms, 7.4 w., wirewound |
| RRW-012 | R96 | RESISTOR—3000 ohms, 7.4 w., wirewound |
| RTD-003 | T6 | TRANSFORMER—FM i-f discriminator |
| RTL-023 | T1 | TRANSFORMER—1st video i-f transformer |

## SPECIALIZED REPLACEMENT PARTS (Cont'd)

| | | |
|---|---|---|
| RCT-013 | C67A, B | CONDENSER—2-section broadcast tuning condenser |
| RCW-2001 | C102 | CAPACITOR—5 mmf., ceramic |
| RCW-026 | C106 | CAPACITOR—1500 mmf., ceramic |
| RCW-1028 | C107, 108 | CAPACITOR—100 mmf., ceramic |
| RCY-015 | C112 | CONDENSER—Television tuning condenser |
| RDC-029 | | CORD—Television tuning drive cord |
| RDC-027 | | CORD—Broadcast dial cord |
| RDD-007 | | HUB AND DRUM ASSEMBLY—On Broadcast dial |
| RDD-008 | | DRUM AND SHAFT ASSEMBLY—For Broadcast dial |
| RDD-009 | | DRUM—Dial drive pointer drum and shaft assembly for B-C tuning |
| RDK-071 | | KNOB—Control knob for Radio Tuning or Focus |
| RKD-072 | | KNOB—Control knob for Television Tuning |
| RKD-073 | | KNOB—Control knob for Station Selector |
| RDK-074 | | KNOB—Control knob for Volume or Contrast |
| RDK-075 | | KNOB—Control knob Off-Tone or Brightness |
| RDL-002 | | LIGHT—Pilot light, Mazda No. 44, 6-8 v., 0.25 A., frosted for B-C tuning scale |
| RDM-006 | | MASK—Picture tube mask |
| RDP-023 | | POINTER—Broadcast dial pointer and hub assembly |
| RDS-034 | | GLASS—Broadcast dial glass |
| RDW-004 | | GLASS—Picture tube safety glass |
| RDX-028 | | SCALE—Broadcast dial scale assembly |
| RHC-008 | | CLIP—Clip for holding tubular capacitors |
| RHG-006 | | GROMMET—Power cord grommet |
| RHM-016 | | CLIP—B-C oscillator coil clip |
| RHM-028 | | CLIP—B.C. r-f coil clip |
| RHX-010 | | HARDWARE—Hardware for mounting gang condenser |
| RJC-001 | | PIN—Speaker lead contact pin |
| RJC-007 | | CONNECTOR—High voltage anode connector for picture tube |
| RJJ-005 | | RECEPTACLE—A-C receptacle (male) on chassis |
| RJP-015 | | PLUG—A-C plug (on back cover) |
| RJS-012 | | PLATE—Mounting plate for electrolytic capacitor (small size) |
| RJS-030 | | SOCKET—Octal base tube socket |
| RJS-037 | | PLATE—Mounting plate for electrolytic capacitor (large size) |
| RJS-041 | | SOCKET—Miniature tube socket for 6AU6 |
| RJS-042 | | SOCKET—Loctal tube socket for 7F8 |
| RJS-057 | | TUBE SOCKET—5-pin socket for 807 |
| RJS-058 | | SOCKET—Tube socket for picture tube |
| RJS-059 | | SOCKET—Dial scale pilot lamp socket |
| RJS-064 | | SOCKET—Bezel pilot lamp socket |
| RJX-014 | S1 | SWITCH—R-f coil assembly completely wired and aligned (including tubes) |
| RLA-007 | T11 | TRANSFORMER—B-C antenna transformer |
| RLC-012 | T12 | TRANSFORMER—B-C oscillator transformer |
| RLD-001 | L9 | COIL—Deflection coil |
| RLF-005 | L1 | CHOKE—7 h., 75 ma. filter choke |
| RLF-006 | L2 | CHOKE—7 h., 140 ma. filter choke |
| RLF-008 | L8 | COIL—Focus coil |
| RLF-009 | L10 | CHOKE—Broadcast choke coil |
| RLI-003 | L18 | CHOKE—R-F amplifier cathode choke |
| RLI-006 | L15, 19 | CHOKE—R-F amplifier cathode choke |
| RLI-007 | L3 and L98 | CHOKE—90 uh. video choke |
| RLI-008 | L4 | CHOKE—55 uh. video choke |
| RLI-009 | L5 | CHOKE—Video detector choke |
| RLI-011 | T26 | COIL—R-F and oscillator coil (Band 7) |
| RLI-012 | T27 | COIL—R-F and oscillator coil (Band 8) |
| RLI-013 | T28 | COIL—R-F and oscillator coil (Band 9) |
| RLI-014 | T29 | COIL—R-F and oscillator coil (Band 10) |
| RLI-015 | T30 | COIL—R-F and oscillator coil (Band 11) |
| RLI-016 | T31 | COIL—R-F and oscillator coil (Band 12) |
| RLI-017 | T32 | COIL—R-F and oscillator coil (Band 13) |
| RLI-019 | L14 | CHOKE—Oscillator cathode choke |
| RLI-031 | L21 | CHOKE—Cathode choke assembly |
| RLM-003 | T22 | COIL—R-F and oscillator coil (Band 3) |
| RLM-004 | T23 | COIL—R-F and oscillator coil (Band 4) |
| RLM-005 | T24 | COIL—R-F and oscillator coil (Band 5) |
| RLM-006 | T25 | COIL—R-F and oscillator coil (Band 6) |
| RLM-008 | T20 | COIL—R-F and oscillator coil (Band 1) |
| RLM-009 | T21 | COIL—R-F and oscillator coil (Band 2) |
| RMB-009 | | BUSHING—B-C tuning shaft bushing |
| RMF-004 | | CLIP—Dial window clip |
| RMR-004 | | RUBBER—Channel rubber for dial |
| RMM-039 | | CUSHION—Picture tube cushion. |
| RMM-040 | | TRAP—Ion trap assembly |
| RMM-041 | | SHIELD—Tube base shield for 7F8 tube |
| RMM-042 | | SHIELD—Tube base shield for television tube |
| RMS-004 | | SPRING—Television tuning drive cord tension spring |
| RMS-109 | | SPRING—For focus coil assembly |
| RMS-110 | | STRAP—Safety strap for picture tube |
| RMS-111 | | SPRING—B-C drive cord tension spring |
| RMW-027 | | PULLEY—Idler pulley for B-C drive cord, ½ in. O. D. |
| RMW-035 | | PULLEY—Idler pulley for B-C drive cord, 13/16 in. O. D. |
| RMX-100 | | SHAFT—B-C tuning shaft assembly and "C" washer |
| RMX-101 | | SHAFT—Television tuning shaft and pulley assembly |
| RRC-020 | R36, 61 | POTENTIOMETER—100,000 ohms, 2 w., (Hor. Hold and Height) |
| RRC-021 | R49, 62 | POTENTIOMETER—250,000 ohms, ½ w., (Hor. Linearity and Vertical Hold) |
| RRC-022 | R69A, B | POTENTIOMETER—2 meg., ½ w., (Volume control); 500,000 ohms, ½ w., (Tone control) |
| RTL-024 | T2 | TRANSFORMER—2nd video i-f transformer |
| RTL-025 | T3 | TRANSFORMER—3rd video i-f transformer |
| RTL-027 | T13 | TRANSFORMER—455 kc i-f transformer |
| RTL-033 | T4 | TRANSFORMER—4th video i-f transformer |
| RTL-034 | T5 | TRANSFORMER—Composite 455 kc and 10.7 mc i-f transformer |
| RTM-001 | T7 | TRANSFORMER—AFC synchronizing transformer |
| RTO-016 | T8 | TRANSFORMER—Vertical sweep output |
| RTO-017 | T10 | TRANSFORMER—Audio output transformer |
| RTO-032 | T9 | TRANSFORMER—Horizontal sweep output |
| RTP-037 | T14 | TRANSFORMER—Power transformer (50 cycles) |
| RTP-040 | T14 | TRANSFORMER—Power transformer (60 cycles) |
| RWL-004 | | CORD—Power cord |
| RWL-010 | | CORD—Power cord assembly, includes female plug |

# GENERAL TELEV. & RADIO CORP.

MODEL 4B5


LOOP ANTENNA PART NO.32-5A
L3
1,000 KC
1
12BE6 CONV.
455 KC
X130
OSC COIL
C5 .0001 600V.
R2 10K
C1
C2
C3
GANG COND PART NO6-1A
C4
I.F. TRANS. PART NO.15-4
T1
L1
L2
455 KC
X1.2
C6 .05 200V.
12BA6 I-F AMPL.
455 KC
X6.5
R4 2 MEG.
C13 .00025 600V.
R3 7K
C7 .00025 600V.
R6 50K
R1 .5MEG. VOL.CONT PART NO. 20-1
C8 .01 400V
12AT6 DET. AVC AUDIO
455 KC
X1
R7 10MEG.
R5 500K
0.1
C10 .00025 600V
C11 .01 400V
400~
X60
C12 .02 600V
R10 150 1/3W 10%
R9 500K
50B5 AUDIO OUTPUT
400~
X6
R8 2K 1W
T3
P.M. SPKR. PART NO.8-1
C9 20 150V 40 150V
ELECT. COND PART NO.3-3
C14 .1 400V
MAZDA NO.47 PILOT LIGHT
35W4
R11 10 10%
LINE SWITCH ON V.C.
110-120 VOLTS AC-60 CYCLE OR D.C.
50B5
12BE6
12BA6
12AT6
General

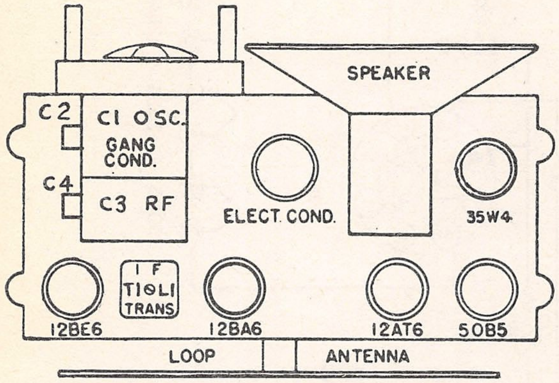
APPROX. GAIN PER STAGE USING CHANALYST. WITH A FIXED BIAS OF 3 VOLTS.

ALL RESISTORS 1/3 WATT 20%-UNLESS OTHER-WISE SPECIFIED.

K=1000 OHMS

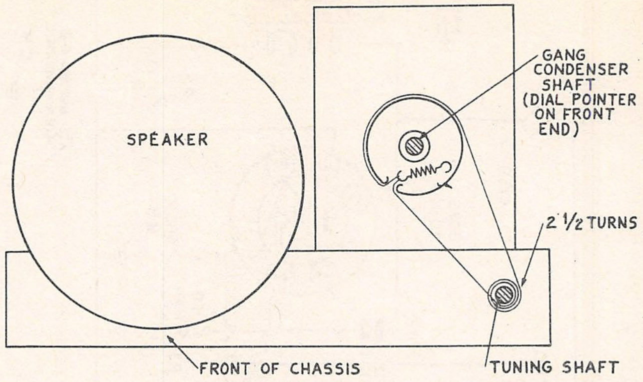
MODEL 4B5
MODEL 5B5, MODEL 9A5,
MODEL 23A6, MODEL 24B6,
MODEL 25B5

# GENERAL TELEV. & RADIO CORP.


SPEAKER
C2
C1 OSC.
GANG COND.
C4
C3 RF
ELECT. COND.
35W4
I F T1 L1 TRANS
12BE6
12BA6
12AT6
50B5
LOOP
ANTENNA

TUBE LAYOUT 4B5

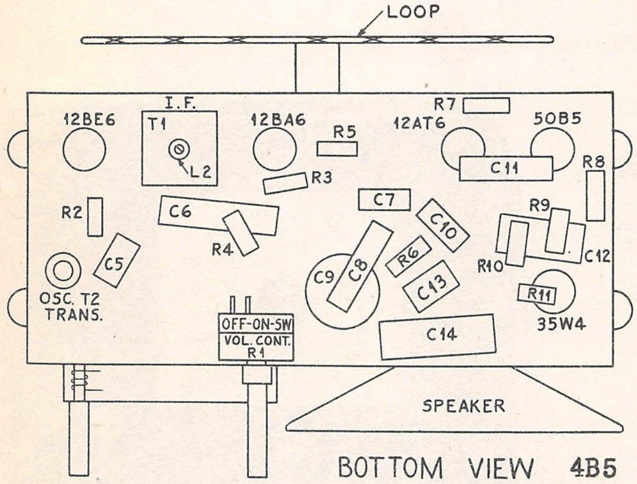
## DIAL CORD DRIVE - MODELS 4B5,5B5,9A5, 23A6,24B6,25B5


SPEAKER
GANG CONDENSER SHAFT (DIAL POINTER ON FRONT END)
2 1/2 TURNS
FRONT OF CHASSIS
TUNING SHAFT

Model 4B5

| SOCKET | PIN | VTVM | 20,000Ω/P.V. | 1,000Ω/P.V. | RESISTANCE |
|---|---|---|---|---|---|
| 12BE6<br>CONV. | 1 | -6 | -6 | -6 ON 100V SCALE<br>-3.5 ON 10V SCALE | 10K |
| | 2 | 0 | 0 | 0 | 0 |
| | 3 | AC | AC | AC | 45Ω |
| | 4 | AC | AC | AC | 30Ω |
| | 5 | +82 | +82 | +82 | OVER 5 MEGS |
| | 6 | +82 | +82 | +82 | OVER 5 MEGS |
| | 7 | -1.0 | -0.5 | -0.2 | 3 MEGS |
| 12BA6<br>I.F. AMPL. | 1 | -1.0 | -0.5 | -0.2 | 3 MEGS |
| | 2 | 0 | 0 | 0 | 0 |
| | 3 | AC | AC | AC | 25Ω |
| | 4 | AC | AC | AC | 15Ω |
| | 5 | +25 | +24 | +22 | OVER 5 MEGS |
| | 6 | +82 | +82 | +82 | OVER 5 MEGS |
| | 7 | 0 | 0 | 0 | 0 |
| 12AT6<br>DET. AVC<br>AUDIO | 1 | -0.5 | -0.2 | 0 | 10 MEGS |
| | 2 | 0 | 0 | 0 | 0 |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | AC | AC | AC | 15Ω |
| | 5 | -0.5 | -0.2 | 0 | 500K |
| | 6 | -0.5 | -0.2 | 0 | 500K |
| | 7 | +40 | +38 | +15 | OVER 5 MEGS |
| 50B5<br>AUDIO<br>OUTPUT | 1 | 0 | 0 | 0 | 500K |
| | 2 | +5 | +5 | +5 | 150Ω |
| | 3 | AC | AC | AC | 85Ω |
| | 4 | AC | AC | AC | 35Ω |
| | 5 | +120 | +120 | +120 | OVER 5 MEGS |
| | 6 | +82 | +82 | +82 | OVER 5 MEGS |
| | 7 | -- | -- | -- | -- |
| 35W4<br>RECT | 1 | AC | AC | AC | 110Ω |
| | 2 | -- | -- | -- | -- |
| | 3 | AC | AC | AC | 85Ω |
| | 4 | AC | AC | AC | 115Ω |
| | 5 | AC | AC | AC | 115Ω |
| | 6 | AC | AC | AC | 110Ω |
| | 7 | +125 | +125 | +125 | OVER 5 MEGS |

ALL VOLTAGE AND RESISTANCE MEASUREMENT MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.


LOOP
I.F.
T1
L2
12BE6
12BA6
R5
R3
12AT6
R7
50B5
C11
R8
R2
C6
R4
C7
C10
R9
C12
R10
C5
C9
C8
R6
C13
R11
OSC. T2 TRANS.
OFF-ON-SW VOL. CONT. R1
C14
35W4
SPEAKER

BOTTOM VIEW 4B5

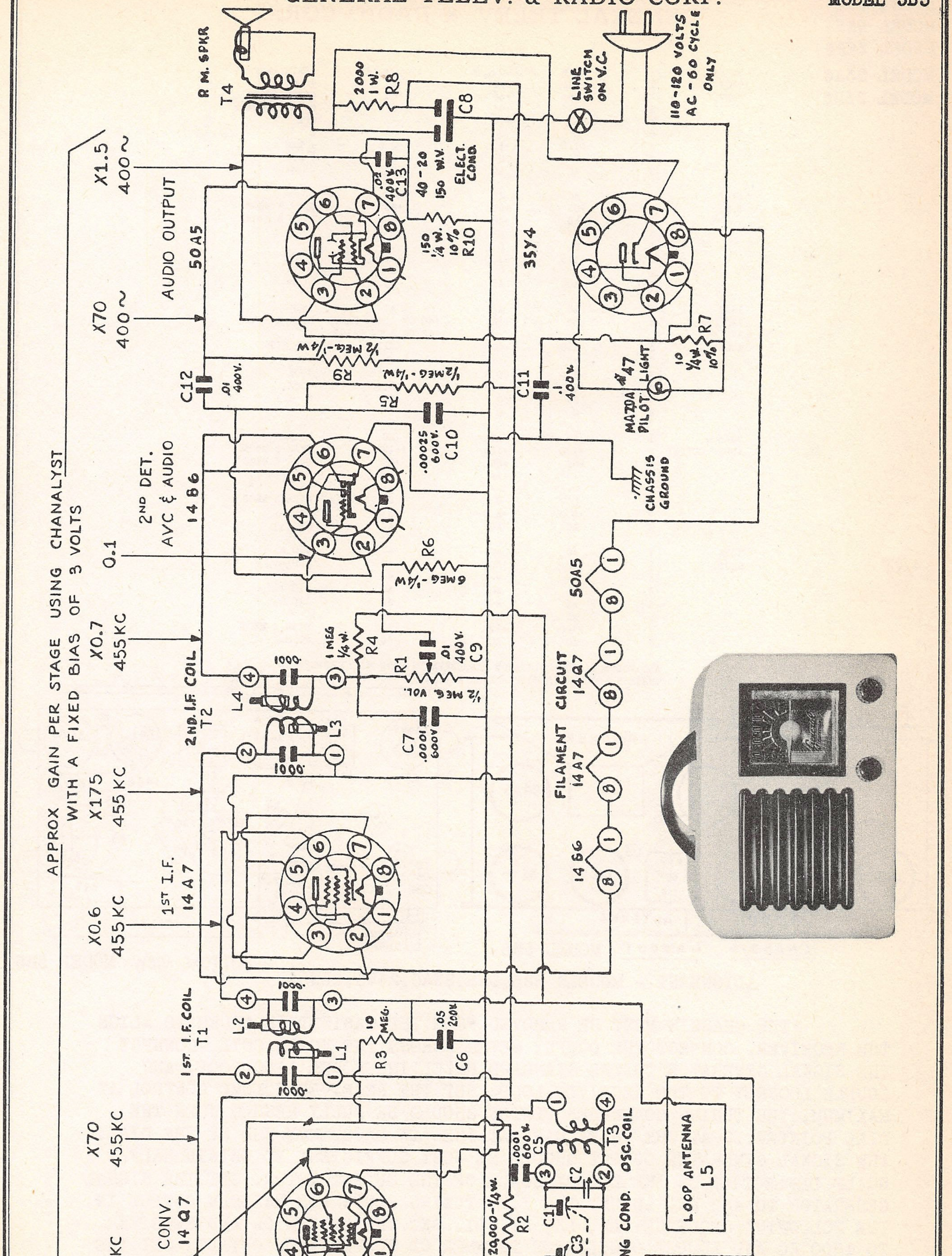
## ALIGNMENT - 4B5

THE CHASSIS MUST BE REMOVED FROM THE CABINET IN ORDER TO ALIGN THE RECEIVER. CONNECT THE OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE MODEL 1150 LOOP, AND COUPLE LOOSELY TO THE RECEIVER LOOP. SET THE RECEIVER VOLUME CONTROL AT MAXIMUM.

THE TUNING CONDENSER PLATES SHOULD BE FULLY MESHED WHEN THE DIAL POINTER IS AT THE INDEX MARK AT THE LOW FREQUENCY END OF THE DIAL. THE SIGNAL GENERATOR OUTPUT SHOULD BE SUFFICIENT TO GIVE HALF SCALE DEFLECTION ON THE LOWEST SCALE OF THE OUTPUT METER. SET THE SIGNAL GENERATOR TO 455 KC. ADJUST THE I.F. TUNING SLUGS FOR MAXIMUM METER DEFLECTION IN THE FOLLOWING SEQUENCE: L2, L1. SET THE GENERATOR AND RECEIVER TO 700 KC AND ADJUST OSCILLATOR TRIMMER C2 FOR MAXIMUM OUTPUT. SET THE GENERATOR AND RECEIVER TO 1400 KC AND ADJUST LOOP TRIMMER C4 FOR MAXIMUM OUTPUT.

# GENERAL TELEV. & RADIO CORP.

**MODEL 5B5**


APPROX GAIN PER STAGE USING CHANALYST WITH A FIXED BIAS OF 3 VOLTS
1 1000 KC
X70 455KC
X0.6 455KC
X175 455KC
X0.7 455KC
0.1
X70 400~
X1.5 400~
CONV. 14Q7
1ST I.F. 14A7
2ND DET. AVC & AUDIO 14B6
AUDIO OUTPUT 50A5
35Y4
1ST I.F. COIL T1
2ND. I.F. COIL T2
L1
L2
L3
L4
1000
R3 10 MEG.
C6 .05 200V.
R2 20,000-1/4W.
C5 .0001 600V.
C1
C2
C3
C4
GANG COND.
T3 OSC. COIL
LOOP ANTENNA L5
C7 .0001 600V
R1 1/2 MEG. VOL.
R4 1 MEG 1/4W.
C9 .01 400V.
R6 6 MEG-1/4W
C10 .00025 600V.
R5 1/2 MEG-1/4W.
R9 1/2 MEG-1/4W
C12 .01 400V.
C11 .1 400V.
MAZDA PILOT #47 LIGHT
R7 10 1/4W. 10%
CHASSIS GROUND
R10 150 1/4W. 10%
C8 40-20 150 W.V. ELECT. COND.
C13 .02 400V.
R8 2000 1W.
T4
R.M. SPKR
LINE SWITCH ON V.C.
110-120 VOLTS AC-60 CYCLE ONLY
FILAMENT CIRCUIT
14B6
14A7
14Q7
50A5

For Dial Data, see P.16-2

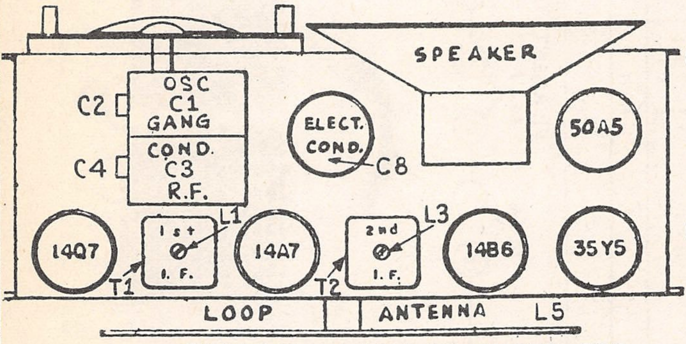
**MODEL 5B5**
**MODEL 9A5**
**MODEL 24B6**
**MODEL 23A6**
**MODEL 25B5**

# GENERAL TELEV. & RADIO CORP.

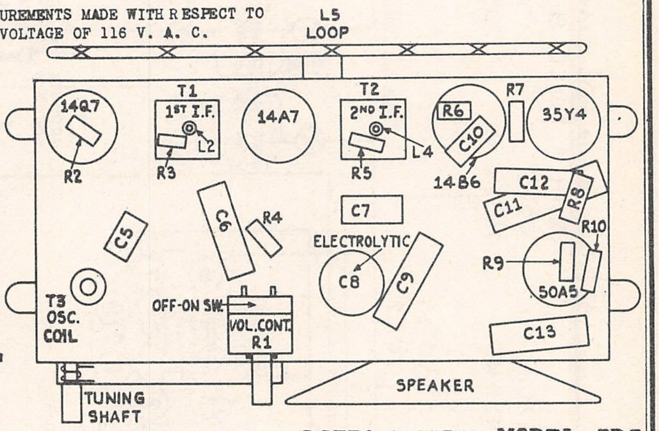
Model 5B5

| SOCKET | PIN | VTVM | 20,000Ω/P.V. | 1,000Ω/P.V. | RESISTANCE |
|---|---|---|---|---|---|
| 14Q7 | 1 | AC | AC | AC | 40Ω |
| CONV. | 2 | +86 | +86 | +86 | OVER 5 MEGS |
| | 3 | +86 | +86 | +86 | OVER 5 MEGS |
| | 4 | -12 | -10 | -7 | 20K |
| | 5 | 0 | 0 | 0 | 0 |
| | 6 | -1.5 | -1.0 | -0.2 | 1 MEG |
| | 7 | 0 | 0 | 0 | 1 Ω |
| | 8 | AC | AC | AC | 25Ω |
| 14A7 | 1 | AC | AC | AC | 15 Ω |
| I.F. | 2 | +86 | +86 | +86 | OVER 5 MEGS |
| | 3 | +86 | +86 | +86 | OVER 5 MEGS |
| | 4 | 0 | 0 | 0 | 0 |
| | 5 | 0 | 0 | 0 | 0 |
| | 6 | -1.5 | -1.0 | -0.2 | 1 MEG |
| | 7 | 0 | 0 | 0 | 0 |
| | 8 | AC | AC | AC | 25 Ω |
| 14B6 | 1 | AC | AC | AC | 15Ω |
| 2ND DET. | 2 | +58 | +52 | +40 ON 1000V RANGE<br>+12 ON 100V RANGE | OVER 5 MEGS |
| AVC AND | | | | | |
| AUDIO | 3 | -1.0 | -0.6 | -013 | 5.5 MEGS |
| | 4 | -- | -- | -- | -- |
| | 5 | -1.0 | -0.6 | -0.3 | 400K |
| | 6 | -1.0 | -0.6 | -0.3 | 400K |
| | 7 | 0 | 0 | 0 | 0 |
| | 8 | 0 | 0 | 0 | 0 |
| 50A5 | 1 | AC | AC | AC | 85Ω |
| AUDIO OUTPUT | 2 | +120 | +120 | +120 | OVER 5 MEGS |
| | 3 | +86 | +86 | +86 | OVER 5 MEGS |
| | 4 | -- | -- | -- | -- |
| | 5 | -- | -- | -- | -- |
| | 6 | 0 | 0 | 0 | OVER 5 MEGS |
| | 7 | +5.0 | +5.0 | +5.0 | 150Ω |
| | 8 | AC | AC | AC | 35 Ω |
| 35Y4 | 1 | AC | AC | AC | 120 Ω |
| RECT. | 2 | AC | AC | AC | 120Ω |
| | 3 | -- | -- | -- | -- |
| | 4 | AC | AC | AC | 110 Ω |
| | 5 | AC | AC | AC | 110Ω |
| | 6 | AC | AC | AC | 0 |
| | 7 | +125 | +125 | +125 | OVER 5 MEGS |
| | 8 | AC | AC | AC | 85Ω |

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.


SPEAKER
OSC
C1
GANG
COND.
C3
R.F.
C2
C4
ELECT.
COND.
C8
50A5
L1
L3
14Q7
1st I.F.
14A7
2nd I.F.
14B6
35Y5
T1
T2
LOOP
ANTENNA
L5

CHASSIS LAYOUT MODEL 5B5

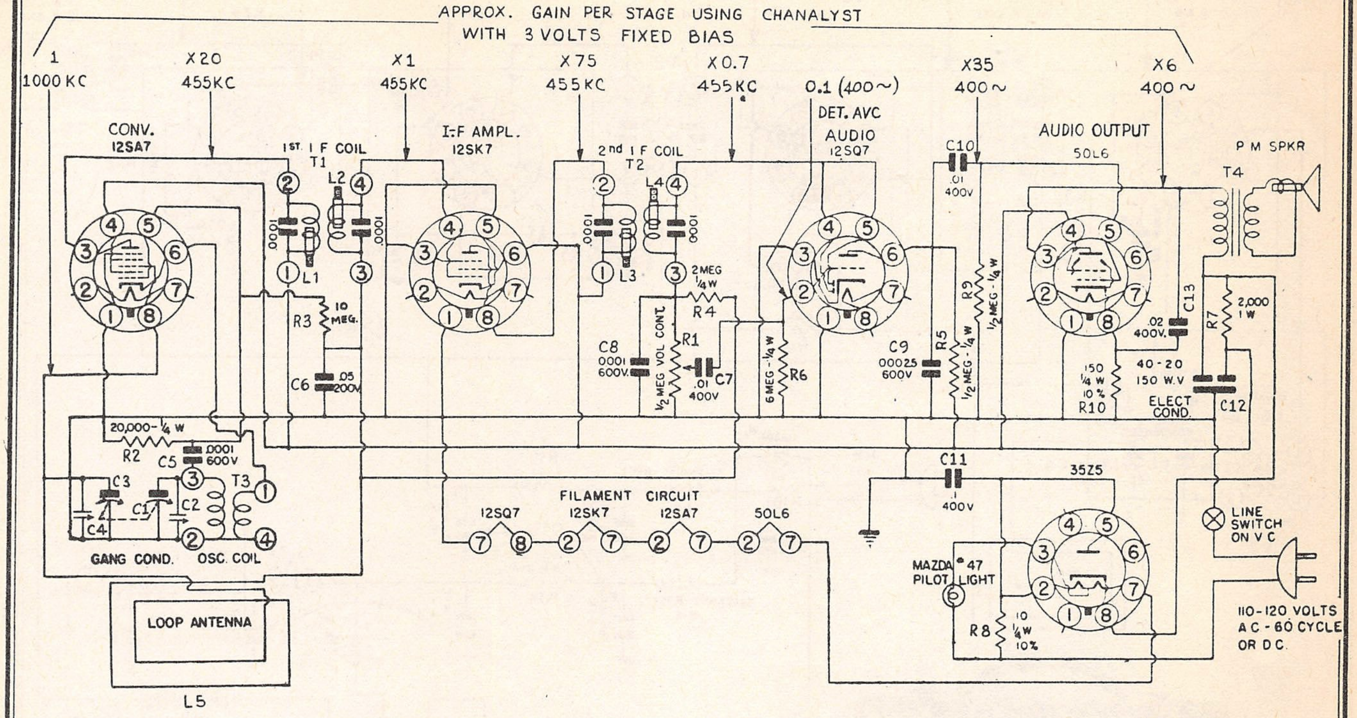

L5
LOOP
14Q7
T1
1ST I.F.
L2
14A7
T2
2ND I.F.
L4
R6
R7
35Y4
C10
R2
R3
R5
14B6
C12
C11
R8
C7
R10
C5
C6
R4
ELECTROLYTIC
C8
C9
R9
50A5
T3
OSC.
COIL
OFF-ON SW.
VOL.CONT.
R1
C13
TUNING
SHAFT
SPEAKER

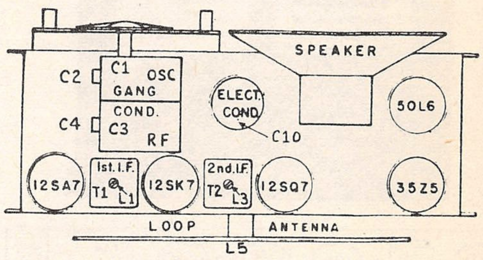
BOTTOM VIEW MODEL 5B5

## ALIGNMENT - MODELS 5B5,9A5,23A6,24B6,25B5

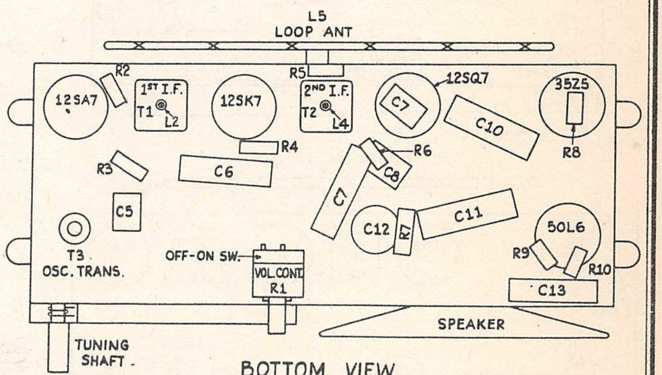
THE CHASSIS MUST BE REMOVED FROM THE CABINET IN ORDER TO ALIGN THE RECEIVER. CONNECT THE OUTPUT METER ACROSS THE VOICE COIL. CONNECT THE SIGNAL GENERATOR TO THE STANDARD HAZELTINE MODEL 1150 LOOP, AND COUPLE LOOSELY TO THE RECEIVER LOOP. SET THE RECEIVER VOLUME CONTROL AT MAXIMUM. THE TUNING CONDENSER PLATES SHOULD BE FULLY MESHED WHEN THE DIAL POINTER IS AT THE INDEX MARK AT THE LOW FREQUENCY END OF THE DIAL. THE SIGNAL GENERATOR OUTPUT SHOULD BE JUST SUFFICIENT TO OBTAIN HALF SCALE DEFLECTION ON THE LOWEST SCALE OF THE OUTPUT METER. SET THE SIGNAL GENERATOR TO 455 KC. ADJUST THE I.F. TUNING SLUGS FOR MAXIMUM OUTPUT IN THE FOLLOWING SEQUENCE: L4, L3, L2, L1. SET THE GENERATOR AND RECEIVER TO 1600 KC AND ADJUST OSCILLATOR TRIMMER C2 FOR MAXIMUM OUTPUT. SET THE GENERATOR AND RECEIVER TO 1400 KC AND ADJUST R.F. TRIMMER C4 FOR MAXIMUM OUTPUT.

# GENERAL TELEV. & RADIO CORP.


APPROX. GAIN PER STAGE USING CHANALYST
WITH 3 VOLTS FIXED BIAS
1
1000 KC
X20
455KC
X1
455KC
X75
455KC
X0.7
455KC
0.1 (400~)
X35
400~
X6
400~
CONV.
12SA7
1st I F COIL
T1
L2
L1
I-F AMPL.
12SK7
2nd I F COIL
T2
L4
L3
DET. AVC
AUDIO
12SQ7
C10
.01
400V
AUDIO OUTPUT
50L6
P M SPKR
T4
.0001
R3
10 MEG.
C6
.05
200V
C8
.0001
600V.
1/2 MEG VOL CONT.
R1
C7
.01
400V
2 MEG
1/4 W
R4
6 MEG - 1/4 W
R6
C9
.00025
600V
R5
1/2 MEG - 1/4 W
R9
1/2 MEG - 1/4 W
150
1/4 W
10%
R10
.02
400V.
C13
40-20
150 W.V
ELECT
COND.
C12
R7
2,000
1 W
20,000 - 1/4 W
R2
C5
.0001
600V
C3
C1
C2
C4
T3
GANG COND.
OSC. COIL
LOOP ANTENNA
L5
FILAMENT CIRCUIT
12SQ7
12SK7
12SA7
50L6
C11
.1
400V
35Z5
LINE SWITCH ON V C
MAZDA 47
PILOT LIGHT
R8
10
1/4 W
10%
110-120 VOLTS
A C - 60 CYCLE
OR D C.


SPEAKER
C2
C1
OSC
GANG
COND.
C4
C3
RF
ELECT.
COND.
C10
50L6
12SA7
Ist. I.F.
T1
L1
12SK7
2nd. I.F.
T2
L3
12SQ7
35Z5
LOOP
ANTENNA
L5

| SOCKET | PIN | VTVM | 20,000Ω/P2 | 1,000Ω/P2 | RESISTANCE |
|---|---|---|---|---|---|
| 12SA7GT | 1 | 0 | 0 | 0 | 0 |
| CONV | 2 | AC | AC | AC | 25Ω |
| | 3 | +78 | +78 | +76 | OVER 5 MEGS |
| | 4 | +78 | +78 | +76 | OVER 5 MEGS |
| | 5 | -9 | -8 | -4.5 | 17K |
| | 6 | 0 | 0 | 0 | 1Ω |
| | 7 | AC | AC | AC | 40Ω |
| | 8 | -6 | -2 | -0.5 | 1.3 MEGS |
| 12SK7GT | 1 | 0 | 0 | 0 | 0 |
| I-F AMPL. | 2 | AC | AC | AC | 15Ω |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | -2 | -0.8 | -0.4 | 1.3 MEGS |
| | 5 | 0 | 0 | 0 | 0 |
| | 6 | +78 | +78 | +76 | OVER 5 MEGS |
| | 7 | AC | AC | AC | 25Ω |
| | 8 | +78 | +78 | +76 | OVER 5 MEGS |
| 12SQ7GT | 1 | 0 | 0 | 0 | 0 |
| DET. AVC | 2 | -1 | -0.8 | -0.4 | 6MEGS |
| AUDIO | 3 | 0 | 0 | 0 | 0 |
| | 4 | -1.5 | -0.4 | -0.2 | 400K |
| | 5 | -1.5 | -0.4 | -0.2 | 400K |
| | 6 | +48 | +46 | +12 | OVER 5 MEGS |
| | 7 | AC | AC | AC | 15Ω |
| | 8 | AC | AC | AC | 0 |
| 50L6GT | 1 | 0 | 0 | 0 | 0 |
| AUDIO OUTPUT | 2 | AC | AC | AC | 40Ω |
| | 3 | +115 | +115 | +115 | OVER 5 MEGS |
| | 4 | +75 | +75 | +75 | OVER 5 MEGS |
| | 5 | 0 | 0 | 0 | 550K |
| | 6 | -- | -- | -- | -- |
| | 7 | AC | AC | AC | 80Ω |
| | 8 | +5 | +5 | +5 | 150Ω |
| 35Z5GT | 1 | -- | -- | -- | -- |
| | 2 | AC | AC | AC | 120Ω |
| | 3 | AC | AC | AC | 110Ω |
| | 4 | -- | -- | -- | -- |
| | 5 | AC | AC | AC | 120Ω |
| | 6 | AC | AC | AC | 120Ω |
| | 7 | AC | AC | AC | 90Ω |
| | 8 | +115 | +115 | +115 | OVER 5 MEGS |


L5
LOOP ANT
R2
R5
12SQ7
35Z5
12SA7
1ST I.F.
T1
L2
12SK7
2ND I.F.
T2
L4
C7
C10
R4
R6
C8
R8
R3
C6
C5
C7
C11
C12
R7
50L6
T3
OSC. TRANS.
OFF-ON SW.
VOL. CONT.
R1
R9
R10
C13
SPEAKER
TUNING
SHAFT.

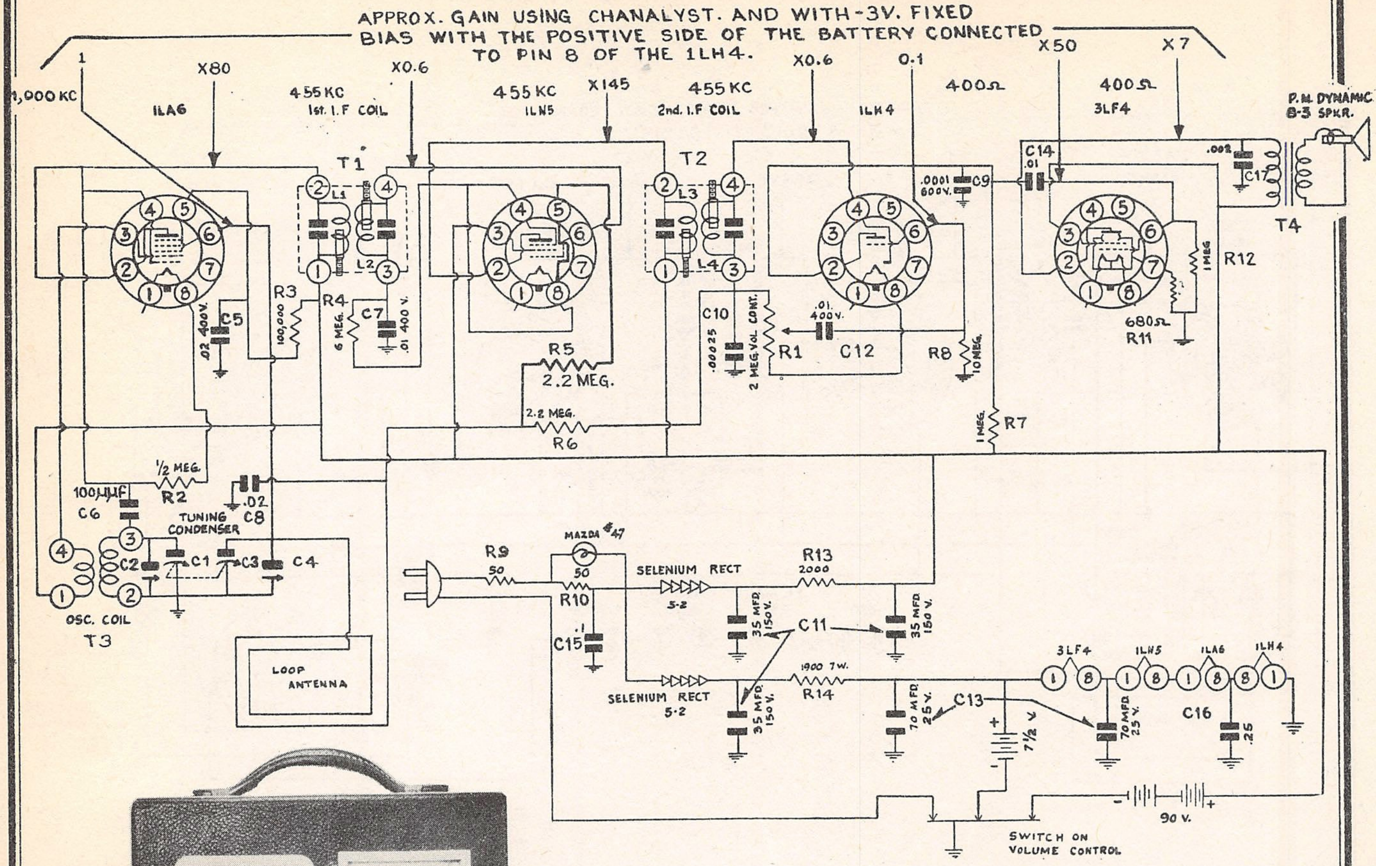
BOTTOM VIEW

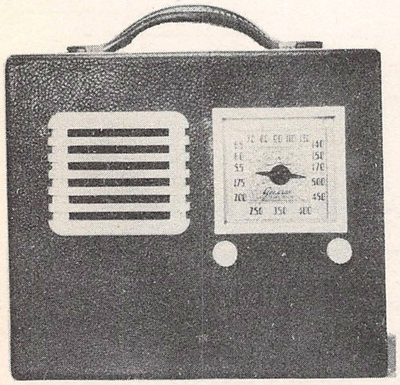
"NOTE" ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.

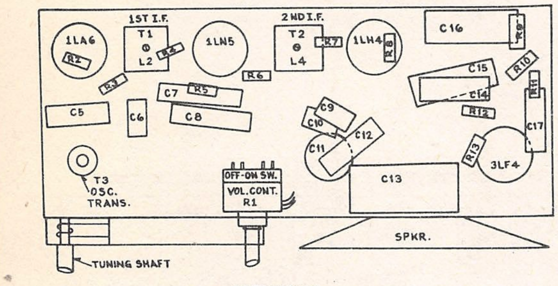
For Alignment, see P.16-4
For Dial Data, see P.16-2

MODEL 23A6

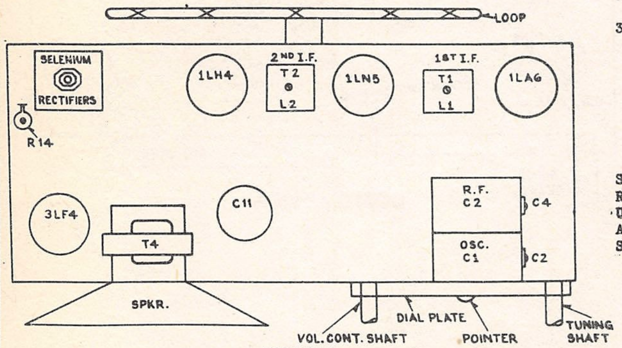
# GENERAL TELEV. & RADIO CORP.


APPROX. GAIN USING CHANALYST. AND WITH -3V. FIXED BIAS WITH THE POSITIVE SIDE OF THE BATTERY CONNECTED TO PIN 8 OF THE 1LH4.
1
X80
X0.6
X145
X0.6
0.1
X50
X7
1,000 KC
1LA6
455 KC 1st. I.F COIL
455 KC 1LN5
455 KC 2nd. I.F COIL
1LH4
400Ω
400Ω 3LF4
P.M. DYNAMIC 8-3 SPKR.
T1
T2
T3
T4
L1
L2
L3
L4
C14 .01
.002
C17
.0001 600V.
C9
R12
1 MEG
680Ω R11
R3 100,000
R4 6 MEG.
C5 .02 400V.
C7 .01 400 V.
R5 2.2 MEG.
R6 2.2 MEG.
C10 .00025
R1 2 MEG. VOL. CONT.
C12 .01 400V.
R8 10 MEG.
R7 1 MEG.
½ MEG R2
100μμF C6
.02 C8
TUNING CONDENSER
C1
C2
C3
C4
OSC. COIL T3
LOOP ANTENNA
R9 50
MAZDA #47
50 R10
C15 .1
SELENIUM RECT 5-2
R13 2000
35 MFD. 150 V.
C11
35 MFD 150 V.
SELENIUM RECT 5-2
1900 7W. R14
35 MFD. 150V.
70 MFD. 25 V.
C13
7½ V
70 MFD. 25 V.
C16
.25
3LF4
1LN5
1LA6
1LH4
90 V.
SWITCH ON VOLUME CONTROL




1ST I.F.
T1
L2
2ND I.F.
T2
L4
1LA6
1LN5
1LH4
C16
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C17
3LF4
T3 OSC. TRANS.
OFF-ON SW. VOL. CONT. R1
SPKR.
TUNING SHAFT

BOTTOM VIEW


LOOP
SELENIUM RECTIFIERS
R14
1LH4
2ND I.F. T2 L2
1LN5
1ST I.F. T1 L1
1LA6
3LF4
T4
C11
R.F. C2
C4
OSC. C1
C2
SPKR.
DIAL PLATE
VOL. CONT. SHAFT
POINTER
TUNING SHAFT

TOP VIEW

| SOCKET | PIN | VTVM | 20,000Ω/P.V. | 1,000Ω/P.V. | RESISTANCE |
|---|---|---|---|---|---|
| 1LA6 | 1 | +3.5 | +3.4 | +3.4 | 24 Ω |
| | 2 | +100 | +100 | +100 | 500K TO 1 MEG |
| | 3 | +100 | +100 | +100 | 500K TO 1 MEG |
| | 4 | -2 | -0.2 | 0 | 500K |
| | 5 | +40 | +40 | -- | 500K TO 1 MEG |
| | 6 | +0.5 | +0.2 | +32 | 1.5 MEG |
| | 7 | -- | -- | -- | -- |
| | 8 | +1.8 | +1.7 | +1.7 | 14 Ω |
| 1LN5 | 1 | +5.3 | +5.2 | +5.2 | 34 Ω |
| | 2 | +100 | +100 | +100 | 500K TO 1 MEG |
| | 3 | +100 | +100 | +100 | 500K TO 1 MEG |
| | 4 | +3.5 | +3.4 | +3.4 | 24 Ω |
| | 5 | +3.5 | +3.4 | +3.4 | 24 Ω |
| | 6 | +2.5 | +0.2 | 0 | 6 MEGS |
| | 7 | +1.5 | +0.2 | 0 | 1.5 MEGS |
| | 8 | +3.5 | +3.4 | +3.4 | 24 Ω |
| 1LH4 | 1 | 0 | 0 | 0 | 0 |
| | 2 | +56 | +48 | +8 | 1.5 MEG TO 2 MEGS |
| | 3 | +8.2 | +8 | +8 | 52 Ω |
| | 4 | +0.7 | +0.2 | 0 | 1.2 MEGS |
| | 5 | -- | -- | -- | -- |
| | 6 | -0.2 | 0 | 0 | 10 MEGS |
| | 7 | -- | -- | -- | -- |
| | 8 | +1.8 | +1.7 | +1.7 | 14 Ω |
| 3LF4 | 1 | +8.2 | +8 | +8 | 52 Ω |
| | 2 | +98 | +98 | +96 | 500K TO 1 MEG |
| | 3 | +100 | +100 | +100 | 500K TO 1 MEG |
| | 4 | -- | -- | -- | -- |
| | 5 | +130 | +130 | +130 | 500K TO 1 MEG |
| | 6 | 0 | 0 | 0 | 1.3 MEGS |
| | 7 | +6.6 | +6.4 | +6.4 | 44 Ω |
| | 8 | +5.3 | +5.2 | +5.2 | 36 Ω |

SELENIUM RECTIFIERS USED FOR A AND B SUPPLY

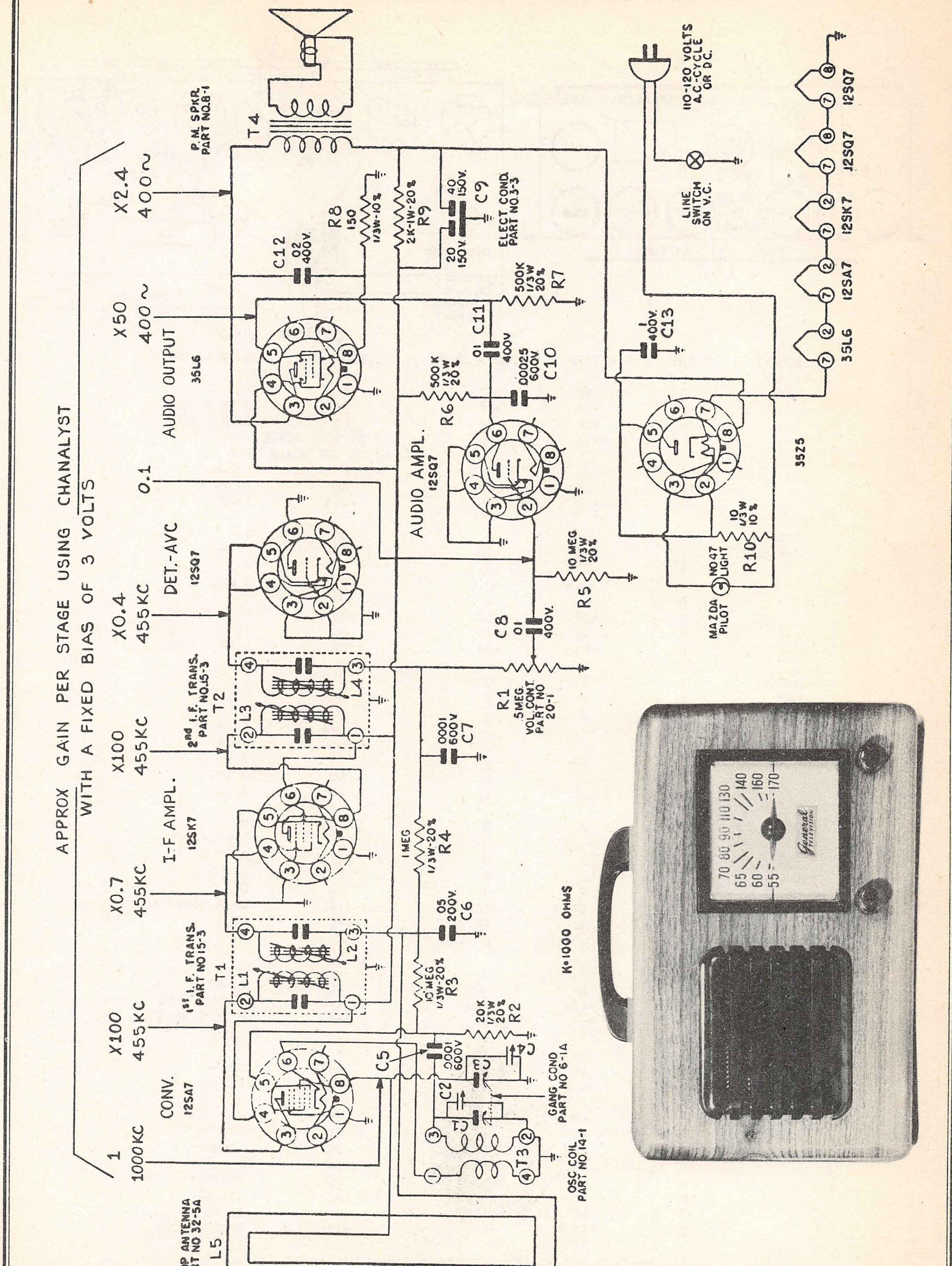
FILAMENT SUPPLY = 8.2 V. D. C.
PLATE SUPPLY = 130V

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.

For Alignment, see P.16-4
For Dial Data, see P.16-2

## GENERAL TELEV. & RADIO CORP.

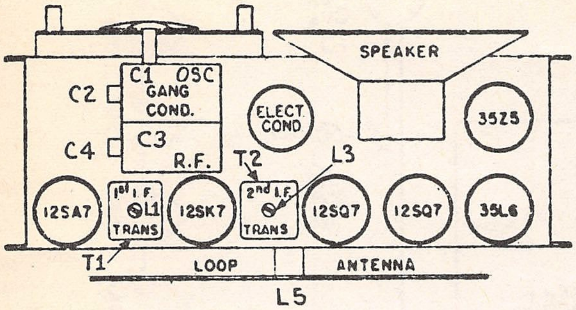
**MODEL 24B6**

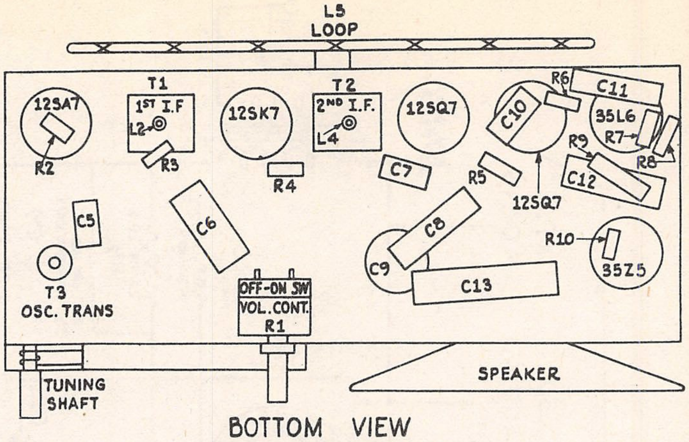

APPROX GAIN PER STAGE USING CHANALYST
WITH A FIXED BIAS OF 3 VOLTS
1
1000KC
X100
455KC
X0.7
455KC
X100
455KC
X0.4
455KC
0.1
X50
400~
X2.4
400~
CONV.
12SA7
I-F AMPL.
12SK7
DET.-AVC
12SQ7
AUDIO AMPL.
12SQ7
AUDIO OUTPUT
35L6
35Z5
1st I.F. TRANS. PART NO.15-3
T1
L1
L2
2nd I.F. TRANS. PART NO.15-3
T2
L3
L4
T4
P.M. SPKR. PART NO.8-1
LOOP ANTENNA PART NO 32-5A
L5
OSC COIL PART NO.14-1
T3
GANG COND PART NO 6-1A
C1
C2
C3
C4
C5
.0001 600V
20K 1/3W 20%
R2
10 MEG 1/3W-20%
R3
.05 200V
C6
1 MEG 1/3W-20%
R4
.0001 600V
C7
R1 .5 MEG. VOL.CONT. PART NO 20-1
C8 .01 400V.
10 MEG 1/3W 20%
R5
500 K 1/3W 20%
R6
.00025 600V
C10
.01 400V
C11
500K 1/3W 20%
R7
C12 .02 400V
R8 150 1/3W-10%
2K-1W-20%
R9
20 150V.
40 150V.
C9
ELECT COND. PART NO.3-3
1 400V.
C13
10 1/3W 10%
R10
NO.47 LIGHT
MAZDA PILOT
110-120 VOLTS A.C.-CYCLE OR D.C.
LINE SWITCH ON V.C.
35L6
12SA7
12SK7
12SQ7
12SQ7
K=1000 OHMS
70 80 90 110 130
65 60 55
140 160 170
General

For Alignment, see P.16-4
For Dial Data, see P.16-2

**MODEL 24B6**

# GENERAL TELEV. & RADIO CORP.


C1 OSC
GANG
COND.
C2
C3
R.F.
C4
ELECT COND
SPEAKER
35Z5
12SA7
1st I.F. TRANS
L1
12SK7
T2
2nd I.F. TRANS
L3
12SQ7
12SQ7
35L6
T1
LOOP
ANTENNA
L5


L5
LOOP
12SA7
R2
T1
1st I.F
L2
R3
12SK7
T2
2ND I.F.
L4
R4
12SQ7
C7
C10
R6
C11
35L6
R7
R9
R8
R5
C12
12SQ7
C5
C6
C8
R10
C9
35Z5
C13
T3
OSC. TRANS
OFF-ON SW
VOL. CONT.
R1
TUNING
SHAFT
SPEAKER

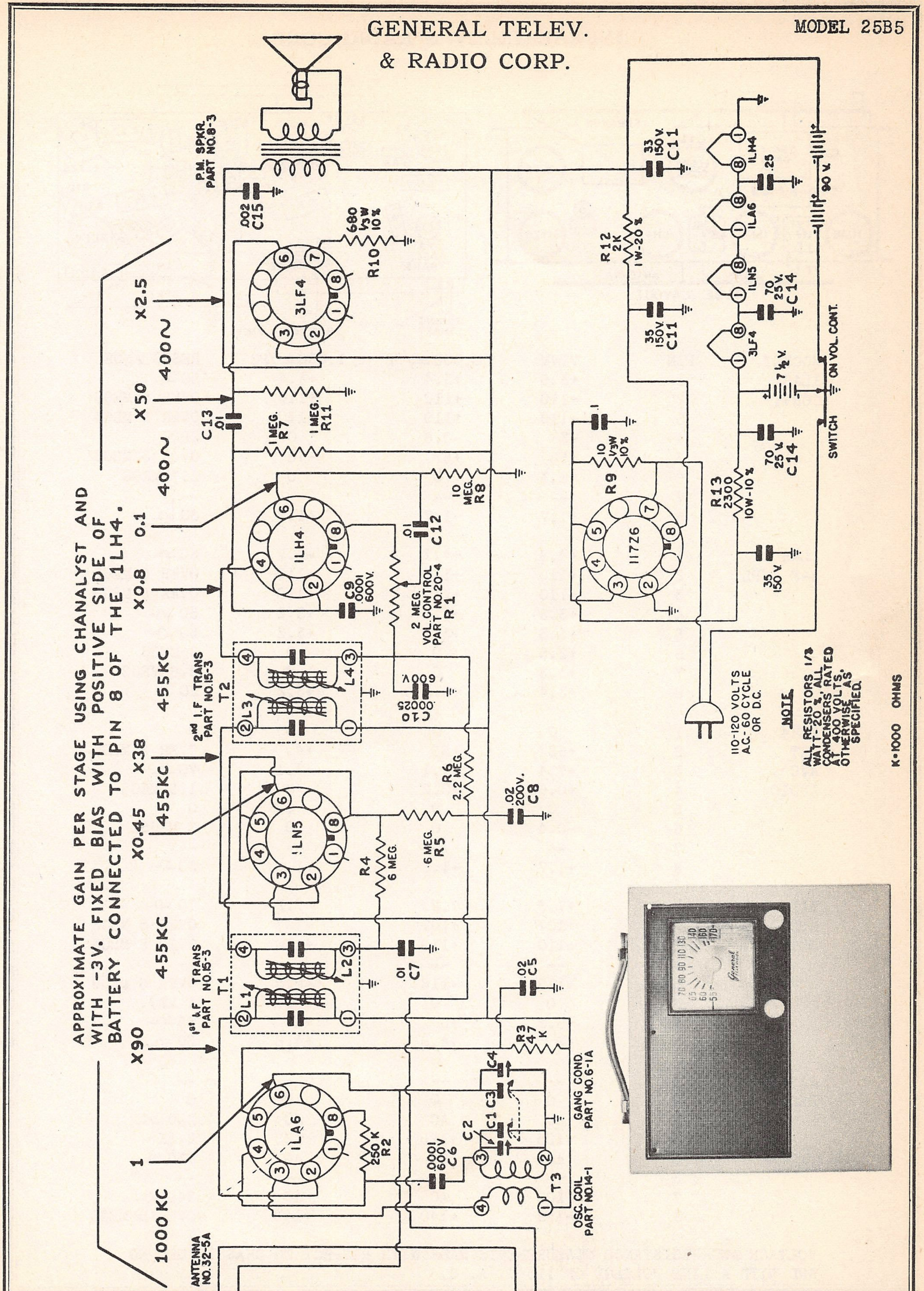
BOTTOM VIEW

| SOCKET | PIN | VTVM | 20,000Ω/P.V. | 1,000Ω/P.V. | RESISTANCE |
|---|---|---|---|---|---|
| 12SA7 | 1 | 0 | 0 | 0 | 0 |
| CONV. | 2 | AC | AC | AC | 70 |
| | 3 | +84 | +84 | +84 | OVER 5 MEGS |
| | 4 | +84 | +84 | +84 | OVER 5 MEGS |
| | 5 | -11 | -10 | -9 ON 100V SCALE<br>-5 ON 10V SCALE | 17K |
| | 6 | 0 | 0 | 0 | 1.2Ω |
| | 7 | AC | AC | AC | 70Ω |
| | 8 | -1.5 | -0.6 | -0.4 | 1 MEG |
| 12SK7 | 1 | 0 | 0 | 0 | 0 |
| I-F AMPL | 2 | AC | AC | AC | 30Ω |
| | 3 | 0 | 0 | 0 | 0 |
| | 4 | -1.5 | -0.6 | -0.4 | 1 MEG |
| | 5 | 0 | 0 | 0 | 0 |
| | 6 | +84 | +84 | +84 | OVER 5 MEGS |
| | 7 | AC | AC | AC | 45Ω |
| | 8 | +84 | +84 | +84 | OVER 5 MEGS |
| 12SQ7 | 1 | 0 | 0 | 0 | 0 |
| DET | 2 | 0 | 0 | 0 | 0 |
| AVC | 3 | 0 | 0 | 0 | 0 |
| | 4 | -0.5 | -0.4 | -0.2 | 450K |
| | 5 | -0.5 | -0.4 | -0.2 | 450K |
| | 6 | 0 | 0 | 0 | 0 |
| | 7 | AC | AC | AC | 30Ω |
| | 8 | AC | AC | AC | 20Ω |
| 12SQ7 | 1 | 0 | 0 | 0 | 0 |
| AUDIO | 2 | -0.8 | -0.6 | -0.2 | 9 MEG |
| AMPL. | 3 | 0 | 0 | 0 | 0 |
| | 4 | 0 | 0 | 0 | 0 |
| | 5 | 0 | 0 | 0 | 0 |
| | 6 | +52 | +48 | +14 | OVER 5 MEG |
| | 7 | AC | AC | AC | 15Ω |
| | 8 | 0 | 0 | 0 | 0 |
| 35L6 | 1 | 0 | 0 | 0 | 0 |
| AUDIO | 2 | AC | AC | AC | 55Ω |
| OUTPUT | 3 | +125 | +125 | +125 | OVER 5 MEGS |
| | 4 | +84 | +84 | +84 | OVER 5 MEGS |
| | 5 | 0 | 0 | 0 | 525K |
| | 6 | -- | -- | -- | -- |
| | 7 | AC | AC | AC | 90Ω |
| | 8 | +4.5 | +4.5 | +4.5 | 150Ω |
| 35Z5 | 1 | -- | -- | -- | -- |
| RECT. | 2 | AC | AC | AC | 120Ω |
| | 3 | AC | AC | AC | 110Ω |
| | 4 | AC | AC | AC | 0 |
| | 5 | AC | AC | AC | 120Ω |
| | 6 | AC | AC | AC | 115Ω |
| | 7 | AC | AC | AC | 85Ω |
| | 8 | +130 | +130 | +130 | OVER 5 MEGS |

ALL VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V.A.C.

# GENERAL TELEV.
# & RADIO CORP.

**MODEL 25B5**


1000KC
1
X90
455KC
X0.45
455KC
X38
455KC
X0.8
0.1
400∿
X50
400∿
X2.5
LOOP ANTENNA PART NO.32-5A
OSC. COIL PART NO.14-1
T3
GANG COND. PART NO.6-1A
C1 C2 C3 C4
.0001 600V C6
250K R2
1LA6
R3 47 K
.02 C5
1st I.F. TRANS PART NO.15-3
T1
L1 L2
.01 C7
1LN5
R4 6 MEG.
6 MEG. R5
R6 2.2 MEG.
.02 200V. C8
2nd I.F. TRANS PART NO.15-3
T2
L3 L4
.00025 600V C10
1LH4
C9 .0001 600V.
2 MEG. VOL. CONTROL PART NO.20-4 R1
.01 C12
10 MEG. R8
1 MEG. R7
1 MEG. R11
C13 .01
3LF4
680 1/3W 10% R10
.002 C15
P.M. SPKR. PART NO.8-3
33 150V. C11
R12 2K 1W-20%
35 150V C11
.1
10 1/3W 10% R9
117Z6
R13 2300 10W-10%
35 150V
70 25V. C14
7½ V.
SWITCH ON VOL. CONT.
.25
1LH4
1LA6
1LN5
3LF4
70 25V. C14
90 V.
110-120 VOLTS AC-60 CYCLE OR D.C.
General

APPROXIMATE GAIN PER STAGE USING CHANALYST AND WITH -3V. FIXED BIAS WITH POSITIVE SIDE OF BATTERY CONNECTED TO PIN 8 OF THE 1LH4.

**NOTE**

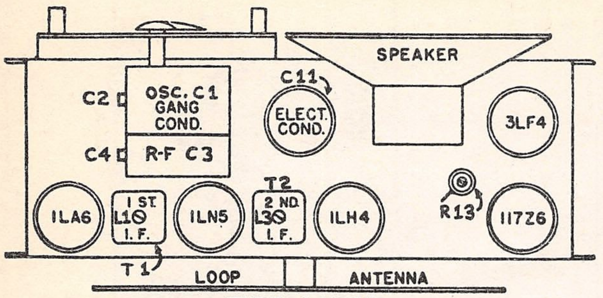
ALL RESISTORS 1/3 WATT-20%, ALL CONDENSERS RATED AT 400 VOLTS, OTHERWISE AS SPECIFIED.

K-1000 OHMS

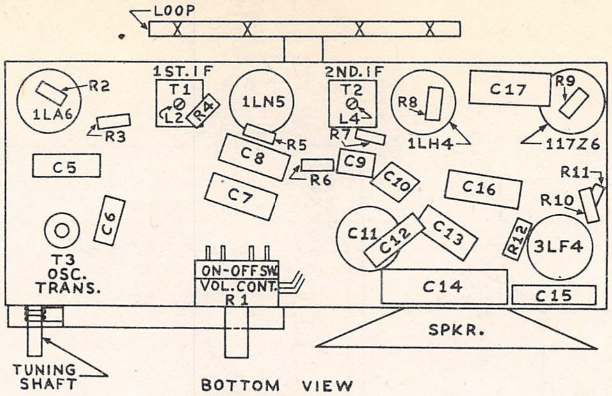
For Alignment, see P.16-4
For Dial Data, see P.16-2

MODEL 25B5

# GENERAL TELEV. & RADIO CORP.


SPEAKER
C2
OSC. C1 GANG COND.
C4
R-F C3
C11
ELECT. COND.
3LF4
1LA6
1 ST. L1 I. F.
1LN5
T2
2 ND. L3 I. F.
1LH4
R13
117Z6
T1
LOOP
ANTENNA

TUBE LAYOUT


LOOP
1LA6
R2
R3
1ST. I F
T1
L2
R4
1LN5
R5
2ND. I F
T2
L4
R7
R8
1LH4
C17
R9
117Z6
C5
C8
C9
R6
C10
C7
C16
R11
R10
C6
T3 OSC. TRANS.
ON-OFF SW. VOL. CONT. R1
C11
C12
C13
R12
3LF4
C14
C15
SPKR.
TUNING SHAFT

BOTTOM VIEW

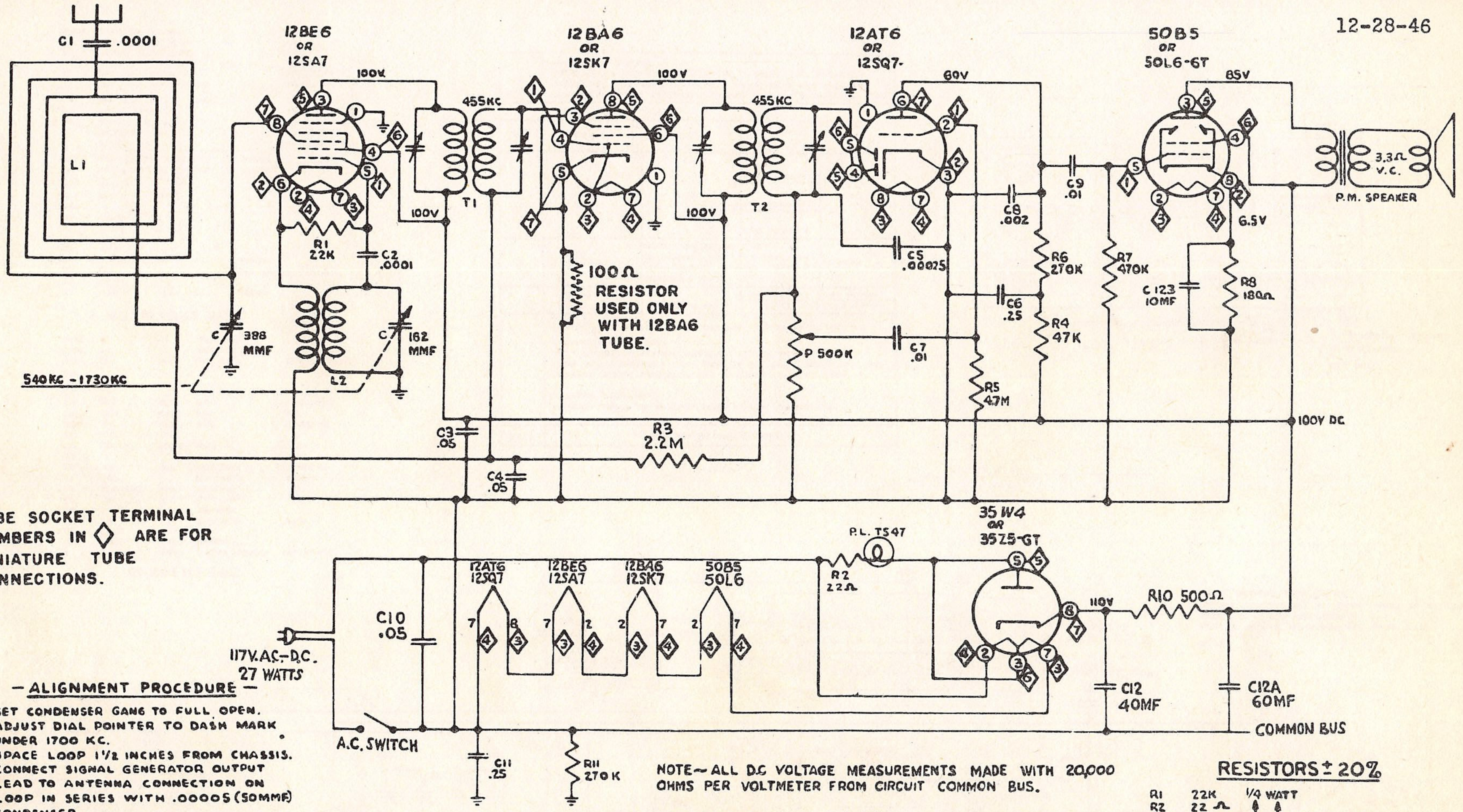
| SOCKET | PIN | VTVM | 20,000Ω/P2 | 1,000Ω/P2 | RESISTANCE |
|---|---|---|---|---|---|
| 1LA6 | 1 | +3.5 | +3.4 | +3.4 | 50 Ω |
| CONV. | 2 | +110 | +110 | +110 | OVER 5 MEGS |
| | 3 | +110 | +110 | +110 | OVER 5 MEGS |
| | 4 | -3 | -0.6 | 0 | 280K |
| | 5 | +58 | +57 | +48 | OVER 5 MEGS |
| | 6 | +1.3 | 0 | 0 | 2.7 MEGS |
| | 7 | -- | -- | -- | -- |
| | 8 | +1.7 | +1.7 | +1.7 | 30 Ω |
| 1LN5 | 1 | +4.8 | +4.7 | +4.7 | 60 Ω |
| I-F AMPL | 2 | +110 | +110 | +110 | OVER 5 MEGS |
| | 3 | +110 | +110 | +110 | OVER 5 MEGS |
| | 4 | +3.3 | +3.2 | +3.2 | 50 Ω |
| | 5 | +3.3 | +3.2 | +3.2 | 50 Ω |
| | 6 | +2.5 | 0 | 0 | 6 MEGS |
| | 7 | +1.3 | 0 | 0 | 2.6 MEGS |
| | 8 | +3.4 | +3.2 | +3.2 | 50 Ω |
| 1LH4 | 1 | 0 | 0 | 0 | 0 |
| DET | 2 | +62 | +55 | +40 | OVER 5 MEGS |
| AVC | 3 | +7.4 | +7.1 | +7.1 | 70 Ω |
| AUDIO | 4 | +0.6 | +0.2 | 0 | 1.5 MEGS |
| | 5 | 0 | 0 | 0 | 0 |
| | 6 | -0.4 | 0 | 0 | 8 MEGS |
| | 7 | -- | -- | -- | -- |
| | 8 | +1.7 | +1.6 | +1.6 | 30 Ω |
| 3LF4 | 1 | +7.3 | 7.2 | 7.2 | 70 Ω |
| AUDIO | 2 | +107 | +107 | +107 | OVER 5 MEGS |
| OUTPUT | 3 | +110 | +110 | +110 | OVER 5 MEGS |
| | 4 | -- | -- | -- | -- |
| | 5 | +118 | +118 | +118 | OVER 5 MEGS |
| | 6 | 0 | 0 | 0 | 1 MEG. |
| | 7 | +6.2 | +6 | +6 | 55 Ω |
| | 8 | +5 | +4.8 | +4.8 | 50 Ω |
| 117Z6GT | 1 | -- | -- | -- | -- |
| RECT. | 2 | 0 | 0 | 0 | 0 |
| | 3 | AC | AC | AC | 250 Ω |
| | 4 | +125 | +125 | +125 | 2.5K |
| | 5 | AC | AC | AC | 250 Ω |
| | 6 | -- | -- | -- | -- |
| | 7 | AC | AC | AC | 240 Ω |
| | 8 | +142 | +140 | +140 | OVER 5 MEGS |

VOLTAGE AND RESISTANCE MEASUREMENTS MADE WITH RESPECT TO CHASSIS GROUND AND WITH A LINE VOLTAGE OF 116 V. A. C.

# GILFILLAN BROS. INC.

MODELS 56A, 56B, 56C,
56D, 56E

12-28-46


C1 .0001
L1
12BE6 OR 12SA7
100V
R1 22K
C2 .0001
C 388 MMF
C 162 MMF
L2
540KC - 1730KC
455KC
T1
100V
12BA6 OR 12SK7
100Ω RESISTOR USED ONLY WITH 12BA6 TUBE.
455KC
T2
100V
12AT6 OR 12SQ7-
60V
C5 .00025
C8 .002
C6 .25
C7 .01
P 500K
R5 4.7M
R6 270K
R4 47K
C9 .01
R7 470K
50B5 OR 50L6-6T
85V
C 123 10MF
R8 180Ω
6.5V
3.3Ω V.C.
P.M. SPEAKER
100V DC
C3 .05
C4 .05
R3 2.2M
35W4 OR 35Z5-GT
P.L. TS47
R2 22Ω
110V
R10 500Ω
C12 40MF
C12A 60MF
COMMON BUS
C10 .05
117V.AC.-D.C. 27 WATTS
A.C. SWITCH
12AT6 12SQ7
12BE6 12SA7
12BA6 12SK7
50B5 50L6
C11 .25
R11 270K

TUBE SOCKET TERMINAL NUMBERS IN ◇ ARE FOR MINIATURE TUBE CONNECTIONS.

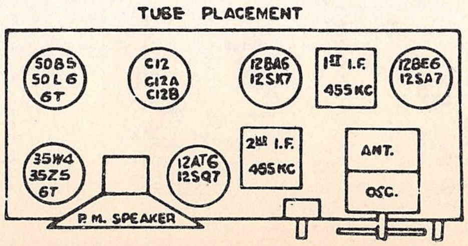
NOTE— ALL D.C. VOLTAGE MEASUREMENTS MADE WITH 20,000 OHMS PER VOLTMETER FROM CIRCUIT COMMON BUS.

NOTE: ON SOME PRODUCTION
R6 & R11 IS 220K
R2 IS 18Ω
R8 IS 220Ω

## — ALIGNMENT PROCEDURE —

1. SET CONDENSER GANG TO FULL OPEN.
2. ADJUST DIAL POINTER TO DASH MARK UNDER 1700 KC.
3. SPACE LOOP 1½ INCHES FROM CHASSIS.
4. CONNECT SIGNAL GENERATOR OUTPUT LEAD TO ANTENNA CONNECTION ON LOOP IN SERIES WITH .00005 (50MMF) CONDENSER.
5. SET SIGNAL GENERATOR TO 455 KC. THEN ADJUST I.F. TRIMMERS FOR PEAK RESPONSE INDICATED BY OUTPUT METER CONNECTED TO SPEAKER VOICE COIL TERMINALS. FINAL ADJUSTMENT MADE WITH VOLUME CONTROL FULL ON & SIGNAL GENERATOR OUTPUT ADJUSTED TO GIVE OUTPUT METER READING OF ½ VOLT A.C. MAXIMUM.
6. SET SIGNAL GENERATOR TO 1500 KC. TURN TUNING KNOB TO SET POINTER ON 1500 KC., THEN ADJUST OSCILLATOR TRIMMER FOR MAXIMUM RESPONSE ON OUTPUT METER. NOW ADJUST R.F. TRIMMER FOR MAXIMUM INDICATION ON OUTPUT METER.
7. INSTALL CHASSIS IN CABINET. MAKE CERTAIN LOOP RESTS AGAINST BACK OF CABINET.

## TUBE PLACEMENT


50B5 50L6 6T
C12 C12A C12B
12BA6 12SK7
1ST I.F. 455KC
12BE6 12SA7
35W4 35Z5 6T
P.M. SPEAKER
12AT6 12SQ7
2ND I.F. 455KC
ANT.
OSC.

## CONDENSERS

| C | CONDENSER GANG | | B00-1685 | |
|---|---|---|---|---|
| C1 | .0001 | MFD. | 500 WV | MICA |
| C2 | .0001 | | 500 | MICA |
| C3 | .05 | | 200 | TUBULAR |
| C4 | .05 | | 200 | • • |
| C5 | .00025 | | 500 | MICA |
| C6 | .25 | | 200 | TUBULAR |
| C7 | .01 | | 200 | |
| C8 | .002 | | 200 | |
| C9 | .01 | | 200 | |
| C10 | .05 | | 200 | |
| C11 | .25 | | 200 | TUBULAR |
| C12 | 40. | | 150 | ELECTROLYTIC |
| C12A | 60. | | 150 | • • |
| C12B | 10. | | 25 | ELECTROLYTIC |
| C13 | .02 | MFD | 200 WV | TUBULAR |

## RESISTORS ± 20%

| | | | |
|---|---|---|---|
| R1 | 22K | ¼ WATT | |
| R2 | 22 Ω | | |
| R3 | 2.2 MEG. | | |
| R4 | 47 K | | |
| R5 | 4.7 MEG. | | |
| R6 | 270 K | | |
| R7 | 470 K | ¼ | |
| R8 | 180Ω | ½ | — ± 10% |
| R9 | ——— | – | |
| R10 | 500 | 3 | WIRE WOUND |
| R11 | 270 K | ¼ WATT | |

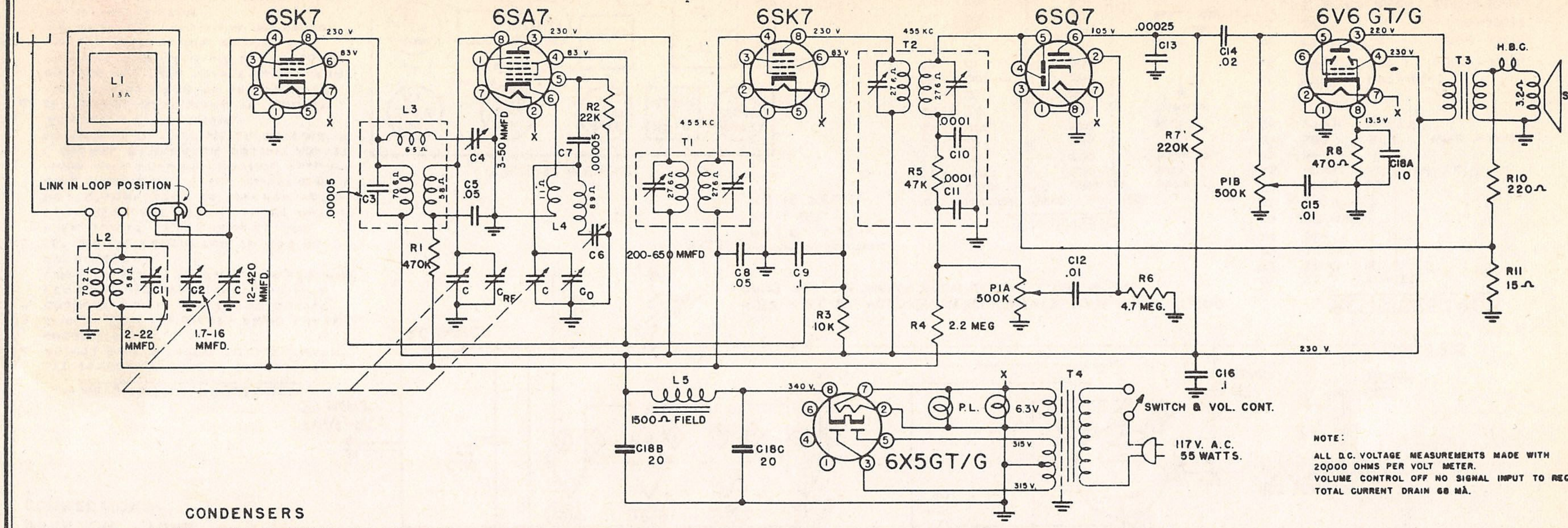
| | | | |
|---|---|---|---|
| L1 | LOOP | C00-16847 | |
| L2 | OSC. | COIL | B 16-23136 |
| T1 | 1ST | I.F. | B00-23126 |
| T2 | 2ND | I.F. | B00-23127 |

P. M. SPEAKER C14-23036

| | | |
|---|---|---|
| P | 500 K Ω | VOL. CONTROL A11-16854 |
| P.L. | TS 47 | |

**MODELS 66AM,66DM**

# GILFILLAN BROS. INC.


6SK7
6SA7
6SK7
6SQ7
6V6 GT/G
6X5GT/G
L1 1.3Ω
LINK IN LOOP POSITION
L2
70.2Ω
5.8Ω
C1
2-22 MMFD.
C2
1.7-16 MMFD.
C
12-420 MMFD.
230 V
83V
X
L3
6.5Ω
70.6Ω
5.8Ω
C3
.00005
C4
3-50 MMFD
C5 .05
R1 470K
C
C RF
R2 22K
C7
.00005
1.1Ω
8.9Ω
L4
C6
C
C O
455 KC
T1
27.6Ω
200-650 MMFD
C8 .05
C9 .1
R3 10K
T2
.0001
C10
R5 47K
.0001
C11
R4 2.2 MEG
105 V
.00025
C13
C14 .02
R7' 220K
C12 .01
P1A 500K
R6 4.7 MEG.
P1B 500K
C15 .01
220 V
13.5 V
R8 470Ω
C18A 10
T3
H.B.C.
3.2Ω
SPKR.
R10 220Ω
R11 15Ω
230 V.
C16 .1
L5
1500Ω FIELD
C18B 20
C18C 20
340 V.
P.L.
6.3V
315 V
315 V.
T4
SWITCH & VOL. CONT.
117V. A.C. 55 WATTS.

NOTE:

ALL D.C. VOLTAGE MEASUREMENTS MADE WITH 20,000 OHMS PER VOLT METER.
VOLUME CONTROL OFF NO SIGNAL INPUT TO RECEIVER.
TOTAL CURRENT DRAIN 68 MA.

## CONDENSERS

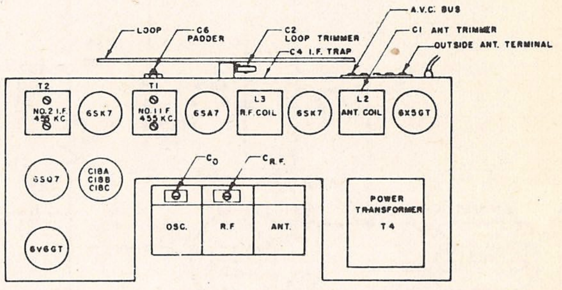
| | | | | |
|---|---|---|---|---|
| C | 12-420 | MMFD | 3 GANG TUNNING | 66AM-420 |
| C1 | 2-22 | MMFD | TRIMMER | |
| C2 | 1.7-16 | " | " | |
| C3 | 50 | " | 500 VOLT | MICA |
| C4 | 3-50 | " | TRIMMER | |
| C5 | .05 | MFD | 400 VOLT | TUBULAR |
| C6 | 200-650 | MMFD | PADDER | |
| C7 | 50 | " | 500 VOLT | MICA |
| C8 | .05 | MFD | 400 VOLT | TUBULAR |
| C9 | .1 | " | " " | " |
| C10 | 100 | MMFD | 500 " | MICA |
| C11 | 100 | " | " " | " |
| C12 | .01 | MFD | 600 " | TUBULAR |
| C13 | 250 | MMFD | 500 " | MICA |
| C14 | .02 | MFD | 600 " | TUBULAR |
| C15 | .01 | " | " " | " |
| C16 | .1 | " | " " | " |
| C17 | | | | |
| C18A | 10 | MFD | 25 VOLT | ELECTROLYTIC |
| C18B | 20 | " | 450 " | " |
| C18C | 20 | " | 450 " | " |

## RESISTORS ±10%

| | | | | | |
|---|---|---|---|---|---|
| R1 | 470K | 1/2 | WATT | CARBON | |
| R2 | 22K | " | " | " | |
| R3 | 10K | 5 | " | WIRE WOUND | ±10% |
| R4 | 2.2 MEG | 1/2 | " | CARBON | |
| R5 | 47K | " | " | " | |
| R6 | 4.7 MEG | " | " | " | |
| R7 | 220K | " | " | " | |
| R8 | 470Ω | 1 | " | " | |
| R9 | | | | | |
| R10 | 220Ω | 1/2 | " | " | |
| R11 | 15Ω | " | " | " | |

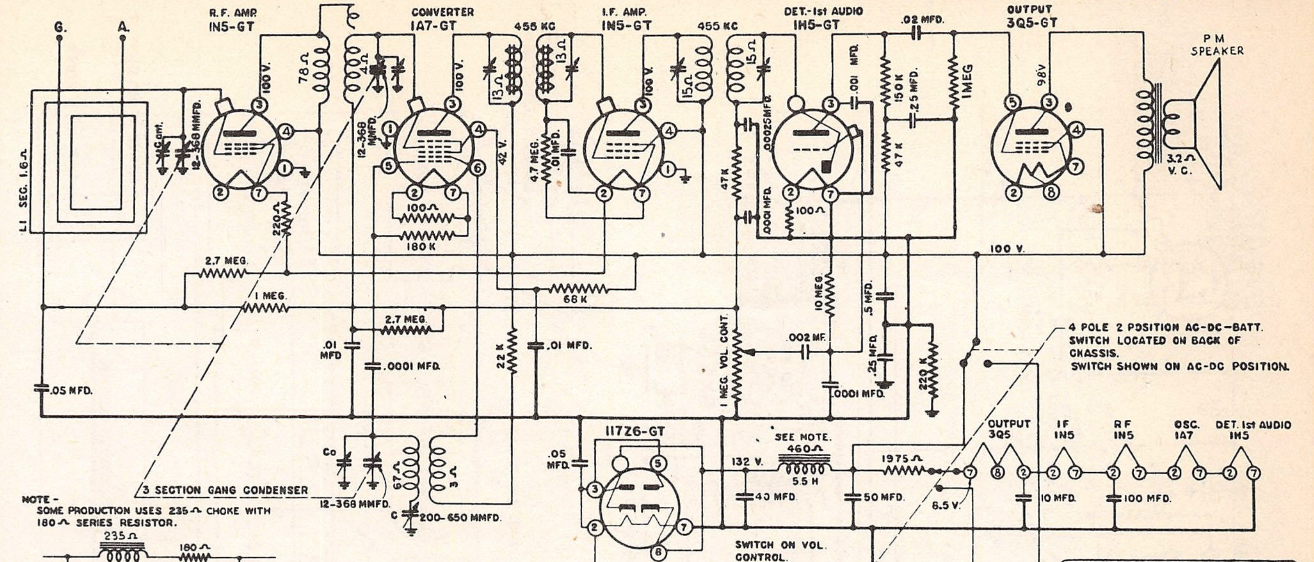
| | | |
|---|---|---|
| P1A | 500K VOLUME CONTROL "A" TAPER | A10-23112 |
| P1B | 500K TONE CONTROL "C" TAPER | |
| L1 | LOOP | 66AM-221-LOOP |
| L2 | ANTENNA COIL | 66AM-221-ANT |
| L3 | R.F. COIL & TRAP | 66AM-221-RF |
| L4 | OSCILLATOR COIL | 66AM-124-OSC |
| L5 | SPEAKER FIELD PART OF | C14-23101 |
| T1 | 1st I.F. TRANSFORMER | B16-23222 |
| T2 | 2nd I.F. TRANSFORMER | B16-23223 |
| T3 | OUTPUT TRANSFORMER PART OF | C14-23101 |
| T4 | POWER TRANSFORMER | 54588 |
| P.L. | PILOT LIGHTS 6-8V. [illegible] MA. | T5-47 |
| SPKR. | ELECTRO-DYNAMIC | C14-23101 |

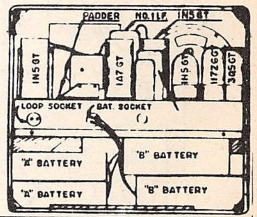
| STEPS | ALIGNMENT PROCEDURE | | | |
|---|---|---|---|---|
| | CONNECT JUMPER ON ANTENNA BINDING POST FOR OUTSIDE ANTENNA RECEPTION.<br>CONNECT SIGNAL GENERATOR TO ANTENNA TERMINAL THRU A .0001 MFD. CONDENSER. USE MINIMUM GENERATOR SIGNAL SO THAT A.V.C. VOLTMETER READING DOES NOT EXCEED MORE THAN APPROXIMATELY 1 VOLT.<br>CONNECT RCA VOLTOHMYST VACUUM TUBE VOLTMETER TO A.V.C. BUS. | | | |
| | TUNE TEST OSC. TO — | TURN RADIO DIAL TO — | ADJUST TRIMMERS FOR — | |
| | | | MAX READING | MIN READING |
| 2 | 455 KC | CONDENSER GANG FULLY MESHED. SET POINTER TO INDEX MARK ON DIAL. | NO. 1 & NO. 2 I.F. TRANSFORMERS. | I.F. TRAP C4 |
| 3 | 1600 KC. | 1600 KC. | OSC. TRIMMER $C_o$<br>R.F. TRIMMER $C_{rf}$<br>ANT TRIMMER C1 | |
| 4 | 600 KC | 600 KC | PADDER C6 ROCK GANG. | |
| 5 | REPEAT STEP 3 | | | |
| 6 | DISCONNECT SIGNAL GENERATOR, CHANGE ANTENNA JUMPER FOR LOOP OPERATION. TUNE RADIO TO SOME STATION NEAR 1600 KC. AND ADJUST LOOP TRIMMER C2 (LOCATED ON LOOP) FOR MAXIMUM VOLTMETER READING. | | | |


LOOP
C6 PADDER
C2 LOOP TRIMMER
C4 I.F. TRAP
A.V.C. BUS
C1 ANT TRIMMER
OUTSIDE ANT. TERMINAL
T2
NO.2 I.F. 455 KC.
6SK7
T1
NO.1 I.F. 455 KC.
6SA7
L3 R.F. COIL
6SK7
L2 ANT. COIL
6X5GT
6SQ7
C18A C18B C18C
C O
C R.F.
OSC.
R.F
ANT.
POWER TRANSFORMER T4
6V6GT

# GILFILLAN BROS. INC.

## MODEL 66B, Series 2, Overland
## MODEL 66B, Series 3, Overland


G.
A.
L1 SEG. 1.6 Ω
R.F. AMP. IN5-GT
CONVERTER 1A7-GT
455 KC
I.F. AMP. IN5-GT
455 KC
DET.-1st AUDIO 1H5-GT
.02 MFD.
OUTPUT 3Q5-GT
PM SPEAKER
3.2 Ω V.C.
100 V.
78 Ω
4 Ω
13 Ω
15 Ω
12-368 MMFD.
42 V.
100 Ω
180 K
4.7 MEG.
.01 MFD.
.00025 MFD.
.0001 MFD.
.001 MFD.
150 K
.25 MFD.
1 MEG
47 K
98 V
220 Ω
2.7 MEG.
1 MEG.
68 K
2.7 MEG.
.01 MFD
.0001 MFD.
22 K
.01 MFD.
10 MEG
.5 MFD.
1 MEG. VOL. CONT.
.002 MF.
.25 MFD.
.0001 MFD.
220 K
.05 MFD.
4 POLE 2 POSITION AC-DC-BATT. SWITCH LOCATED ON BACK OF CHASSIS. SWITCH SHOWN ON AC-DC POSITION.
117Z6-GT
.05 MFD.
SEE NOTE.
460 Ω
5.5 H
132 V.
1975 Ω
40 MFD.
50 MFD.
6.5 V.
OUTPUT 3Q5
IF IN5
RF IN5
OSC. 1A7
DET. 1st AUDIO 1H5
10 MFD.
100 MFD.
Co
12-368 MMFD.
6.7 Ω
3 Ω
C
200-650 MMFD.
3 SECTION GANG CONDENSER
NOTE - SOME PRODUCTION USES 235-Ω CHOKE WITH 180-Ω SERIES RESISTOR.
235 Ω
180 Ω
40 MFD.
50 MFD.
SWITCH ON VOL. CONTROL
117 V AC-DC 27 WATTS
"A" 9 V.
"B" 90 V.

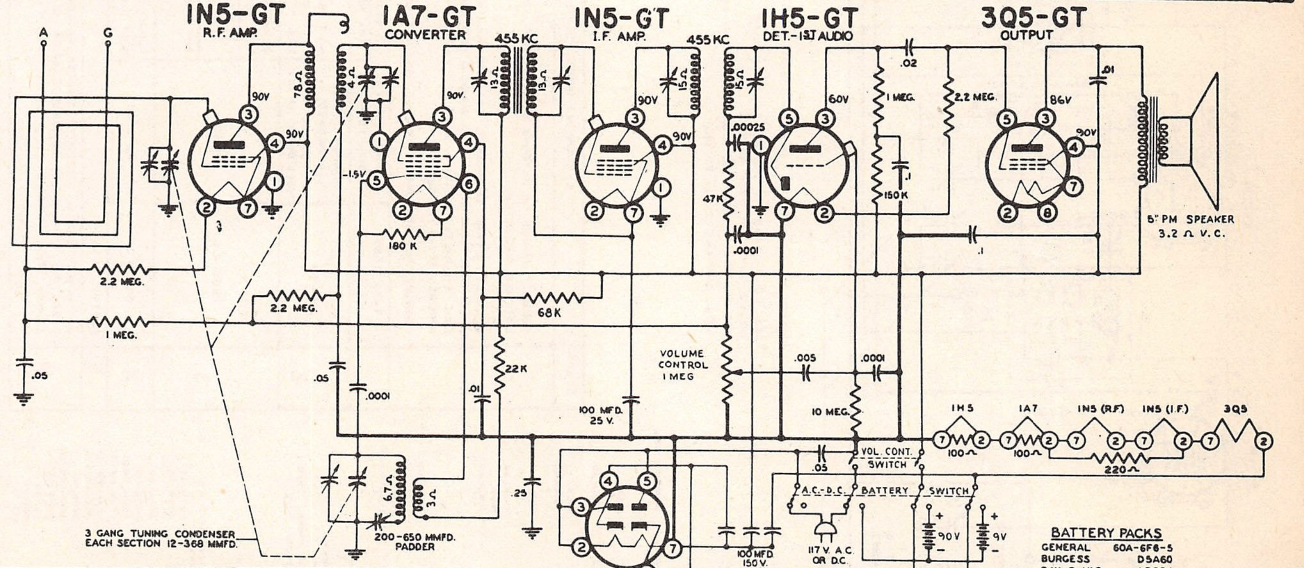

PADDER
NO.1 I.F.
IN5GT
IN5GT
1A7GT
1H5GT
117Z6GT
3Q5GT
LOOP SOCKET
BAT. SOCKET
"A" BATTERY
"A" BATTERY
"B" BATTERY
"B" BATTERY

| ALIGNMENT PROCEDURE | | | |
|---|---|---|---|
| PRELIMINARY INFORMATION | CONNECT SIGNAL GENERATOR TO ANTENNA AND GROUND TERMINALS. USE ONLY SUFFICIENT SIGNAL STRENGTH TO CAUSE -.5 VOLT ON A.V.C. BUS (LARGE TERMINAL OF LOOP PLUG) AS READ ON RCA VOLTOHMYST VACUUM TUBE VOLTMETER OR EQUIVALENT. | | |
| STEPS | TUNE TEST OSC. TO— | TUNE RADIO DIAL TO— | ADJUST TRIMMER FOR MAXIMUM READING. |
| 1 | 455 KC | CONDENSER GANG FULLY MESHED SET POINTER HORIZONTAL | I.F. TRANSFORMERS T1 AND T2. |
| 2 | 1600 KC | 1600 KC | OSC TRIMMER Co<br>R.F. TRIMMER Crf<br>ANT. TRIMMER Cant |
| 3 | 600 KC | 600 KC | PADDER C<br>WHILE ROCKING GANG |
| 4 | REPEAT STEP 2 | | |
| 5 | MOVE POINTER SLIGHTLY IF CALIBRATION CAN BE IMPROVED. | | |

THE OVERLAND - MODEL 66B
SERIES 2

THIS RADIO IS SUPPLIED WITH COMBINATION A-B BATTERY PACK. FOR YOUR CONVENIENCE AN EXTRA BATTERY CABLE MAY BE OBTAINED FROM YOUR DEALER SO THAT YOU MAY MAKE BATTERY REPLACEMENTS BY MEANS OF SEPARATE "A" AND "B" BATTERIES. YOUR GILFILLAN PORTABLE RADIO HAS BEEN ESPECIALLY DESIGNED TO GIVE 200-250 HOURS OF BATTERY LIFE WHEN USED ON BATTRIES AN AVERAGE OF 4 HOURS PER DAY. WHEN OPERATED ON A.C. OR D.C. HOUSE CURRENT YOUR BATTERIES ARE NOT USED.

| MFG'R | A-B PACKS | "A" BATTERIES | "B" BATTERIES |
|---|---|---|---|
| | NO. | NO. | NO. |
| GENERAL | 60A-6F6-5 | 3H3 | V30A OR F30A |
| BURGESS | D5A60 | 63 | M30 |
| EVEREADY | | 746 | 482 |
| RAY-O-VAC | AB994 | P83A | P430 |
| PHILCO | P841A | P100 | P210 |


A
G
IN5-GT
R.F. AMP.
1A7-GT
CONVERTER
455KC
IN5-GT
I.F. AMP.
455KC
1H5-GT
DET.-1ST AUDIO
3Q5-GT
OUTPUT
90V
78 Ω
4 Ω
90V
90V.
-1.5V
13 Ω
15 Ω
90V
90V
60V
.00025
.02
1 MEG.
2.2 MEG.
86V
.01
47K
.1
150 K
.0001
.1
5" PM SPEAKER 3.2 Ω V.C.
180 K
2.2 MEG.
2.2 MEG.
68K
1 MEG.
.05
.05
.0001
.01
22K
VOLUME CONTROL 1 MEG
.005
.0001
10 MEG.
100 MFD. 25 V.
1H5
1A7
IN5 (R.F.)
IN5 (I.F.)
3Q5
100 Ω
100 Ω
220 Ω
.05
VOL. CONT. SWITCH
A.C.-D.C. BATTERY SWITCH
.25
6.7 Ω
3 Ω
200-650 MMFD. PADDER
3 GANG TUNING CONDENSER EACH SECTION 12-368 MMFD.
117Z6-GT
100 MFD 150 V.
117 V. A.C. OR D.C.
90V
9V

BATTERY PACKS

| | |
|---|---|
| GENERAL | 60A-6F6-5 |
| BURGESS | D5A60 |
| RAY-O-VAC | AB994 |
| PHILCO | P841A |

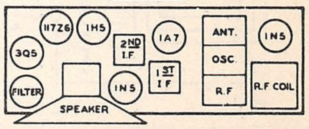
50 MFD 150 V
100 MFD 12 V.
650 Ω
1550 Ω
117Z6-GT

| ALIGNMENT INSTRUCTIONS | | | |
|---|---|---|---|
| 1. REMOVE CHASSIS, BATTERY AND LOOP FROM CABINET AND PLACE IN SAME RELATIVE POSITION AS IF SET WERE IN CABINET. LOOP MUST BE CLOSE TO BACK OF CHASSIS TO OBTAIN PROPER ALIGNMENT.<br>2. CONNECT SIGNAL GENERATOR LEADS TO ANT.-GND. POSTS ON LOOP; CONNECT AUDIO OUTPUT METER ACROSS VOICE COIL TERMINALS. DO NOT EXCEED .5 VOLT READING ON METER. ADJUST POINTER TO HORIZONTAL POSITION WITH GANG CLOSED. | | | |
| STEP | TUNE TEST OSCILLATOR TO | TUNE RADIO DIAL TO | ADJUST TRIMMERS FOR MAXIMUM OUTPUT READING |
| 1 | 455 KC | 1600 KC | I. F. TRANSFORMERS |
| 2 | 1400 KC | 1400 KC | OSC., R.F., ANT. |
| 3 | 600 KC | 600 KC | PADDER CONDENSER |
| IN SOME CASES IT IS IMPOSSIBLE TO OBTAIN SUFFICIENT ATTENUATION OF THE GENERATOR SIGNAL FOR ACCURATE ALIGNMENT. IN SUCH CASES THE GENERATOR SHOULD BE CONNECTED TO AN AUXILIARY LOOP PLACED A FOOT OR SO FROM THE RECEIVER LOOP. | | | |

THE OVERLAND - MODEL 66B
THIRD SERIES

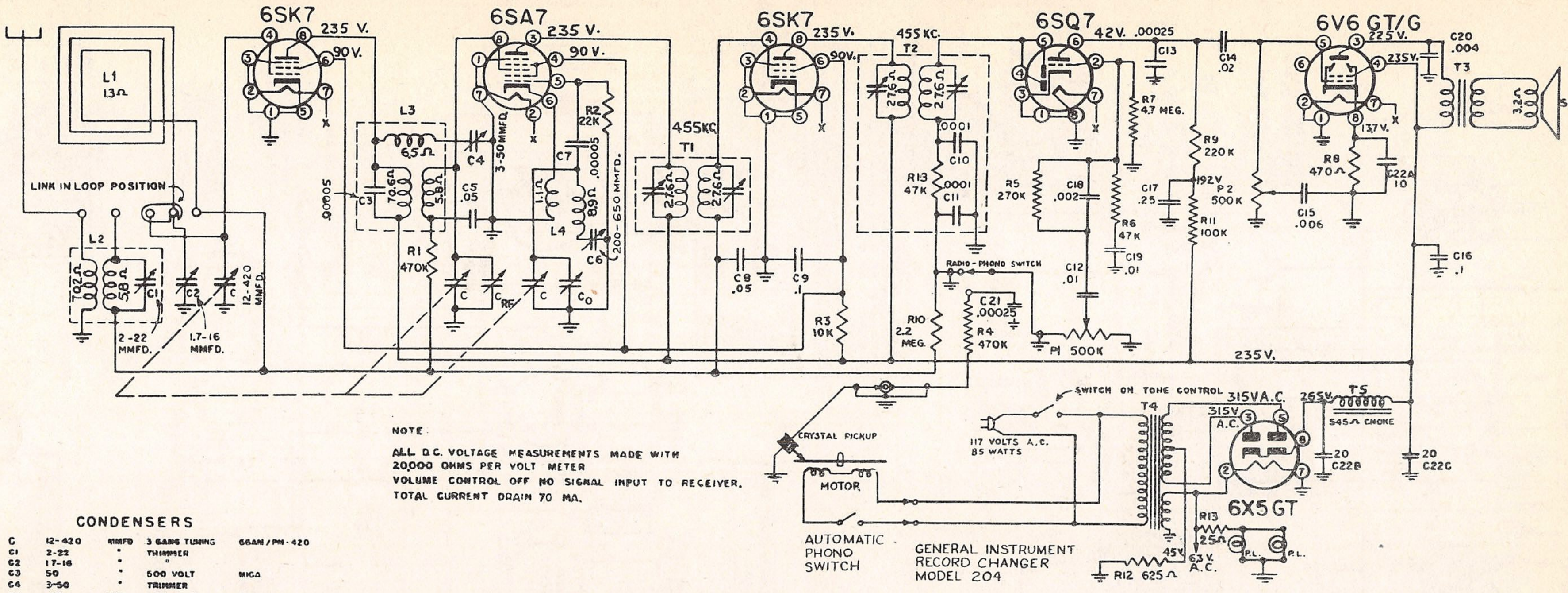
APPROVED 2-20-41 R.A. HARRIS

TUBE LAYOUT


117Z6
1H5
3Q5
2ND I.F.
1A7
ANT.
IN5
OSC
FILTER
IN5
1ST I.F.
R.F.
R.F. COIL
SPEAKER

MODEL 66PM

# GILFILLAN BROS. INC.


6SK7
235 V.
90V.
6SA7
235 V.
90 V.
6SK7
235 V.
90V.
455 KC.
T2
6SQ7
42V.
.00025
C13
C14
.02
6V6 GT/G
225 V.
235V.
137 V.
C20
.004
T3
3.2Ω
SPKR.
L1
13Ω
LINK IN LOOP POSITION
L2
70.2Ω
5.8Ω
C1
C2
12-420 MMFD.
2-22 MMFD.
1.7-16 MMFD.
L3
6.5Ω
70.6Ω
5.8Ω
C3
.00005
C4
3-50 MMFD.
C5
.05
R1
470K
C
C RF
C
Co
1.1Ω
L4
8.9Ω
C7
.00005
R2
22K
C6
200-650 MMFD.
455KC
T1
2.76Ω
2.76Ω
C8
.05
C9
.1
R3
10K
2.76Ω
2.76Ω
.0001
C10
R13
47K
.0001
C11
R5
270K
C18
.002
R6
47K
C19
.01
C12
.01
R7
4.7 MEG.
C17
.25
R9
220 K
192 V
P2
500 K
R11
100K
R8
470Ω
C22A
10
C15
.006
C16
.1
RADIO - PHONO SWITCH
R10
2.2 MEG.
C21
.00025
R4
470K
P1 500K
235 V.
SWITCH ON TONE CONTROL
315V A.C.
265V.
T5
545Ω CHOKE
T4
315V A.C.
20
C22B
20
C22C
117 VOLTS A.C.
85 WATTS
CRYSTAL PICKUP
MOTOR
6X5 GT
R13
25Ω
P.L.
P.L.
45V.
6.3 V.
A.C.
R12 625Ω
AUTOMATIC PHONO SWITCH
GENERAL INSTRUMENT RECORD CHANGER MODEL 204

NOTE

ALL D.C. VOLTAGE MEASUREMENTS MADE WITH 20,000 OHMS PER VOLT METER
VOLUME CONTROL OFF NO SIGNAL INPUT TO RECEIVER.
TOTAL CURRENT DRAIN 70 MA.

## CONDENSERS

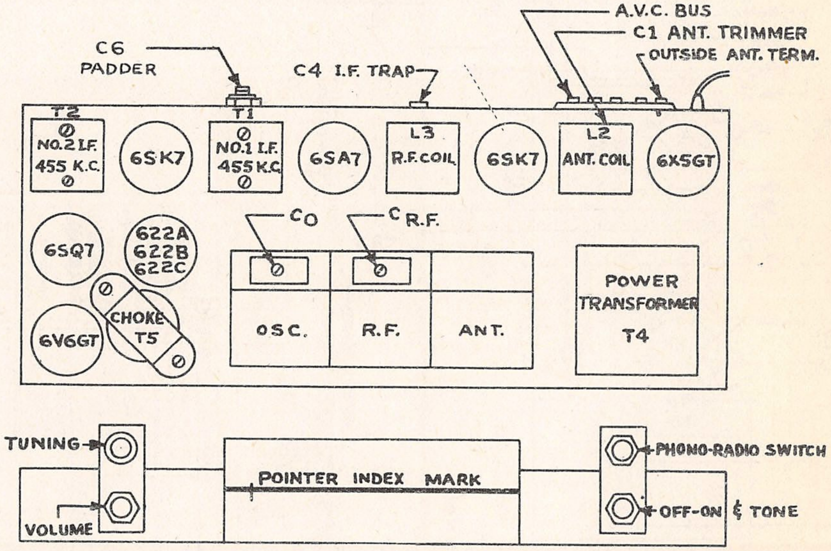
| | | | | | |
|---|---|---|---|---|---|
| C | 12-420 | MMFD | 3 GANG TUNING | | 66AM/PM-420 |
| C1 | 2-22 | " | TRIMMER | | |
| C2 | 17-16 | " | " | | |
| C3 | 50 | " | 500 | VOLT | MICA |
| C4 | 3-50 | " | TRIMMER | | |
| C5 | 05 | MFD | 400 | VOLT | TUBULAR |
| C6 | 200-650 | MMFD | PADDER | | |
| C7 | 50 | " | 500 | VOLT | MICA |
| C8 | 05 | MFD | 400 | VOLT | TUBULAR |
| C9 | 1 | " | " | " | " |
| C10 | 100 | MMFD | 500 | " | MICA |
| C11 | 100 | " | " | | " |
| C12 | .01 | MFD | 600 | " | TUBULAR |
| C13 | 250 | MMFD | 500 | " | MICA |
| C14 | 02 | MFD | 600 | " | TUBULAR |
| C15 | .006 | " | 600 | " | " |
| C16 | .1 | " | 600 | " | " |
| C17 | 25 | " | 400 | " | " |
| C18 | .002 | " | 600 | " | |
| C19 | 01 | " | 400 | " | TUBULAR |
| C20 | .004 | " | 600 | " | " |
| C21 | 250 | MMFD | 500 | " | MICA |
| C22A | 10 | MFD | 25 | " | ELECTROLYTIC |
| C22B | 20 | " | 450 | " | " |
| C22C | 20 | " | " | " | " |

## RESISTORS ± 20%

| | | | | | |
|---|---|---|---|---|---|
| R1, R4 | 470 K | 1/2 | WATT | CARBON | |
| R2 | 22K | " | " | " | |
| R3 | 10K | 5 | " | WIRE WOUND | ±10% |
| R5 | 270 K | 1/2 | " | CARBON | ±10% |
| R6, R13 | 47K | " | " | " | |
| R7 | 4.7MEG | " | " | " | |
| R8 | 470Ω | 1 | " | " | |
| R9 | 220 K | 1/2 | " | " | |
| R10 | 2.2MEG | " | " | " | |
| R11 | 100 K | " | " | " | |
| R12 | 625 Ω | 10 | " | WIREWOUND | ±10% |
| R13 | 25Ω | 1/2 | " | CARBON | |

| | | |
|---|---|---|
| P1 | 500K VOLUME CONTROL | 66PM-14 |
| P2 | 500K TONE CONTROL | 66PM-13 |
| L1 | LOOP | 66PM-29 |
| L2 | ANTENNA COIL | 66PM-214 |
| L3 | R F COIL & TRAP | 66PM-200 |
| L4 | OSCILLATOR COIL | 66AM/PM-37 |
| T1 | 1st I F TRANSFORMER | 66AM/PM-34 |
| T2 | 2nd I F TRANSFORMER | 66AM/PM-35 |
| T3 | OUTPUT TRANSFORMER | 66PM-15 |
| T4 | POWER TRANSFORMER | 66AM/PM-138 |
| T5 | FILTER CHOKE | 66PM-16 |
| P L | PILOT LIGHTS 6-8V 150 MA | TS-44 |
| SPKR | P M SPEAKER | 66PM-8 |

| STEPS | ALIGNMENT PROCEDURE | | | |
|---|---|---|---|---|
| | CONNECT JUMPER ON ANTENNA BINDING POST FOR OUTSIDE ANTENNA RECEPTION.<br>CONNECT SIGNAL GENERATOR TO ANTENNA TERMINAL THRU A .0001 MFD. CONDENSER. USE MINIMUM GENERATOR SIGNAL SO THAT A.V.C. VOLTMETER READING DOES NOT EXCEED MORE THAN APPROXIMATELY 1 VOLT.<br>CONNECT RCA VOLTOHMYST VACUUM TUBE VOLTMETER TO A.V.C. BUS. | | | |
| | TUBE TEST OSC. TO — | TURN RADIO DIAL TO — | ADJUST TRIMMERS FOR — | |
| | | | MAX. READING | MIN READING |
| 2 | 455 K C | CONDENSER GANG FULLY MESHED SET POINTER TO INDEX MARK ON DIAL | NO 1 & NO 2 I F TRANSFORMERS. | I.F. TRAP C4 |
| 3 | 1500 K C. | 1500 K C. | OSC. TRIMMER $C_o$<br>R. F. TRIMMER $C_{R.F.}$<br>ANT TRIMMER C1 | |
| 4 | 600 K C. | 600 K C. | PADDER C6<br>ROCK GANG. | |
| 5 | REPEAT STEP 3 | | | |
| 6 | DISCONNECT SIGNAL GENERATOR, CHANGE ANTENNA JUMPER FOR LOOP OPERATION TUNE RADIO TO SOME STATION NEAR 1500 KC., AND ADJUST LOOP TRIMMER C2 (LOCATED ON LOOP) FOR MAXIMUM VOLTMETER READING. | | | |


C6
PADDER
C4 I.F. TRAP
A.V.C. BUS
C1 ANT. TRIMMER
OUTSIDE ANT. TERM.
T2
NO.2 I.F.
455 K.C.
6SK7
T1
NO.1 I.F.
455 K.C.
6SA7
L3
R.F. COIL
6SK7
L2
ANT. COIL
6X5GT
6SQ7
622A
622B
622C
CHOKE
T5
6V6GT
Co
C R.F.
OSC.
R.F.
ANT.
POWER TRANSFORMER
T4
TUNING
VOLUME
POINTER INDEX MARK
PHONO-RADIO SWITCH
OFF-ON & TONE

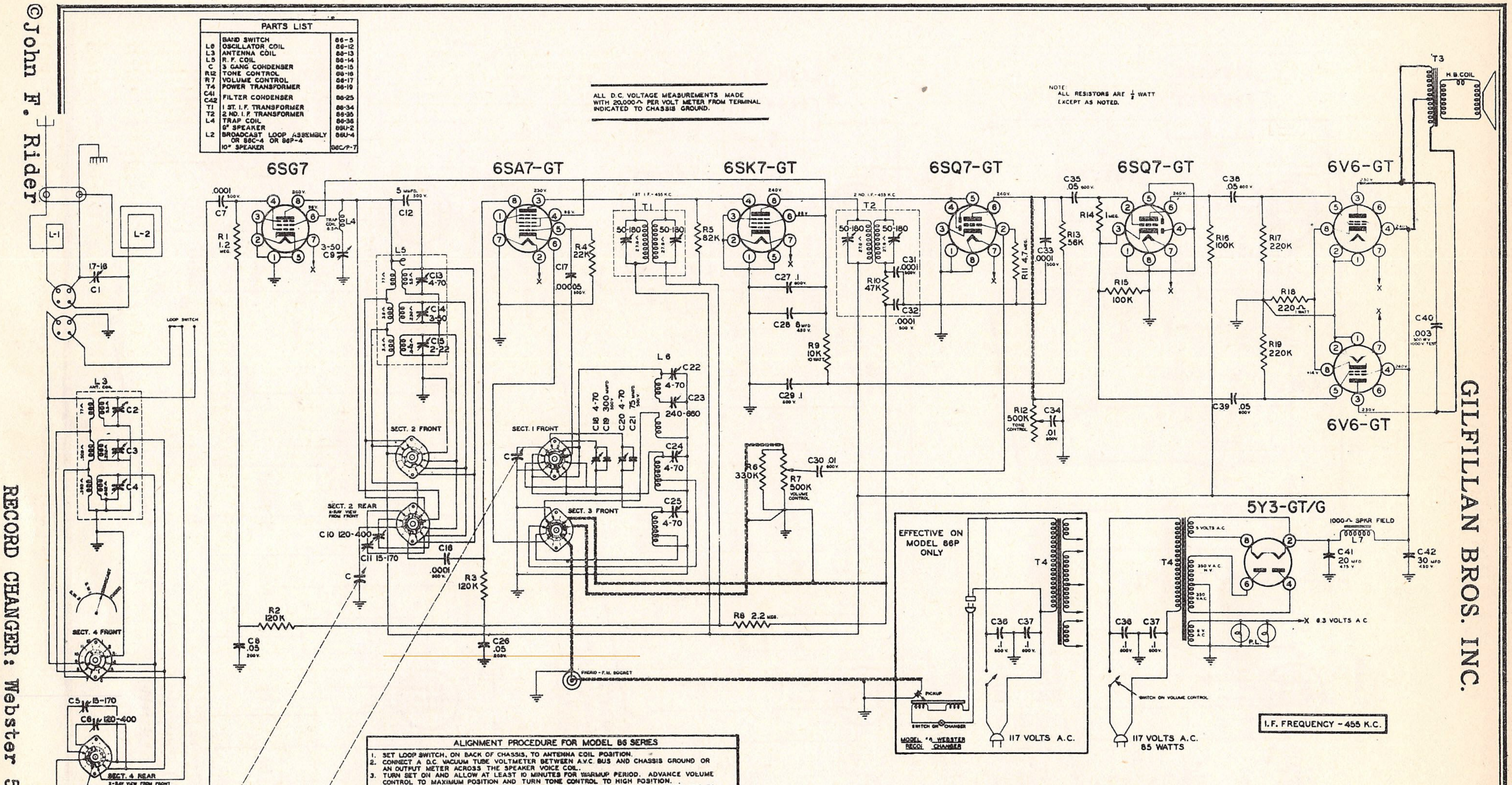
RECORD CHANGER: General Instrument 204, RCD. CH. P.15-1

# GILFILLAN BROS. INC.

| | PARTS LIST | |
|---|---|---|
| | BAND SWITCH | 86-5 |
| L6 | OSCILLATOR COIL | 86-12 |
| L3 | ANTENNA COIL | 86-13 |
| L5 | R. F. COIL | 86-14 |
| C | 3 GANG CONDENSER | 86-15 |
| R12 | TONE CONTROL | 86-16 |
| R7 | VOLUME CONTROL | 86-17 |
| T4 | POWER TRANSFORMER | 86-19 |
| C41<br>C42 | FILTER CONDENSER | 86-25 |
| T1 | 1 ST. I. F. TRANSFORMER | 86-34 |
| T2 | 2 ND. I. F. TRANSFORMER | 86-35 |
| L4 | TRAP COIL | 86-36 |
| | 9" SPEAKER | 86U-2 |
| L2 | BROADCAST LOOP ASSEMBLY OR 86C-4 OR 86P-4 | 86U-4 |
| | 10" SPEAKER | 86C/P-7 |

ALL D.C. VOLTAGE MEASUREMENTS MADE WITH 20,000-Ω PER VOLT METER FROM TERMINAL INDICATED TO CHASSIS GROUND.

NOTE: ALL RESISTORS ARE ½ WATT EXCEPT AS NOTED.


6SG7
6SA7-GT
6SK7-GT
6SQ7-GT
6SQ7-GT
6V6-GT
6V6-GT
5Y3-GT/G
T3
H.B. COIL
L-1
L-2
L3 ANT. COIL
C1 1.7-18
LOOP SWITCH
C7 .0001 500 V.
R1 1.2 MEG.
C9 3-50
L4 TRAP COIL
C12 5 MMFD.
L5
C13 4-70
C14 3-50
C15 2-22
C2
C3
C4
SECT. 2 FRONT
SECT. 2 REAR
SECT. 1 FRONT
SECT. 3 FRONT
SECT. 4 FRONT
SECT. 4 REAR
C10 120-400
C11 15-170
C5 15-170
C6 120-400
3 GANG - 452 MMFD. PER SECT.
C17 .00005
R4 22K
L6
C22 4-70
C23 240-660
C16 4-70
C19 300 MMFD
C20 4-70
C21 75 MMFD
C24 4-70
C25 4-70
T1 1 ST. I.F. - 455 K.C.
50-180
R5 82K
C27 .1
C28 8 MFD
R9 10K
C29 .1
T2 2 ND. I.F. - 455 K.C.
C31 .0001
C32 .0001
R10 47K
R11 4.7 MEG.
C33 .0001
R12 500K TONE CONTROL
C34 .01
R6 330K
R7 500K VOLUME CONTROL
C30 .01
C35 .05
R13 56K
R14 1 MEG.
R15 100K
R16 100K
R17 220K
R18 220-Ω
R19 220K
C38 .05
C39 .05
C40 .003
C18 .0001
R3 120K
R2 120K
C8 .05
C26 .05
R8 2.2 MEG.
PHONO - F.M. SOCKET
EFFECTIVE ON MODEL 86P ONLY
T4
C36 .1
C37 .1
117 VOLTS A.C.
MODEL 6 WEBSTER RECORD CHANGER
PICKUP
SWITCH ON CHANGER
1000-Ω SPKR FIELD
L7
C41 20 MFD
C42 30 MFD
6.3 VOLTS A.C.
P.L.
SWITCH ON VOLUME CONTROL
117 VOLTS A.C. 85 WATTS

I.F. FREQUENCY - 455 K.C.

## ALIGNMENT PROCEDURE FOR MODEL 86 SERIES

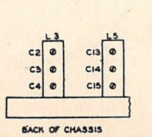
1. SET LOOP SWITCH, ON BACK OF CHASSIS, TO ANTENNA COIL POSITION.
2. CONNECT A D.C. VACUUM TUBE VOLTMETER BETWEEN A.V.C. BUS AND CHASSIS GROUND OR AN OUTPUT METER ACROSS THE SPEAKER VOICE COIL.
3. TURN SET ON AND ALLOW AT LEAST 10 MINUTES FOR WARMUP PERIOD. ADVANCE VOLUME CONTROL TO MAXIMUM POSITION AND TURN TONE CONTROL TO HIGH POSITION.
4. USE MINIMUM GENERATOR SIGNAL FOR ALL MEASUREMENTS. COUPLE SIGNAL GENERATOR TO RADIO AS INDICATED IN CHART BELOW, BETWEEN ANTENNA TERMINAL AND CHASSIS GROUND.
5. TURN BAND SWITCH TO BROADCAST POSITION.
6. USE STANDARD DUMMY ANTENNA, A 400-Ω RESISTOR (NON-INDUCTIVE), OR A .01 CONDENSER IN SERIES WITH SIGNAL GENERATOR, WHEN SPECIFIED IN CHART BELOW AS DUMMY ANTENNA.

| GENERATOR COUPLING | GENERATOR FREQUENCY | RADIO DIAL SETTING | ADJUST | REMARKS |
|---|---|---|---|---|
| DIRECT | 455 K.C. | HI-FREQ. END UNMESHED | 1 ST. AND 2 ND. I.F. TRIMMERS | TUNE FOR MAXIMUM VOLTAGE INDICATION. |
| DIRECT | 455 K.C. | HI-FREQ. END UNMESHED | C9 | TUNE FOR MINIMUM VOLTAGE INDICATION. |
| DUMMY ANT. | 1500 K.C. | 1500 K.C. | C22, C2, C13 | TUNE FOR MAXIMUM VOLTAGE INDICATION. |
| DUMMY ANT. | 600 K.C. | 600 K.C. | C23 | ROCK GANG FOR MAXIMUM VOLTAGE INDICATION. |
| REPEAT STEPS 3 AND 4. | | | | |
| TURN BAND SWITCH TO SHORTWAVE 1 POSITION. | | | | |
| DUMMY ANT. | 12 M.C. | 12 M.C. | C24, C3, C14 | TUNE FOR MAXIMUM VOLTAGE INDICATION. |
| DUMMY ANT. | 6 M.C. | 6 M.C. | C18, C6, C11 | TUNE FOR MAXIMUM VOLTAGE INDICATION. |
| REPEAT STEPS 1 AND 2. | | | | |
| TURN BAND SWITCH TO SHORTWAVE 2 POSITION. | | | | |
| DUMMY ANT. | 18 M.C. | 18 M.C. | C25, C4, C15 | TUNE FOR MAXIMUM VOLTAGE INDICATION. |
| DUMMY ANT. | 12 M.C. | 12 M.C. | C20, C5, C10 | TUNE FOR MAXIMUM VOLTAGE INDICATION. |
| REPEAT STEPS 1 AND 2. | | | | |

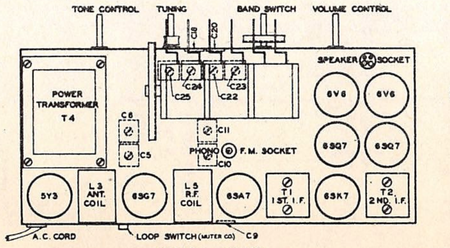
TURN BAND SWITCH TO BROADCAST POSITION AND SET LOOP SWITCH ON LOOP POSITION. DISCONNECT SIGNAL GENERATOR FROM ANTENNA TERMINAL. CONNECT 2 OR 3 TURNS OF WIRE TO SIGNAL GENERATOR LEAD TO FORM A LOOP. SET SIGNAL GENERATOR AT 1500 K.C. PLACE TEST LOOP AT LEAST 10" FROM BACK OF CABINET. TUNE RADIO TO 1500 K.C. ADJUST TRIMMER C1 FOR MAXIMUM OUTPUT.

DO NOT BEND PLATES TO TRIM ANY FREQUENCY DIFFERENCE IN R.F. STAGES.

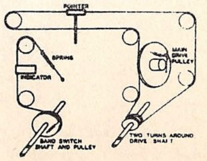
REPEAT TUNING PROCEDURE IF NECESSARY.


L3
L5
C2
C3
C4
C13
C14
C15

BACK OF CHASSIS


TONE CONTROL
TUNING
BAND SWITCH
VOLUME CONTROL
SPEAKER SOCKET
POWER TRANSFORMER T4
C8
C5
C11
C10
C24
C25
C23
C22
PHONO F.M. SOCKET
6V6
6V6
6SQ7
6SQ7
6SK7
T2 2ND. I.F.
T1 1ST. I.F.
6SA7
L5 R.F. COIL
6SG7
L3 ANT. COIL
5Y3
A.C. CORD
LOOP SWITCH (MUTER CO.) C9

CHASSIS LAYOUT

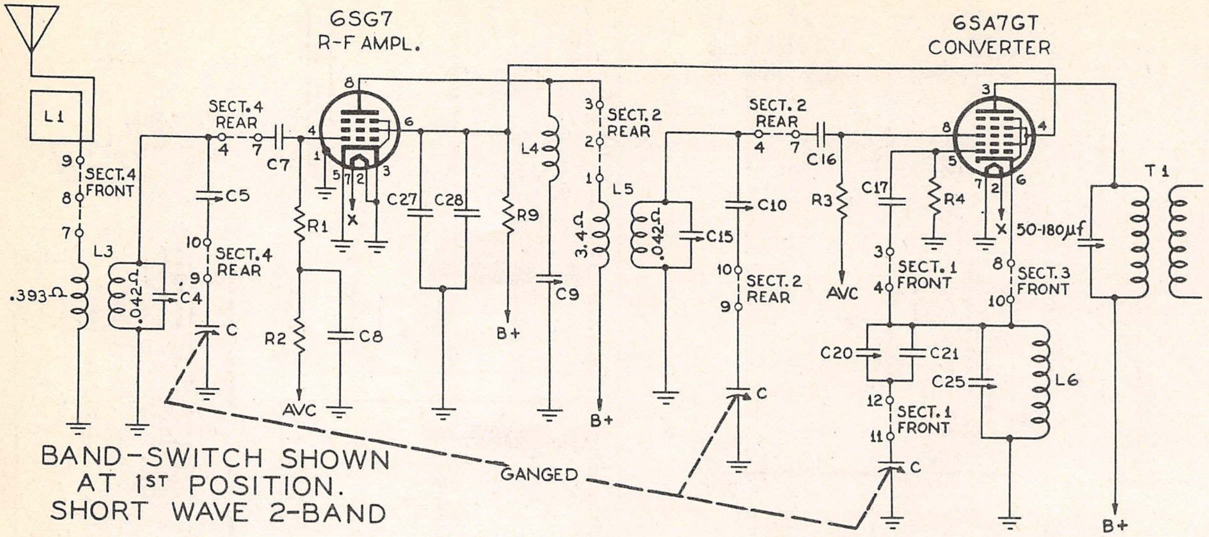

POINTER
SPRING
INDICATOR
MAIN DRIVE PULLEY
BAND SWITCH SHAFT AND PULLEY
TWO TURNS AROUND DRIVE SHAFT

DIAL CORD DRIVE

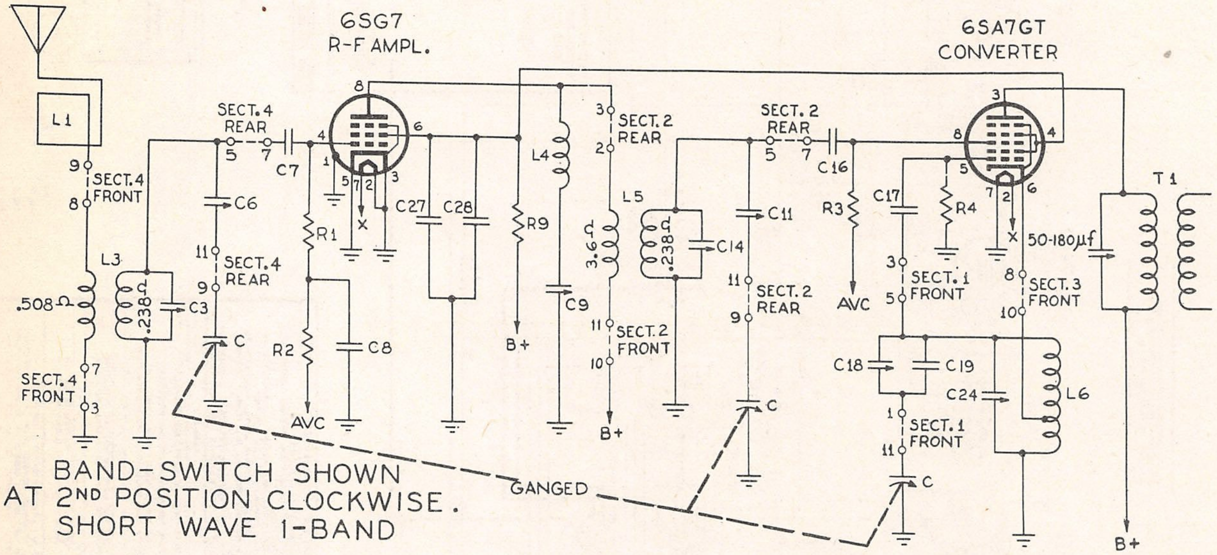
RECORD CHANGER: Webster 56, RCD. CH. P.15-10

**MODEL 86 Series**

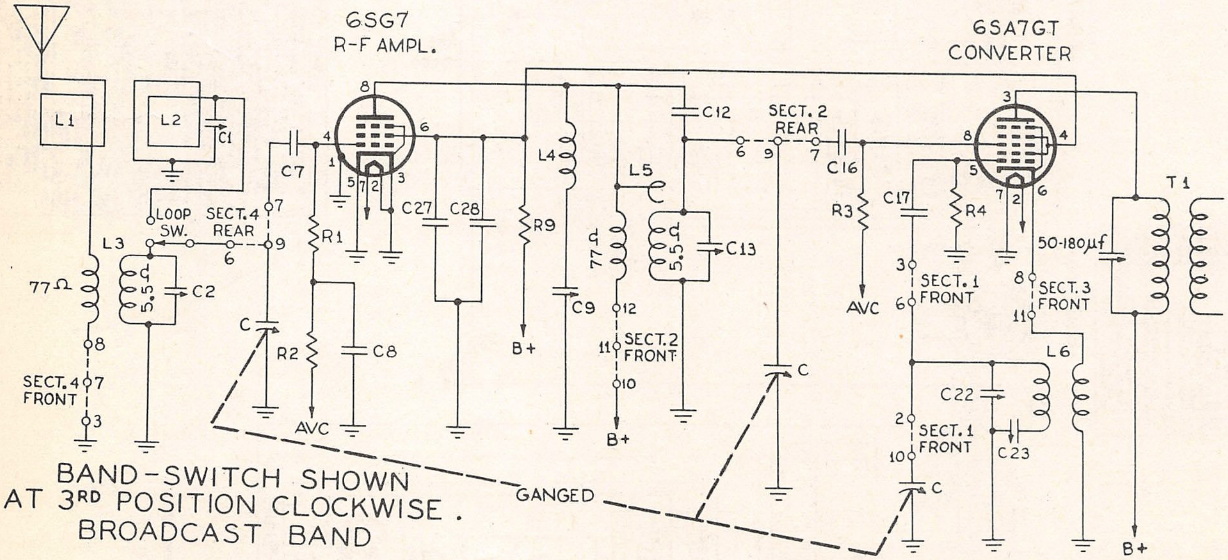
## GILFILLAN BROS. INC.


6SG7
R-F AMPL.
6SA7GT
CONVERTER
L1
SECT.4 FRONT
.393Ω
L3
.042Ω
C4
SECT.4 REAR
C5
C7
C
R1
R2
C8
AVC
X
C27
C28
R9
B+
L4
L5
3.4Ω
C9
SECT.2 REAR
.042Ω
C15
C10
C16
R3
AVC
C17
R4
SECT.1 FRONT
SECT.3 FRONT
50-180μf
T1
C20
C21
C25
L6
GANGED

BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE 2-BAND


6SG7
R-F AMPL.
6SA7GT
CONVERTER
L1
SECT.4 FRONT
.508Ω
L3
.238Ω
C3
SECT.4 REAR
C6
C7
C
R1
R2
C8
AVC
X
C27
C28
R9
B+
L4
L5
3.6Ω
C9
SECT.2 REAR
SECT.2 FRONT
.238Ω
C14
C11
C16
R3
AVC
C17
R4
SECT.1 FRONT
SECT.3 FRONT
50-180μf
T1
C18
C19
C24
L6
GANGED

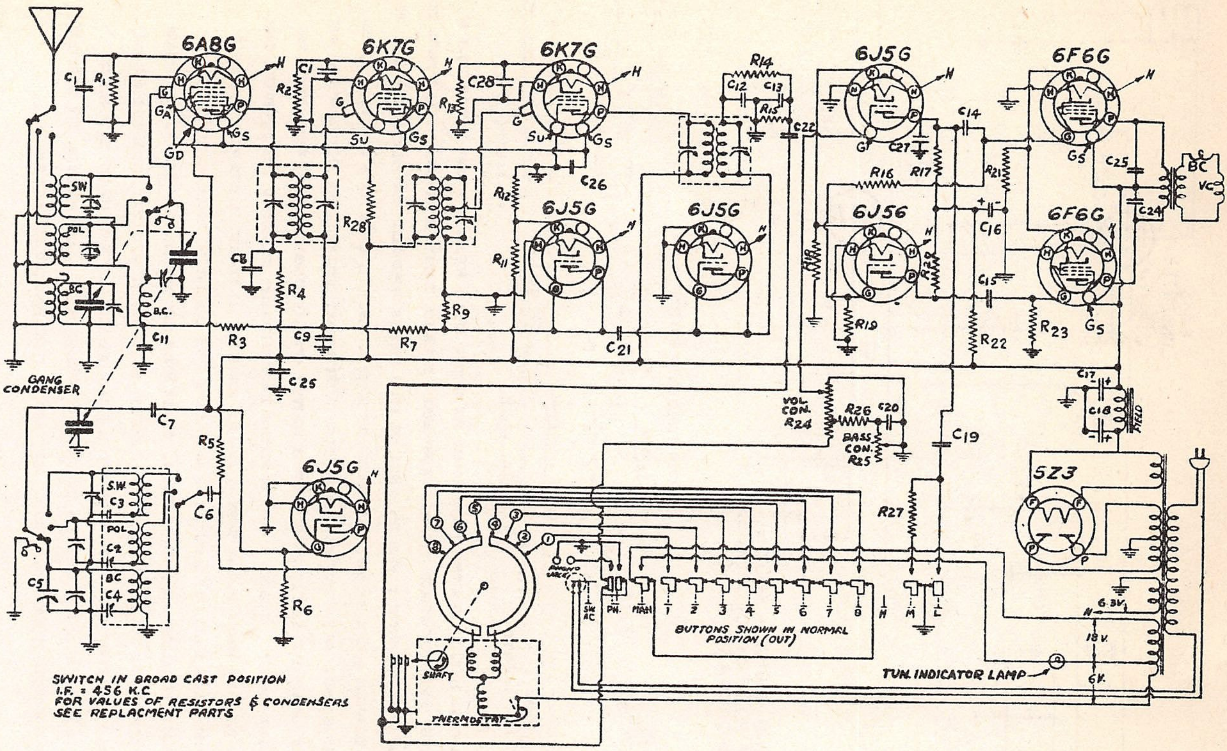
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE 1-BAND


6SG7
R-F AMPL.
6SA7GT
CONVERTER
L1
L2
C1
LOOP SW.
SECT.4 REAR
SECT.4 FRONT
77Ω
L3
5.5Ω
C2
C7
C
R1
R2
C8
AVC
C27
C28
R9
B+
L4
L5
77Ω
C9
C12
5.5Ω
C13
SECT.2 REAR
SECT.2 FRONT
C16
R3
AVC
C17
R4
SECT.1 FRONT
SECT.3 FRONT
50-180μf
T1
L6
C22
C23
GANGED

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
BROADCAST BAND

MODEL R-635

## B. F. GOODRICH CO.



SWITCH IN BROAD CAST POSITION
I.F. = 456 K.C
FOR VALUES OF RESISTORS & CONDENSERS
SEE REPLACMENT PARTS

## 11A REPLACEMENT PARTS LIST

### PAPER CONDENSERS

| | |
|---|---|
| C 1—P148 | .05 Mfd. 200 V. |
| C 2 | Police Band Padder—(.0008—.0016 Mfd.) |
| C 4 | Broadcast Band Padder—(.003—.0006 Mfd.) |
| C 6—P1322 | .005 Mfd. 600 V. |
| C 8—P276 | .1 Mfd. 400 V. |
| C 9—P148 | .05 Mfd. 200 V. |
| C11—P142 | .1 Mfd. 200 V. |
| C14—P334 | .05 Mfd. 400 V. |
| C15—P334 | .05 Mfd. 400 V. |
| C19—P334 | .05 Mfd. 400 V. |
| C20—P1322 | .005 Mfd. 600 V. |
| C22—P148 | .05 Mfd. 200 V. |
| C23—P1322 | .005 Mfd. 600 V. |
| C24—P1322 | .005 Mfd. 600 V. |
| C25—P276 | .1 Mfd. 400 V. |
| C26—P276 | .1 Mfd. 400 V. |
| C28—P148 | .05 Mfd. 200 V. |

### MICA CONDENSERS

| | |
|---|---|
| C 3—P1683 | .004 Mfd. |
| C 7—P480 | .0001 Mfd. |
| C12—P480 | .0001 Mfd. |
| C13—P480 | .0001 Mfd. |
| C21—P1382 | .00025 Mfd. |
| C27—P480 | .0001 Mfd. |

### ELECTROLYTIC CONDENSERS

| | |
|---|---|
| C16 } C17 } P1939 | Dual Electrolytic |
| C18—P1937 | Electrolytic |

### ADJUSTABLE CONDENSERS

| | |
|---|---|
| P1918A | Variable Condenser |
| P2743 | Gang Trimmer Strip |
| P1682 | Oscillator Padder Condensers |

### RESISTORS

| | |
|---|---|
| R 1—P140 | 500 Ohm ¼ Watt |
| R 2—P1950 | 350 Ohm ¼ Watt 10% |
| R 3—P139 | 250,000 Ohm ¼ Watt |
| R 4—P481 | 3,000 Ohm ¼ Watt |
| R 5—P673 | 10,000 Ohm ½ Watt |
| R 6—P417 | 50,000 Ohm ¼ Watt |
| R 7—P137 | 500,000 Ohm ¼ Watt |
| R 9—P137 | 1,000,000 Ohm ¼ Watt |
| R11—P2731 | 25,000 Ohm 1 Watt |
| R12—P278 | 600 Ohm ¼ Watt |
| R13—P1950 | 350 Ohm ¼ Watt |
| R14—P417 | 50,000 Ohm ¼ Watt |
| R15—P139 | 250,000 Ohm ¼ Watt |
| R16—P1220 | 200,000 Ohm ¼ Watt |
| R17—P166 | 25,000 Ohm ¼ Watt |
| R18—P376 | 750 Ohm ¼ Watt |
| R19—P258 | 15,000 Ohm ¼ Watt |
| R20—P166 | 25,000 Ohm ¼ Watt |
| R21—P2732 | 220 Ohm 2 Watt |
| R22—P167 | 10,000 Ohm ¼ Watt |
| R23—P139 | 250,000 Ohm ¼ Watt |
| R24 | Volume Control—2,000,000 Ohms |
| R25 | Bass Control—1,000,000 Ohms |
| R26—P1217 | 60,000 Ohm ¼ Watt |
| R27—P167 | 10,000 Ohm ¼ Watt |
| R28—P165 | 25,000 Ohm ¼ Watt |
| R29 | Speaker Field—600 Ohm |

### TRANSFORMERS AND COILS

| | |
|---|---|
| P2710 | Power Transformer |
| P1930 | 1st I.F. Transformer |
| P2704 | 2nd I.F. Transformer |
| P2711 | 3rd I.F. Transformer |
| G5794 | Oscillator Coil Assembly |
| G5310 | Police and Short Wave Antenna Coil |
| G5347 | Broadcast Antenna Coil |

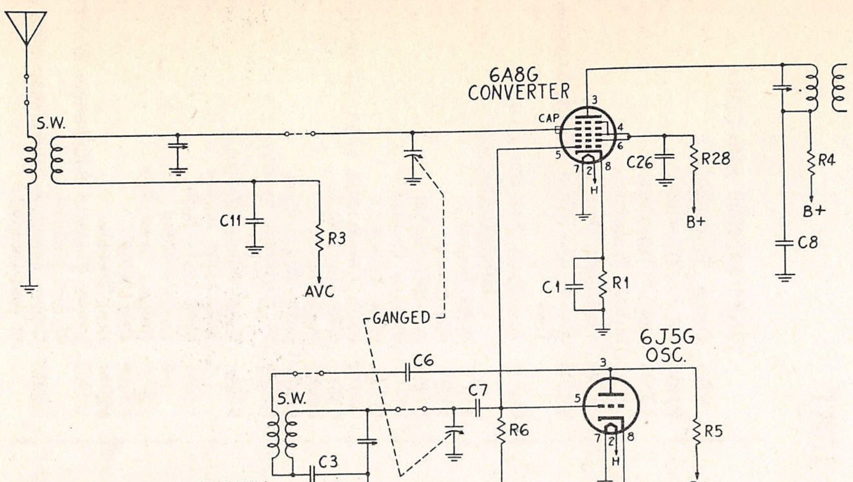
### MISCELLANEOUS

| | |
|---|---|
| P1928 | Tube Socket |
| P1153 | 5Z3 Socket |
| P945 | Speaker Socket |
| P2705 | Volume Control |
| P2706 | Bass Control |
| G5788 | Band Switch and Lead Assembly |
| P929 | A.C. Line Cord |
| P1455 | Tube Shield |
| P1456 | Tube Shield Base |
| P2716 | 12" Dynamic Speaker |
| P2694 | Push Button Switch |
| 3 | Pilot Light Socket |
| P1504 | Pilot Light Bulb |
| 0 | Electric Motor |
| P2689 | Rubber Drive Belt |
| P2688 | Dial Scale |
| P2644 | Dial Pointer |
| G5462 | Lower Segment Adjustment Bracket and Contact |
| G5463 | Upper Segment Adjustment Bracket and Contact |

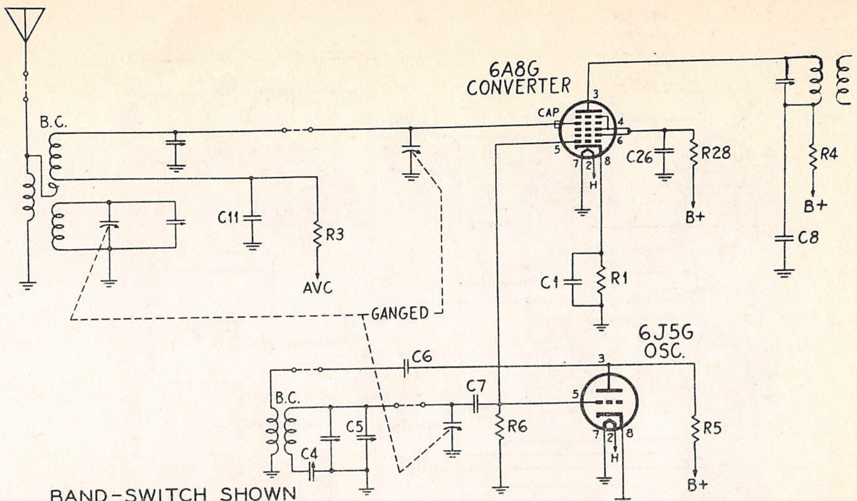
"clarified schematics"

**MODEL R-635**

# B. F. GOODRICH CO.


6A8G
CONVERTER
CAP
S.W.
C11
R3
AVC
GANGED
C26
R28
B+
R4
C8
C1
R1
6J5G
OSC.
C6
C7
R6
R5
S.W.
C3
H

BAND-SWITCH SHOWN
AT 1ST POSITION
SHORT WAVE BAND


6A8G
CONVERTER
CAP
B.C.
C11
R3
AVC
GANGED
C26
R28
B+
R4
C8
C1
R1
6J5G
OSC.
C6
C7
R6
R5
B.C.
C5
C4
H

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
BROADCAST BAND

MOTOR TUNED PUSH BUTTON

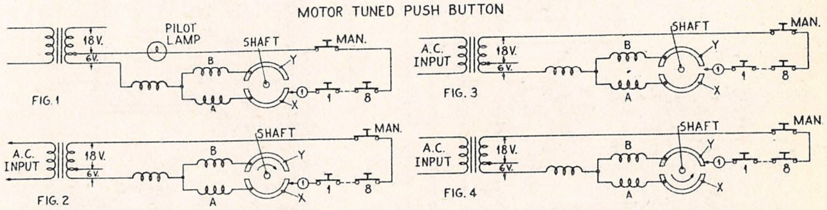
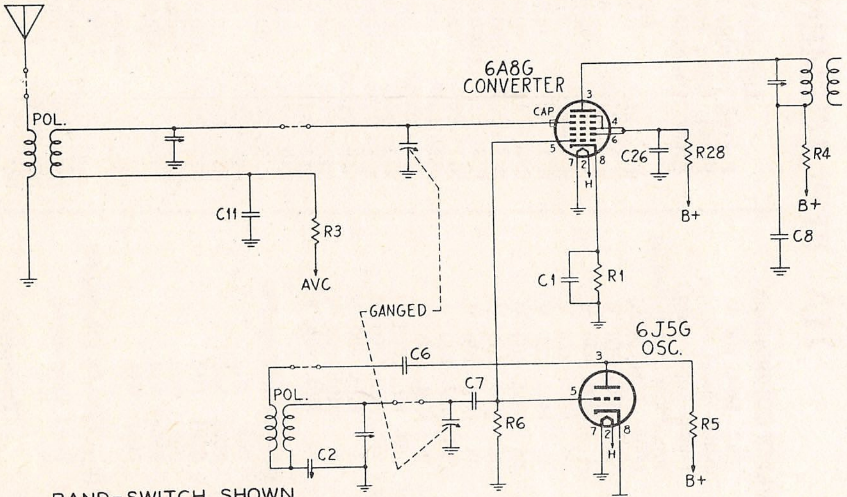
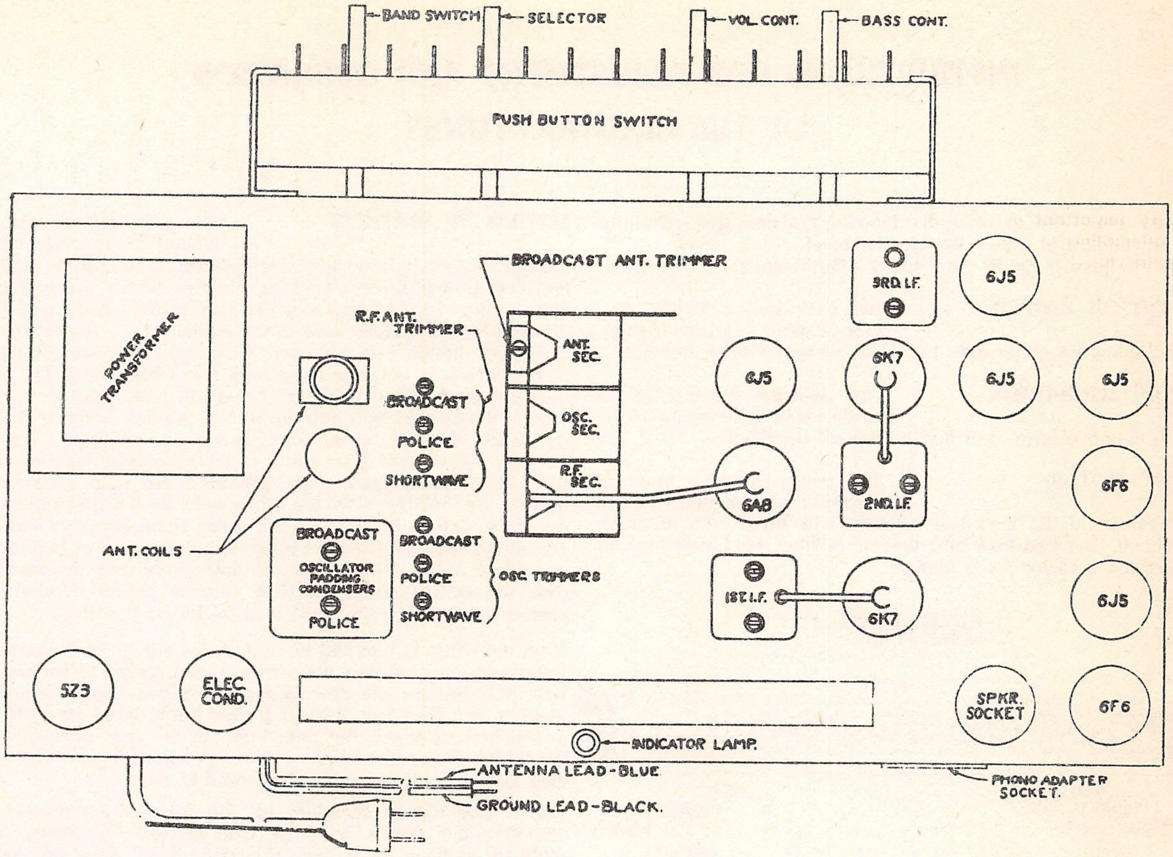

18V.
6V.
PILOT LAMP
SHAFT
MAN.
B
A
Y
X
1
8
A.C. INPUT

FIG. 1 FIG. 2 FIG. 3 FIG. 4


6A8G
CONVERTER
CAP
POL.
C11
R3
AVC
GANGED
C26
R28
B+
R4
C8
C1
R1
6J5G
OSC.
C6
C7
R6
R5
POL.
C2
H

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
POLICE BAND

NOTES: FIGS. 1, 2, 3 AND 4 SHOW SCHEMATICALLY THE SETTING UP AND AUTOMATIC TUNING OF PUSHBUTTON NO. 1. THE OTHER PUSHBUTTONS FOLLOW THIS PATTERN BUT AREN'T SHOWN FOR CLARITY OF DIAGRAM. FIG. 1 SHOWS THE SETTING UP OF PUSHBUTTON 1, WITH THE MANUAL AND NO. 1 BUTTONS DEPRESSED. THE PILOT LAMP WILL LIGHT, BEING ENERGIZED ACROSS THE 6-V. TAP THROUGH THE MOTOR WINDING (A), ROTOR PLATE X, CONTACT 1, AND THE PUSHBUTTONS. WHEN BUTTON NO. 1 IS ADJUSTED TO THE CORRECT FREQUENCY, THE PILOT LAMP GOES OUT BECAUSE CONTACT 1 IS THEN POSITIONED BETWEEN PLATES X AND Y, SIMILAR TO FIG. 3, WHICH BREAKS THE ELECTRICAL CONTACT. IN ORDER TO TUNE TO STATION 1 AUTOMATICALLY, PUSHBUTTON 1 IS DEPRESSED, ENERGIZING THE MOTOR ACROSS 18-V AS SHOWN IN FIG. 2. SINCE THE (A) WINDING IS ENERGIZED, THE MOTOR WILL TURN PLATES X AND Y IN DIRECTION OF ARROW SHOWN UNTIL CONTACT IS BROKEN, WHICH WILL OCCUR WHEN PLATES REACH POSITION SHOWN IN FIG. 3. IF THE MOTOR DOES NOT STOP FAST ENOUGH, THEN PLATES X AND Y, WHICH ARE MECHANICALLY GANGED BY THE SHAFT TO THE TUNING CAPACITORS, WILL TURN TOO FAR, PUTTING THE STATION OUT OF TUNE BUT IF THEY DO ROTATE TOO MUCH THEY MUST ASSUME THE POSITION SHOWN IN FIG. 4 WHICH THEN ENERGIZES THE OTHER (B) WINDING OF THE MOTOR, REVERSING THE DIRECTION OF ROTATION UNTIL IT COMES TO A STOP AT ITS CORRECTLY TUNED POSITION SHOWN IN FIG. 3.


BAND SWITCH
SELECTOR
VOL. CONT.
BASS CONT.
PUSH BUTTON SWITCH
BROADCAST ANT. TRIMMER
R.F. ANT. TRIMMER
ANT. SEC.
OSC. SEC.
R.F. SEC.
POWER TRANSFORMER
BROADCAST
POLICE
SHORTWAVE
ANT. COILS
BROADCAST
OSCILLATOR PADDING CONDENSERS
POLICE
BROADCAST
POLICE
SHORTWAVE
OSC. TRIMMERS
3RD I.F.
6J5
6J5
6K7
6J5
6J5
6A8
2ND I.F.
6F6
1ST I.F.
6K7
6J5
5Z3
ELEC. COND.
SPKR. SOCKET
6F6
INDICATOR LAMP
ANTENNA LEAD-BLUE
GROUND LEAD-BLACK
PHONO ADAPTER SOCKET

## ALIGNMENT DATA AND SERVICING

**GENERAL DATA** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

**CORRECT ALIGNMENT PROCEDURE** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

**I.F. ALIGNMENT** With the wave switch in the Broadcast Band and the gang condenser set at minimum push in the white button until it locks. Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align the six I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT** Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

**POLICE BAND ALIGNMENT** The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit of this frequency as described in the instructions for padding the broadcast circuits.

**SHORT WAVE BAND ALIGNMENT** The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padd condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

# INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC TUNER

It is very important to read the following instructions carefully before attempting to adjust the electric tuner.
The electric tuner is made up of three integral units:

**PUSH BUTTON SWITCH:** The push button switch consists of eight (8) brown push buttons flanked on either side by three (3) white push buttons.

**SELECTOR MECHANISM:** The selector mechanism is made up of the selector plate, eight (8) thumb screws, and the adjustment light bulb.

**ELECTRIC MOTOR:** The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.

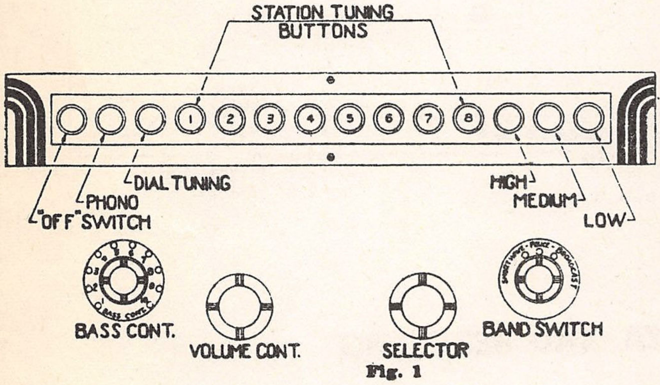


Fig. 1

**SETTING UP STATIONS** The first step to take in adjusting the electric push button device incorporated into this receiver is to choose eight (8) of the most powerful local stations, stations which are free from excess fading. Turn on the receiver (broadcast band) and press in the dial tuning button; tune in the station of the **lowest frequency**, using the station selector knob. Now hold the dial tuning button in and press in button number one (1). (See Figure 1). Both buttons are now locked into place; a small pilot lamp located at the rear of the chassis will light up unless the thumb screw at the rear accidently happens to be correctly set. Loosen thumb screw number one (See Figure 2 for order of thumb screws) enough to allow it to slide freely back and forth until the light goes out. Now tighten the thumb screw; the adjustment for the first station is now complete. Out of the station call letter sheet supplied remove the proper station call disc and insert into the recess of button number one. Push one of the clear celluloid discs into the recess also, over the station call disc. Now release button number one by pressing the dial tuning button in as far as it will go.

With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two. Both buttons are now locked into place. Loosen thumb screw number two (see Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call disc and celluloid disc into the window of button number two.

Follow this same procedure for the remaining stations, always choosing the station with the next highest frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. Note: In the window above the white button, insert the word "OFF" found in the call letter sheet.

**NOTE:** In the recesses of the white push buttons insert the words found in the call letter sheet as shown in Figure 1.

# HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the dial tuning button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. **Note:** Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above.

To change from electric tuning to manual selecting, simply press in the dial tuning button. When the dial tuning button is in, the set may be tuned as a conventional receiver. **Note:** If it is desired to tune Short Wave or Police while the set is being operated with push buttons, it is not necessary to change over from push button tuning to manual tuning. Simply turn the band switch and proceed to tune with the selector knob. When the band switch is returned to broadcast, the station last selected by button will automatically tune in by itself.

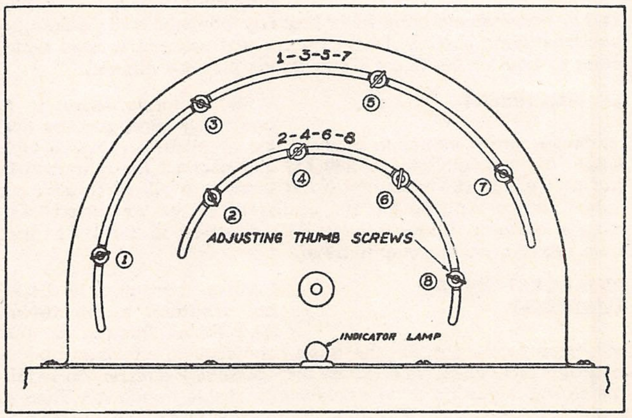
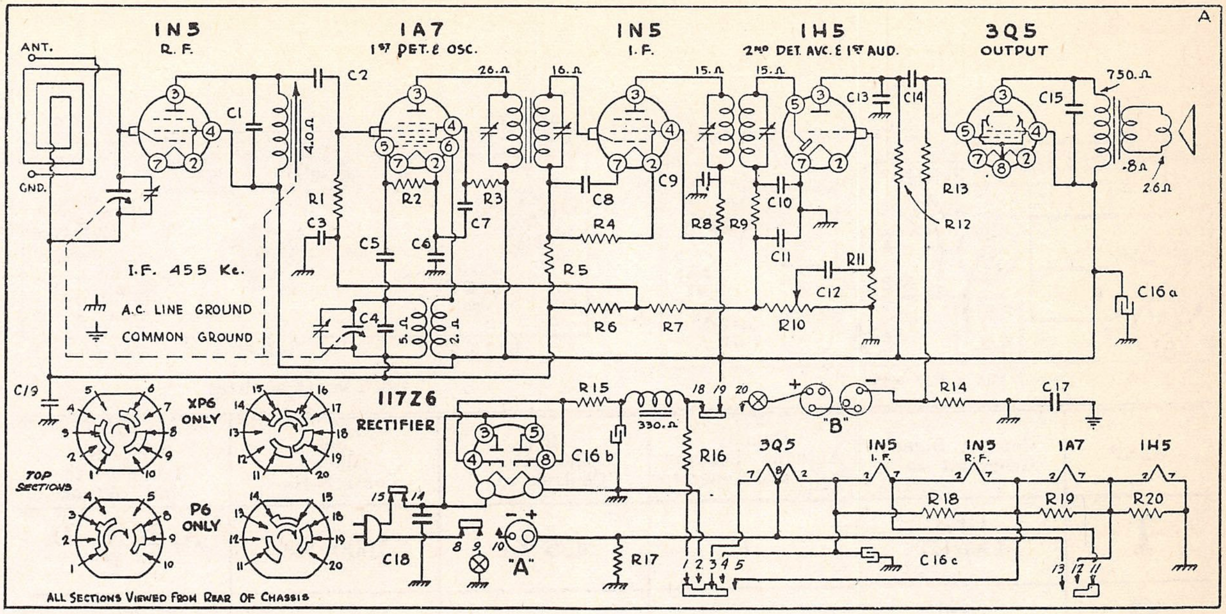


Fig. 2

# B. F. GOODRICH

MODEL R-661


A
1N5 R.F.
1A7 1ST DET. & OSC.
1N5 I.F.
1H5 2ND DET. AVC. & 1ST AUD.
3Q5 OUTPUT
ANT.
GND.
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16a
C16b
C16c
C17
C18
C19
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
4.0Ω
26.Ω
16.Ω
15.Ω
15.Ω
750.Ω
.8Ω
2.6Ω
5.Ω
2.Ω
330.Ω
I.F. 455 Kc.
A.C. LINE GROUND
COMMON GROUND
117Z6 RECTIFIER
XP6 ONLY
P6 ONLY
TOP SECTIONS
"A"
"B"
3Q5
1N5 I.F.
1N5 R.F.
1A7
1H5
ALL SECTIONS VIEWED FROM REAR OF CHASSIS

Late Model.

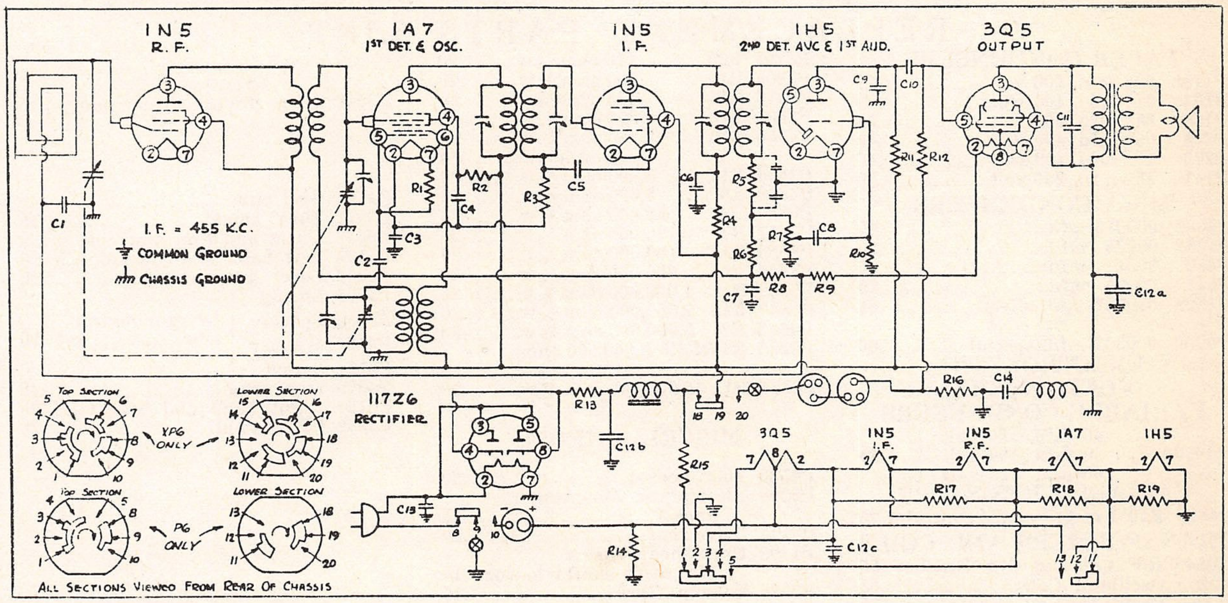
Power switch in line position. Common ground is chassis ground.

**CONDENSERS**

| No. | Ohms | Watts | No. | Ohms | Watts |
|---|---|---|---|---|---|
| R1 | 100,000 | ½ | R11 | 15,000,000 | ½ |
| R2 | 200,000 | ½ | R12 | 1,000,000 | ½ |
| R3 | 5,000,000 | ½ | R13 | 2,000,000 | ½ |
| R4 | 5,000,000 | ½ | R14 | 400 | ½ |
| R5 | 5,000,000 | ½ | R15 | 22 | ½ |
| R6 | 5,000,000 | ½ | R16 | 2,150 | 5 |
| R7 | 3,000,000 | ½ | R17 | 3,000 | ½ |
| R8 | 5,000 | ½ | R18 | 500 | ½ |
| R9 | 70,000 | ½ | R19 | 200 | ½ |
| R10 | 1,000,000 | V.C. | R20 | 110 | ½ |

**RESISTORS**

| No. | Capacity (Mfd.) | Volts | No. | Capacity (Mfd.) | Volts |
|---|---|---|---|---|---|
| C1 | .000367 | Silver Mica | C11 | .0001 | Mica |
| C2 | .00025 | Mica | C12 | .01 | 400 |
| C3 | .01 | 400 | C13 | .00025 | Mica |
| C4 | .000015 | Mica | C14 | .01 | 400 |
| C5 | .00005 | Mica | C15 | .002 | 600 |
| C6 | .25 | 200 | C16a | 40. | 150 |
| C7 | .01 | 400 | C16b | 30. | 150 |
| C8 | .01 | 400 | C16c | 100. | 25 |
| C9 | .05 | 400 | C17 | .1 | 400 |
| C10 | .00005 | In I.F. Can | C18 | .05 | 400 |
|  |  |  | C19 | .05 | 200 |


1N5 R.F.
1A7 1ST DET. & OSC.
1N5 I.F.
1H5 2ND DET. AVC & 1ST AUD.
3Q5 OUTPUT
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12a
C12b
C12c
C13
C14
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
I.F. = 455 K.C.
COMMON GROUND
CHASSIS GROUND
117Z6 RECTIFIER
TOP SECTION
LOWER SECTION
XP6 ONLY
P6 ONLY
3Q5
1N5 I.F.
1N5 R.F.
1A7
1H5
ALL SECTIONS VIEWED FROM REAR OF CHASSIS

Early Model.

**RESISTORS**

| No. | Ohms | Watts | No. | Ohms | Watts |
|---|---|---|---|---|---|
| R1 | 200,000 | ½ | R11 | 1,000,000 | ½ |
| R2 | 50,000 | ½ | R12 | 2,000,000 | ½ |
| R3 | 5,000,000 | ½ | R13 | 22—10% | ½ |
| R4 | 5,000 | ½ | R14 | 1,000 | ½ |
| R5 | 70,000 | ½ | R15 | 2,150—10% | 5 |
| R6 | 3,000,000 | ¼ | R16 | 400—10% | ½ |
| R7 | 1,000,000 | V.C. | R17 | 500—10% | ½ |
| R8 | 5,000,000 | ½ | R18 | 200—10% | ½ |
| R9 | 10,000,000 | ¼ | R19 | 110—10% | ½ |
| R10 | 15,000,000 | ½ |  |  |  |

**CONDENSERS**

| No. | Capacity (Mfd.) | Volts | No. | Capacity (Mfd.) | Volts |
|---|---|---|---|---|---|
| C1 | .05 | 200 | C9 | .00025 | Mica |
| C2 | .00005 | Mica | C10 | .001 | 600 |
| C3 | .25 | 200 | C11 | .002 | 600 |
| C4 | .01 | 400 | C12a | 50. Elect. | 150 |
| C5 | .001 | 600 | C12b | 30. Elect. | 150 |
| C6 | .05 | 400 | C12c | 100. Elect. | 25 |
| C7 | .05 | 200 | C13 | .05 | 400 |
| C8 | .001 | 600 | C14 | .2 | 200 |

1942

MODEL R-661

# B. F. GOODRICH

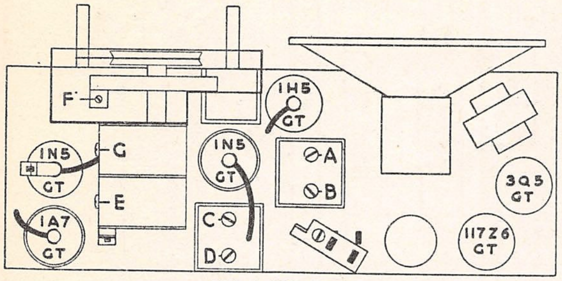

F
G
E
1N5
GT
1A7
GT
1H5
GT
1N5
GT
A
B
C
D
3Q5
GT
117Z6
GT

FIG. 1 TOP VIEW

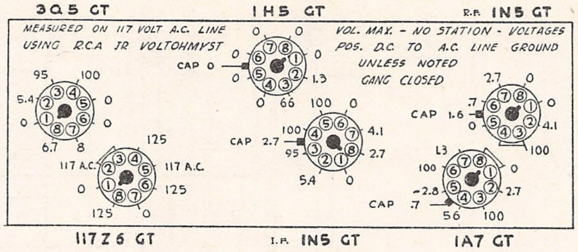

3Q5 GT
1H5 GT
R.F. 1N5 GT
MEASURED ON 117 VOLT A.C. LINE
USING R.C.A JR VOLTOHMYST
VOL. MAX. - NO STATION - VOLTAGES
POS. D.C TO A.C. LINE GROUND
UNLESS NOTED
GANG CLOSED
95
100
5.4
0
0
0
6.7
8
CAP 0
0
0
0
0
1.3
0
66
125
117 A.C.
117 A.C.
0
125
125
0
100
0
CAP 2.7
100
95
4.1
2.7
5.4
0
2.7
0
.7
CAP 1.6
0
0
4.1
100
L3
100
0
-2.8
2.7
CAP .7
56
100
117Z6 GT
I.F. 1N5 GT
1A7 GT

FIG. 2 VOLTAGE CHART

| STEP | Connect Signal Generator to— | Dummy Antenna Between Radio and Generator | Set Generator Controls to— | Set Radio Controls to— | Adj. Following Trimmers to Max. Output |
|---|---|---|---|---|---|
| 1 | Grid 1A7 GT | .1 | 455 Kc | 1600 Kc. | A, B, C, D, I. F. |
| 2 | Grid 1N5 GT | .1 | 1600 Kc. | 1600 Kc. | E Osc. |
| 3 | Grid 1A7 GT | .1 | 1400 Kc. | 1400 Kc. | F — R. F. (Gang Early) on (Slug Late) |
| 4 | Loop Radiator | Two feet from Radio No Connection | 1400 Kc. | 1400 Kc. | G Ant. |

Use Aerometer or three turn loop in series with 400 ohm resistor 10″ diameter on Signal Generator in Step 4.

## REPLACEMENT PARTS LIST

### PAPER CONDENSERS

| | | |
|---|---|---|
| P1193 | .002 mfd. 600 volt | .20 |
| P164 | .01 mfd. 400 volt | .25 |
| P148 | .05 mfd. 200 volt | .20 |
| P334 | .05 mfd. 400 volt | .40 |
| P276 | .1 mfd. 400 volt | .40 |
| P141 | .25 mfd. 200 volt | .30 |

### MICA CONDENSERS

| | | |
|---|---|---|
| P5209 | .000015 mfd. | .20 |
| P1382 | .00005 mfd. | .20 |
| P480 | .0001 mfd. | .20 |
| P817 | .00025 mfd. | .20 |
| P1599 | .000367 mfd. silver | .65 |
| or | | |
| P5200 | .000367 mfd. special | .60 |

### ELECTROLYTIC CONDENSERS

### VARIABLE CONDENSERS

| | | |
|---|---|---|
| P4860A | 40 mfd. 150 volt<br>30 mfd. 150 volt<br>100 mfd. 25 volt | 1.60 |

### VARIABLE RESISTORS

| | | |
|---|---|---|
| P4820 | R10 1 meg. Volume control | 1.25 |

### TRANSFORMERS AND COILS

| | | |
|---|---|---|
| G6543 | R.F. Coil and Mtg. Bracket | .55 |
| P5208 | Oscillator Coil | .65 |
| P3967 | Oscillator Coil (Early) | .65 |
| P4818 | 1st I.F. Transformer | 1.50 |
| P4819 | 2nd I.F. Transformer | 1.70 |

| | | |
|---|---|---|
| P5187 | Gang Condenser, 2 gang | 3.50 |
| P4817 | Gang Condenser, 3 gang | 3.50 |

### RESISTORS

| | | | |
|---|---|---|---|
| P5268 | R15 | 22 ohm ½ w (wirewound) | .20 |
| P3801 | R20 | 110 ohm ½ w | .20 |
| P3806 | R19 | 200 ohm ½ w | .20 |
| P3816 | R14 | 400 ohm ½ w | .20 |
| P3820 | R18 | 500 ohm ½ w | .20 |
| P4856 | R16 | 2,150 ohm 5 w (wirewound) | .60 |
| P3833 | R17 | 3,000 ohm ½ w | .20 |
| P3836 | R8 | 5,000 ohm ½ w | .20 |
| P3853 | R3 | 50,000 ohm ½ w | .20 |
| P3857 | R9 | 70,000 ohm ½ w | .20 |
| P3860 | R1 | 100,000 ohm ½ w | .20 |
| P3864 | R2 | 200,000 ohm ½ w | .20 |
| P3882 | R12 | 1,000,000 ohm ½ w | .20 |
| P3883 | R13 | 2,000,000 ohm ½ w | .20 |
| P4663 | R7 | 3,000,000 ohm ½ w | .20 |
| P3886 | R4,R5,R6 | 5,000,000 ohm ½ w | .20 |
| P3891 | R11 | 15,000,000 ohm ½ w | .20 |

### MISCELLANEOUS

| | | |
|---|---|---|
| P4583 | Tube Socket | .20 |
| P5206 | Electrolytic Mounting Base | .15 |
| P5194 | Drive shaft | .20 |
| P1399 | Horseshoe Washer (for drive shaft) ½ doz. | .15 |
| P2925 | Takeup Spring | .15 |
| P1585 | Snap button for scale ½ doz. | .15 |
| P4435 | Dial Pointer | .20 |
| P4816 | Dial Background | .25 |
| P4876 | Knob | .20 |
| P4695 | Escutcheon | 1.75 |
| P4833 | Indicator disc | .20 |
| P929A | Line cord | .65 |
| P3557 | Line cord clamp | .15 |
| P3017 | Two-prong battery plug | .15 |
| P3016 | Three-prong battery plug | .15 |
| P470 | Grid clip | .05 |
| P3571 | Tube shield | .15 |
| G6538 | Drum and cam assembly | .30 |
| P5193 | Left hand dial bracket | .20 |
| P6546 | Lever arm assembly | .20 |
| P5005 | Spring | |
| P5032 | Spacer | |
| P5197 | Washer | Lever mounting hdw. set .10 |
| P931 | Screw | |
| P4979 | Iron Slug | .40 |
| P5192 | Right hand dial bracket | .25 |
| P4852 | I.F. Shield | .20 |

All prices quoted are list and subject to the usual trade discount.

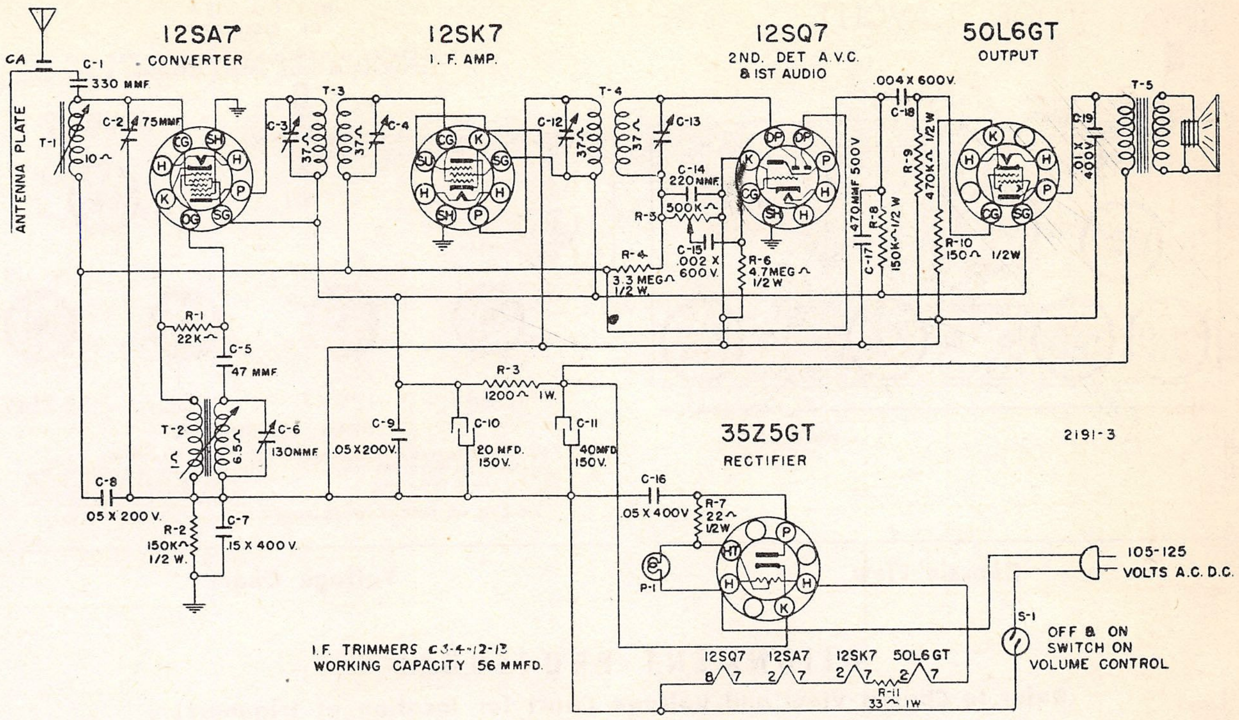
A handling charge of $0.25 will be made on all orders under $0.75 list.

Shipments are F.O.B. our factory. When remitting in advance please include postage.

Price are subject to change without notice.

# W. T. GRANT CO.

## MODELS 500,501,Series A

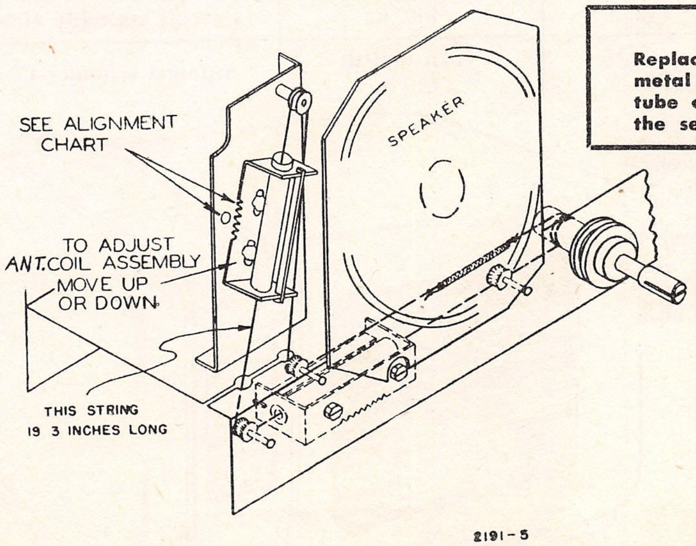

12SA7
CONVERTER
12SK7
I. F. AMP.
12SQ7
2ND. DET A.V.C. & IST AUDIO
50L6GT
OUTPUT
CA
C-1
330 MMF
ANTENNA PLATE
T-1
10 ~
C-2
75MMF
T-3
C-3
37 ~
C-4
37 ~
C-12
T-4
37 ~
C-13
C-14
220 MMF
R-5
500K ~
C-15
.002 X 600 V.
R-4
3.3 MEG ~ 1/2 W.
R-6
4.7MEG ~ 1/2 W
C-17
470 MMF 500V
R-8
150K ~ 1/2 W
.004 X 600V.
C-18
R-9
470K ~ 1/2 W
R-10
150 ~ 1/2W
C19
.01 X 400V
T-5
R-1
22K ~
C-5
47 MMF
R-3
1200 ~ 1W.
T-2
1 ~
6.5 ~
C-6
130MMF
C-9
.05 X 200V.
C-10
20 MFD. 150V.
C-11
40MFD 150V.
35Z5GT
RECTIFIER
2191-3
C-8
.05 X 200 V.
R-2
150K ~ 1/2 W.
C-7
.15 X 400 V.
C-16
.05 X 400V
R-7
22 ~ 1/2W
P-1
105-125 VOLTS A.C. D.C.
S-1
OFF & ON SWITCH ON VOLUME CONTROL
I.F. TRIMMERS C3-4-12-13 WORKING CAPACITY 56 MMFD.
12SQ7 8/\7
12SA7 2/\7
12SK7 2/\7
50L6GT 2/\7
R-11
33 ~ 1W

**CORRECTION:**— Pin 7 of 12SA7 tube goes to pin 7 of 12SQ7 tube. Pin 2 of 12SA7 tube goes to Pin 2 of 12SK7 tube.

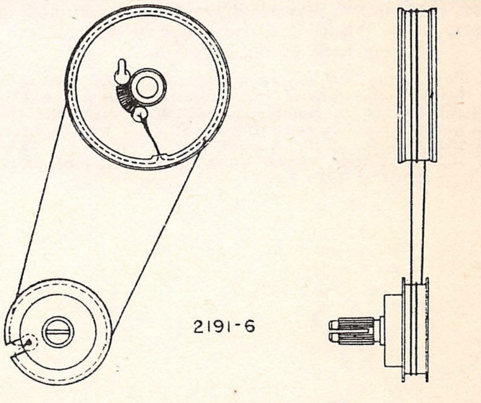
| | |
|---|---|
| POWER SUPPLY | 105 to 125 volts, DC or 50-60 cycle AC, 35 watts. |
| FREQUENCY RANGE | 545 to 1700 kc. |
| INTERMEDIATE FREQ. | 455 kc. |
| TUNING | Permeability. |
| ANTENNA | Built-in plate type. Also provisions for external antenna. No ground required. |
| SPEAKER | 4-inch; P.M.; voice coil impedance 3.2 ohms. |
| POWER OUTPUT | 800 milliwatts, undistorted. 1.0 watts maximum. |
| SENSITIVITY | 35 microvolts average for 50-milliwatt output. |
| SELECTIVITY | 75 kc. broad at 1000 times signal at 1000 kc. |
| TUBE COMPLEMENT | 12SA7, converter<br>12SK7, I. F. amplifier<br>12SQ7, 2nd detector, AVC, 1st audio<br>50L6GT, output amplifier<br>35Z5GT, rectifier |

**NOTE ON TUBE REPLACEMENT**

**Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.**


SEE ALIGNMENT CHART
SPEAKER
TO ADJUST ANT.COIL ASSEMBLY MOVE UP OR DOWN
THIS STRING 19 3 INCHES LONG
2191-5

*Coil Assembly View*

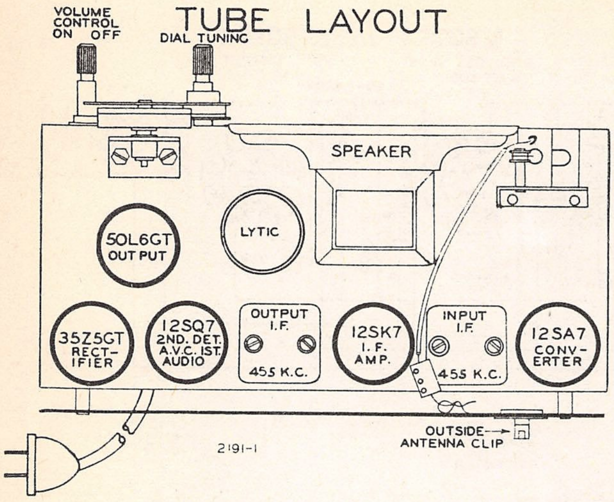


*Dial Stringing View*

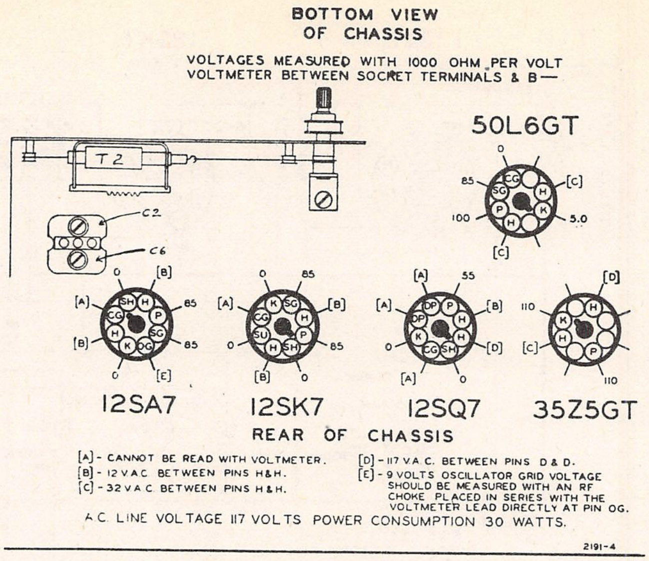
For Parts List, see P.16-5

## MODELS 500,501, Series A

## W. T. GRANT CO.


VOLUME CONTROL ON OFF
DIAL TUNING
TUBE LAYOUT
SPEAKER
LYTIC
50L6GT OUT PUT
35Z5GT RECT-IFIER
12SQ7 2ND. DET. A.V.C. IST. AUDIO
OUTPUT I.F.
455 K.C.
12SK7 I. F. AMP.
INPUT I.F.
455 K.C.
12SA7 CONV-ERTER
OUTSIDE ANTENNA CLIP
2191-1

**Chassis View**


BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B —
T2
C2
C6
50L6GT
0
85
100
[C]
5.0
[C]
CG
SG
P
H
H
K
12SA7
0
[B]
[A]
85
[B]
85
0
[E]
SH
H
CG
P
H
SG
K
OG
12SK7
0
85
[A]
[B]
0
85
[B]
0
K
SG
CG
H
SU
P
H
SH
12SQ7
[A]
55
[A]
[B]
0
[D]
[A]
0
DP
P
DP
H
K
H
CG
SH
35Z5GT
[D]
110
[C]
110
H
K
H
P
REAR OF CHASSIS
[A] - CANNOT BE READ WITH VOLTMETER.
[B] - 12 V.A.C. BETWEEN PINS H&H.
[C] - 32 V.A.C. BETWEEN PINS H&H.
[D] - 117 V.A.C. BETWEEN PINS D & D.
[E] - 9 VOLTS OSCILLATOR GRID VOLTAGE SHOULD BE MEASURED WITH AN RF CHOKE PLACED IN SERIES WITH THE VOLTMETER LEAD DIRECTLY AT PIN OG.
A.C. LINE VOLTAGE 117 VOLTS POWER CONSUMPTION 30 WATTS.
2191-4

**Voltage Chart**

## ALIGNMENT PROCEDURE

**(Refer to Chassis View and Voltage Chart for location of trimmers)**

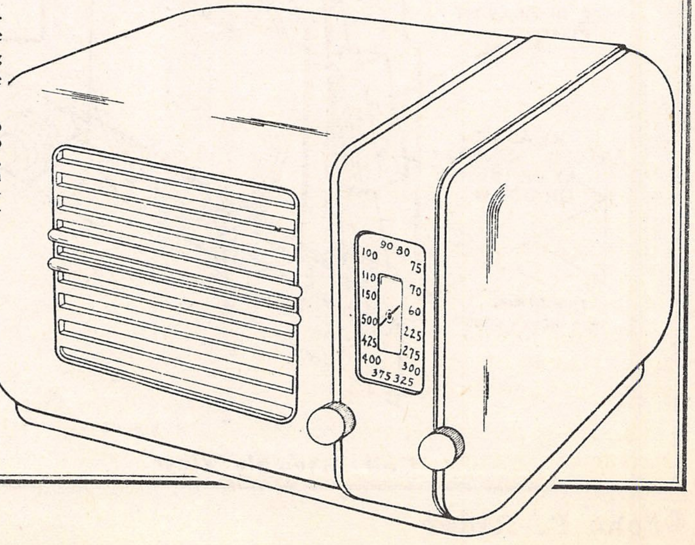
Output meter across 3.2-ohm output load.
Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

- Volume control at maximum for all adjustments.
- Chassis must be removed from cabinet for proper alignment

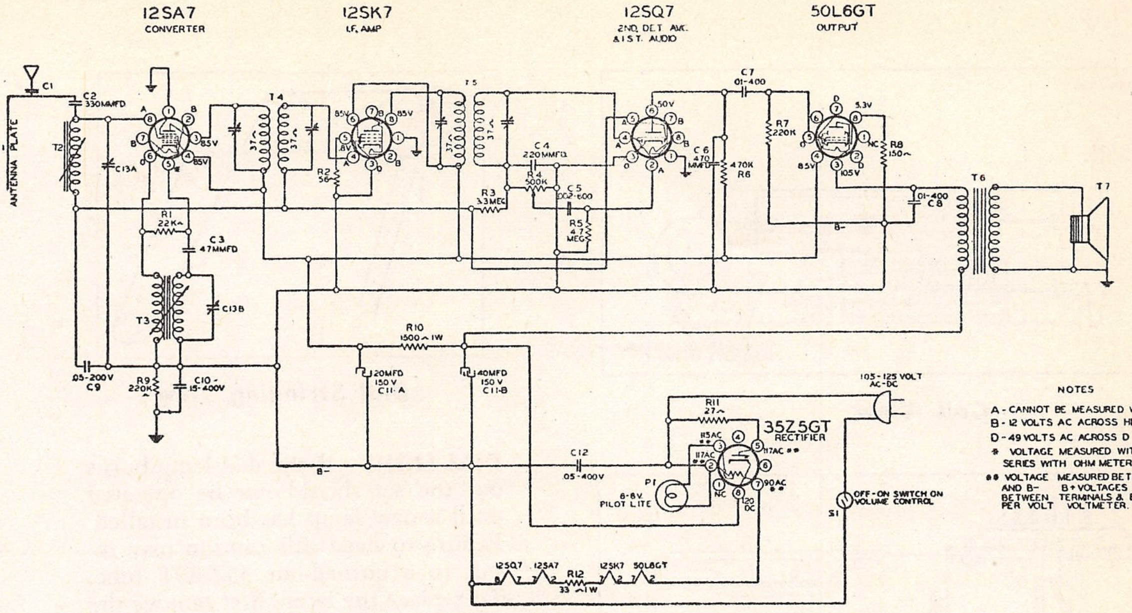
| *SIGNAL GENERATOR* | | | | *TUNER SETTING* | *ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)* |
|---|---|---|---|---|---|
| *Frequency* | *Dummy Antenna* | *Connection to Radio* | *Ground Connection* | | |
| 455 kc | .1 mf | Metal antenna plate | 12SQ7 Pin 3 | Iron cores all the way out | Trimmers on output and input I.F. cans |
| 1720 kc | .1 mf | Metal antenna plate | 12SQ7 Pin 3 | Iron cores all the way out | Oscillator trimmer C6 |
| 1720 kc | 200 mmf | External antenna clip | 12SQ7 Pin 3 | Iron cores all the way out | Antenna trimmer C2 |
| 1400 kc | 200 mmf | External antenna clip | 12SQ7 Pin 3 | Turn dial to 1400 kc | Adjust position of ant. coil (see coil assembly view) |
| 1720 kc | 200 mmf | External antenna clip | 12SQ7 Pin 3 | Turn dial to 1720 kc | Antenna trimmer C2 |

The antenna coil assembly is made so that it is movable up or down. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C2) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.


100
90
80
75
110
70
150
60
500
225
425
275
400
300
375
325

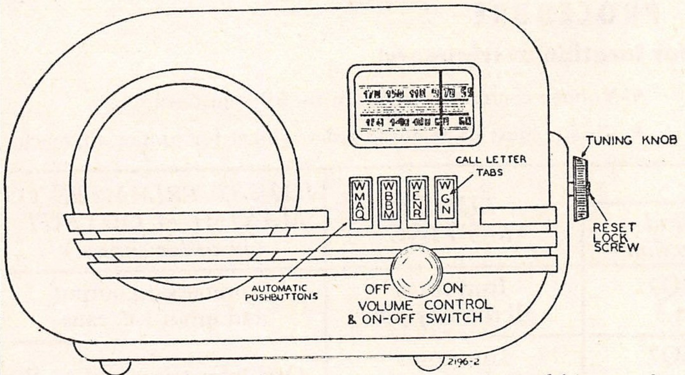
## W. T. GRANT CO. MODELS 502,503, Series A


12SA7
CONVERTER
12SK7
I.F. AMP
12SQ7
2ND. DET. AVC. & 1ST. AUDIO
50L6GT
OUTPUT
35Z5GT
RECTIFIER
ANTENNA PLATE
T1
T2
T3
T4
T5
T6
T7
C1
C2 330MMFD
C13A
C13B
R1 22K
C3 47MMFD
C4 220MMFD
R4 500K
C5 .002-600
R5 4.7 MEG
R3 3.3MEG
R2 56
C6 470 MMFD
R6 470K
C7 .01-400
R7 220K
R8 150
C8 .01-400
R9 220K
C9 .05-200V
C10 15-400V
R10 1500 1W
C11-A 20MFD 150V
C11-B 40MFD 150V
R11 27
C12 .05-400V
P1 6-8V PILOT LITE
S1 OFF-ON SWITCH ON VOLUME CONTROL
105-125 VOLT AC-DC
R12 33 1W
B-

NOTES

A - CANNOT BE MEASURED WITH VOLTMETER
B - 12 VOLTS AC ACROSS HEATER TERMINALS
D - 49 VOLTS AC ACROSS D TERMINALS
* VOLTAGE MEASURED WITH R.F CHOKE IN SERIES WITH OHM METER LEAD
** VOLTAGE MEASURED BETWEEN TERMINALS AND B- B+ VOLTAGES MEASURED BETWEEN TERMINALS & B- WITH A 1000 OHM PER VOLT VOLTMETER.

| | |
|---|---|
| POWER SUPPLY | 105 to 125 volts, DC or 50-60 cycle AC, 35 watts. |
| FREQUENCY RANGE | 545 to 1700 kc. |
| INTERMEDIATE FREQ. | 455 kc. |
| TUNING | Permeability. |
| ANTENNA | Built-in plate type. Also provisions for external antenna. No ground required. |
| SPEAKER | 5-inch; P.M.; voice coil impedance 3.2 ohms. |
| POWER OUTPUT | 800 milliwatts, undistorted. 1.2 watts maximum. |
| SENSITIVITY | 35 microvolts average for 50-milliwatt output. |
| TUBE COMPLEMENT | 12SA7, converter<br>12SK7, I. F. amplifier<br>12SQ7, 2nd detector, AVC, 1st audio<br>50L6GT, output amplifier<br>35Z5GT, rectifier |


WMAQ
WBBM
WENR
WGN
CALL LETTER TABS
TUNING KNOB
RESET LOCK SCREW
AUTOMATIC PUSHBUTTONS
OFF
ON
VOLUME CONTROL & ON-OFF SWITCH
2196-2

**SETTING THE PUSHBUTTONS**—The pushbuttons may be used, after proper adjustment, for the automatic tuning of any four stations on the standard broadcast band. They can be set up in any order.

**1.** Turn on the radio.

**2.** Push out the call letters of the four stations from the call-letter sheets supplied with this manual.

**3.** Insert one call-letter tab in the rectangular opening in the front of each pushbutton, in any order. Press an acetate tab (supplied in small envelope) into each of the pushbuttons.

**4.** With the screwdriver supplied, check to see that the locking screw in the center of the tuning knob (see front view) is loose. If it is not, turn it several turns to the left (counterclockwise).

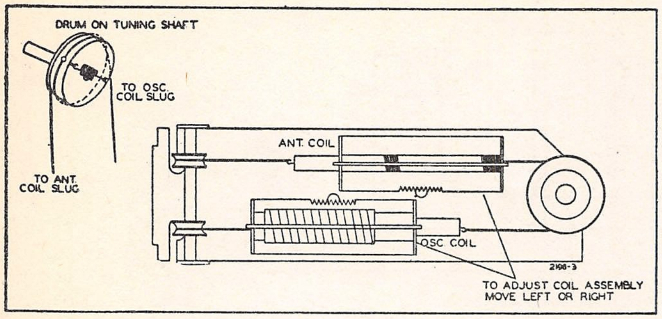
**5.** Press the first pushbutton down *all the way.* With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.

**6.** Follow this procedure for each of the three other buttons, setting each one for a different station.

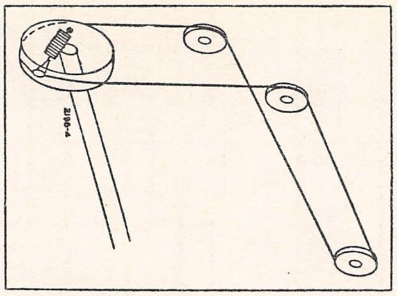
**7.** Rotate the tuning knob on the side of the cabinet as far to the right as it will go. Tighten the locking screw in the center of the knob. IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.

**8.** The pushbuttons are now properly set for automatic tuning. Any of the four stations may be tuned in simply by pressing the proper button down as far as it will go. If you wish to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.

# W. T. GRANT CO.

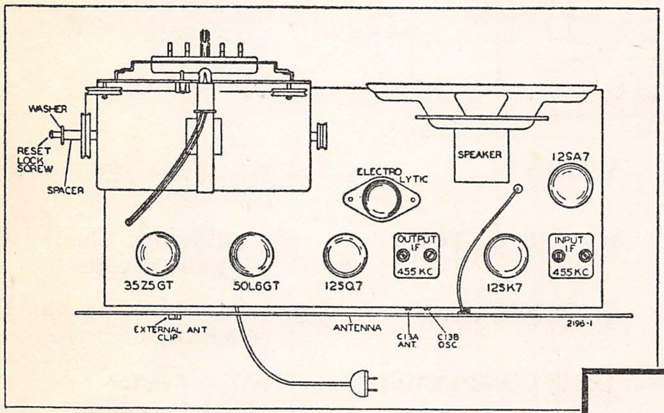

DRUM ON TUNING SHAFT
TO OSC. COIL SLUG
TO ANT. COIL SLUG
ANT. COIL
OSC COIL
2198-3
TO ADJUST COIL ASSEMBLY MOVE LEFT OR RIGHT

Coil View



Dial Stringing View

**DIAL LIGHT**—If the dial lamp burns out the set should not be operated until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube. To replace the lamp, first remove the buttons which hold the back to the cabinet. The Chassis View illustration shows the location of the dial lamp. *Pull* the lamp bracket toward the rear of the radio. The lamp can now be removed and replaced. Use a 6- to 8-volt lamp, type T-47.


WASHER
RESET LOCK SCREW
SPACER
SPEAKER
12SA7
ELECTROLYTIC
OUTPUT I.F. 455 KC
INPUT I.F. 455 KC
35Z5GT
50L6GT
12SQ7
12SK7
EXTERNAL ANT CLIP
ANTENNA
C13A ANT.
C13B OSC.
2196-1

Chassis View

## NOTE ON TUBE REPLACEMENT

**Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.**

## ALIGNMENT PROCEDURE

**(Refer to Chassis View for location of trimmers)**

Output meter across 3.2-ohm output load.

Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

- Volume control at maximum for all adjustments.
- Chassis must be removed from cabinet for proper alignment.

| *SIGNAL GENERATOR* | | | | *TUNER SETTING* | *ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)* |
|---|---|---|---|---|---|
| *Frequency* | *Dummy Antenna* | *Connection to Radio* | *Ground Connection* | | |
| 455 kc | .1 mf | Metal antenna plate | 12SQ7 Pin 3 | Iron cores all the way out | Trimmers on output and input I.F. cans |
| 1700 kc | .1 mf | Metal antenna plate | 12SQ7 Pin 3 | Iron cores all the way out | Oscillator trimmer C13-B |
| 1700 kc | 200 mmf | External antenna clip | 12SQ7 Pin 3 | Iron Cores all the way out | Antenna trimmer C13-A |
| 1400 kc | 200 mmf | External antenna clip | 12SQ7 Pin 3 | Turn dial to 1400 kc | Adjust position of ant. coil (see coil assembly view) |
| 1700 kc | 200 mmf | External antenna clip | 12SQ7 Pin 3 | Iron cores all the way out | Antenna trimmer C13-A |

The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C13-A) adjustment again at 1700 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1700 Kc.

## Models 502 and 503—Series A

### CAPACITORS

| Reference No. | Part No. | Description |
|---|---|---|
| C11-A<br>C11-B | 11992 | Electrolytic—20 mf; 40 mf x 150 volts For use on 60 cycles |
| C11-A<br>C11-B | 11993 | Electrolytic—40 mf; 60 mf x 150 volts For use on 25 cycles |
| C13-A<br>C13-B | 124151 | Dual Trimmer—Ant. and OSC |
| C9 | C-8D-10770 | .05 Mf x 200 Volts—Tubular |
| C7, 8 | C-8D-10761 | .01 Mf x 400 Volts—Tubular. |
| C12 | C-8D-10813 | .05 Mf x 400 Volts—Tubular |
| C5 | C-8D-10778 | .002 Mf x 600 Volts—Tubular |
| C10 | C-8D-10953 | .15 Mf x 400 Volts—Tubular |
| C6 | C-8F3-12 | 470 Mmf, 20% Mica |
| C4 | C-8F3-10 | 220 Mmf, 20% Mica |
| C2 | C-8F3-11 | 330 Mmf, 20% Mica |
| C3 | C-8F3-6 | 47 Mmf, 20% Mica |

### *RESISTORS

| Reference No. | Part No. | Description |
|---|---|---|
| R4<br>S1 | 101-238 | Volume Control (500 K) and Switch |
| | | or |
| R4<br>S1 | A-1CA-11306 | Volume Control (500 K) and Switch |
| R8 | C-9B1-52 | 150 Ohms ½ Watt 10% |
| R7, 9 | C-9B1-27 | 220K Ohms ½ Watt 20% |
| R5 | C-9B1-35 | 4.7 Megohms ½ Watt 20% |
| R3 | C-9B1-34 | 3.3 Megohms ½ Watt 20% |
| R1 | C-9B1-78 | 22K Ohms ½ Watt 10% |
| R10 | C-9B2-64 | 1500 Ohms 1 Watt 10% |
| R2 | C-9B1-47 | 56 Ohms ½ Watt 10% |
| R12 | C-9B2-4 | 33 Ohms 1 Watt 20% |
| R6 | C-9B1-94 | 470K Ohms ½ Watt 10% |
| R11 | C-9B1-43 | 27 Ohms ½ Watt 10. |

### COILS

| Reference No. | Part No. | Description |
|---|---|---|
| T4 | 108157L | Input I. F. Coil Complete in Can |
| T5 | 108157N | Output I. F. Coil Complete in Can |
| T2, T3 | 112877 | Antenna and Oscillator Coil Tuning Assembly R-F. Choke |

### SOCKETS

| Reference No. | Part No. | Description |
|---|---|---|
| | 121210 | Eight Prong Octal Socket |
| | 121216 | Bakelite Socket Base for Filter Condenser |

### SPEAKER

| Reference No. | Part No. | Description |
|---|---|---|
| T7 | 114225 | Five Inch P.M. Dynamic Speaker |
| T6 | 105108E | Output Transformer for Speaker |

### MISCELLANEOUS

| Reference No. | Part No. | Description |
|---|---|---|
| | 10798D | Line Cord and Plug |
| | 120389 | Coiled Tension Spring (For Coil Assembly) |
| P1 | 107249 | 6-8 Volt Pilot Lite Bulb—Type T47 |
| | 107274 | Socket Assembly for Pilot Lite |
| | 107205 | Insulating Shield for Pilot Lite Sock |
| | 134101 | Rubber Feet for Bottom of Cabinet |
| T1, C1 | 128586-S-1 | Back for Cabinet—Walnut |
| T1, C1 | 128-586-S | Back for Cabinet—Ivory |
| | 131193 | Snap-in Rivets to Fasten Back |
| | 128333-18 | Bakelite Cabinet—Dark Walnut |
| | 128333-9 | Bakelite Cabinet—Ivory Color |
| | 128162-17 | Knob for Volume Control—Walnut |
| | 128162-8 | Knob for Volum Control—Ivory |
| | B-5B-10994-18 | Tuning Knob—Walnut |
| | B-5B-10994-9 | Tuning Knob—Ivory |
| | A-2H-10996 | Reset Key |
| | 120388 | Locking Spring for Tuning Knob |
| | A-3F-10995 | Locking Screw |
| | 128-292B-17 | Molded Pushbuttons—Walnut |
| | 128-292B-8 | Molded Pushbuttons—Ivory |
| | 112784 | Set of Station Call Letters |
| | 112-606 | Acetate Tabs |

### TUNER PARTS

| Reference No. | Part No. | Description |
|---|---|---|
| | 117837 | Cam Shaft |
| | 117840 | Brass Spacer |
| | 117838 | Thrust Collar. |
| | 131142 | "C" Washer |
| | 115146 | Cam. |
| | 115143 | Keywasher |
| | 117528 | Brass Spacer |
| | 117529 | Brass Spacer. |
| | 131181 | Spring Washer |
| | 117604 | Locking Collar |
| | 117610 | Brass Spacer |
| | 112602 | Drum for Dial String |
| | 120285 | Coiled Spring for Dial String |
| | 120214 | Silk Line Dial String |
| | 115361 | Lever with Roller. |
| | 120283 | Return Spring for Lever |

### DIAL PARTS

| Reference No. | Part No. | Description |
|---|---|---|
| | 112878 | Dial Scale |
| | 112661 | Crystal for Dial |
| | 131277 | Metal Clamp for Crystal |
| | 115453 | Dial Bracket—with 3 Pulleys |
| | 112668 | Pointer |
| | 117609 | Brass Spacer for Pointer |

## Models 500 and 501—Series A

### CAPACITORS*

| Ref. No. | Part No. | Description |
|---|---|---|
| C18 | C-8D-10788 | .004 x 600 Volt Tubular Condenser |
| C19, C15 | C-8D-10761 | .01 x 400 Volt Tubular Condenser |
| C16 | C-8D-10813 | .05 x 400 Volt Tubular Condenser |
| C8, C9 | C-8D-10770 | .05 x 200 Volt Tubular Condenser |
| C15 | C-8D-10789 | .002 x 600 Volt Tubular Condenser |
| C7 | C-8D-10953 | .15 x 400 Volt Tubular Condenser |
| C10, C11 | 119-92 | 20 Mfd.—40 Mfd. x 150 Volt Electrolytic (For 60 Cycle) |
| C2, C6 | 124100 | Trimmer (Antenna; Oscillator) |
| C17 | C-8F6-121 | .00047 Mica Condenser |
| C14 | C-8F3-10 | .00022 Mica Condenser |
| C5 | C-8F3-11 | .00033 Mica Condenser |
| C1 | C-8F3-6 | .000047 Mica Condenser. |

### RESISTORS*

| Ref. No. | Part No. | Description |
|---|---|---|
| R4 | C-9B1-34 | 3.3 megohm, ½ watt resistor |
| R9 | C-9B1-29 | 470M ohm, ½ watt resistor |
| R2, R8 | C-9B1-26 | 150M ohm, ½ watt resistor |
| R10 | C-9B1-52 | 150 ohm, ½ watt resistor |
| R1 | C-9B1-78 | 22M ohm, ½ watt resistor |
| R6 | C-9B1-35 | 4.7 megohm, ½ watt resistor |
| R3 | C-9B2-63 | 1200 ohm, 1 watt resistor |
| R7 | C-9B1-42 | 22 ohm, ½ watt resistor |
| R11 | C-9B2-44 | 33 ohm, 1 watt resistor |
| R5, S1 | 101196 | Volume control and on-off switch (500M ohm) |

### COILS

| Ref. No. | Part No. | Description |
|---|---|---|
| T3-C3-C4 | 108157C | Input I.F. coil assembly complete |
| T4-C12-C13 | 108157C | Output I.F. coil assembly complete |
| T2 | 110126 | Oscillator coil assembly complete |
| T1 | 111136B | Antenna coil assembly complete with bracket |
| | 112-676 | Iron core for antenna coil |
| | 112-677 | Iron core for oscillator coil |

### SOCKETS

| Ref. No. | Part No. | Description |
|---|---|---|
| | 121210 | Eight prong octal socket |
| | 121177 | Eight prong octal socket 12SK7 |

### SPEAKER

| Ref. No. | Part No. | Description |
|---|---|---|
| T5 | B-18A-11124 | 4 Inch P.M. dynamic speaker complete with output transformer |

### MISCELLANEOUS

| Ref. No. | Part No. | Description |
|---|---|---|
| | 10798 | Line cord and plug |
| | 115408 | Mounting bracket complete with brass pulley (for mounting ant. coil) |
| CA | 115-459-18 | Walnut finish metal antenna plate (back for cabinet) |
| CA | 115-459-9 | Ivory finish metal antenna plate (back for, cabinet) |
| | 12742 | Flat fibre washer for mounting antenna plate (back) |
| | 127138 | Fibre grommet for mounting antenna plate |
| | 13255 | No. 6 x ¼" hex. head screws (mount antenna plate to chassis) |
| | 132-69 | No. 6 x ⅜" hex. head self-tapping screw, holds antenna plate to cabinet |
| | 13220 | No. 6—32 x ⅜ screws; unslotted head; chassis mounting |
| | 128-345-18 | Walnut cabinet complete (less back) |
| | 128-345-9 | Ivory cabinet complete (less back) |
| | 128342-17 | Walnut knobs |
| | 128342-8 | Ivory knobs |

### DIAL PARTS LIST

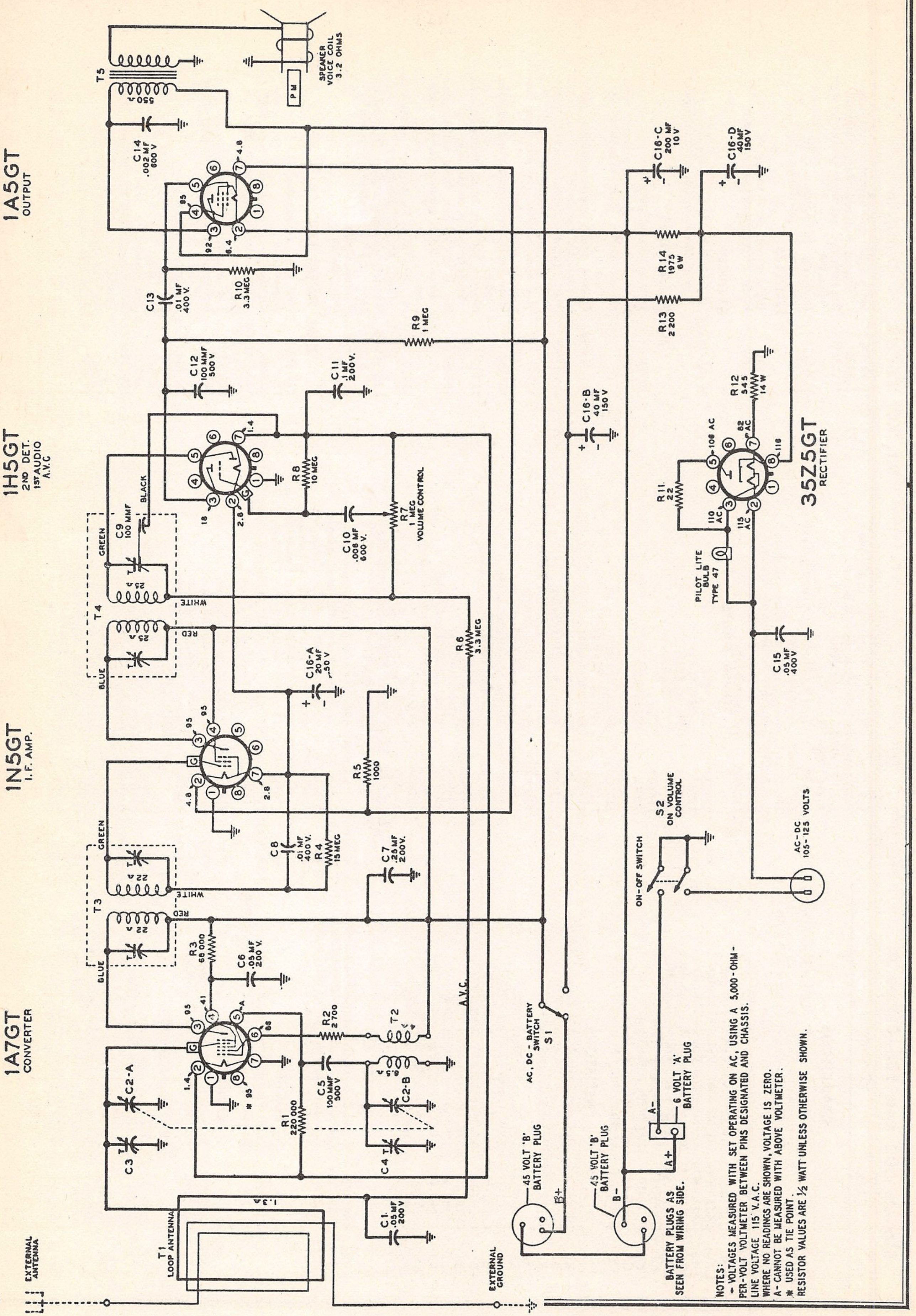
| Ref. No. | Part No. | Description |
|---|---|---|
| | 112-673 | Dial scale (calibrated) |
| | 112675 | Pointer disc |
| P1 | 107249 | 6-8 volt pilot light bulb type T-47 |
| | A55A-11408 | Socket assembly for pilot light |
| | A2D-11331 | Bracket for socket assembly |
| | 117625 | Tuning control drive shaft |
| | 117624 | Drive pulley with stop pin (for drive shaft) |
| | 115464 | Bracket for dial shaft |
| | 115465 | Dial bracket |
| | 117627 | Dial shaft |
| | 112602 | Dial drum |
| | 120214 | Silk drive string for pointer (1 ft. used) |
| | 120285 | Tension spring for drive string |
| | 131269 | Speed nut to fasten dial scale |

*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control, some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences follows:

Pre-standardized value—200,000 ohms, 20%, 1/3 watt
RMA value—220,000 ohms, 20%, 1/2 watt
Pre-standardized value—50 mmf, 500 volts, 20%
RMA value—47 mmf, 500 volts 20%

MODEL 510, Series A

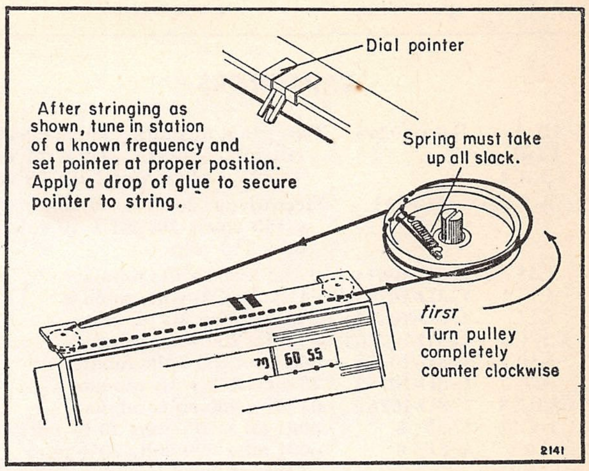
# W. T. GRANT CO.


1A7GT
CONVERTER
1N5GT
I. F. AMP.
1H5GT
2ND DET.
1ST AUDIO
A.V.C
1A5GT
OUTPUT
35Z5GT
RECTIFIER
SPEAKER
VOICE COIL
3.2 OHMS
P M
T5
550 Ω
C14
.002 MF
600 V
C13
.01 MF
400 V.
R10
3.3 MEG
R9
1 MEG
C12
100 MMF
500 V
C11
1 MF
200V.
R8
10 MEG
C10
.006 MF
600 V.
R7
1 MEG
VOLUME CONTROL
C9
100 MMF
BLACK
GREEN
WHITE
RED
BLUE
T4
25 Ω
R6
3.3 MEG
C16-A
20 MF
50 V
R5
1000
C8
.01 MF
400 V.
R4
15 MEG
C7
.25 MF
200V.
T3
22 Ω
R3
68 000
C6
.05 MF
200 V.
R2
2 700
T2
C5
100 MMF
500 V
R1
220 000
C2-A
C2-B
C3
C4
C1
.05 MF
200 V
T1
LOOP ANTENNA
1.3 Ω
EXTERNAL
ANTENNA
EXTERNAL
GROUND
A.V.C.
AC. DC - BATTERY
SWITCH
S1
45 VOLT 'B'
BATTERY PLUG
B+
B-
A+
A-
6 VOLT 'A'
BATTERY PLUG
BATTERY PLUGS AS
SEEN FROM WIRING SIDE.
ON-OFF SWITCH
S2
ON VOLUME
CONTROL
AC-DC
105-125 VOLTS
C16-B
40 MF
150 V
C16-C
200 MF
10 V
C16-D
40 MF
150V
R14
1975
6W
R13
2 200
R12
545
14 W
R11
22
PILOT LITE
BULB
TYPE 47
C15
.05 MF
400V
108 AC
82 AC
116
110 AC
115 AC
4.8
95
92
6.4
1.4
18
2.8
41
86
* 95

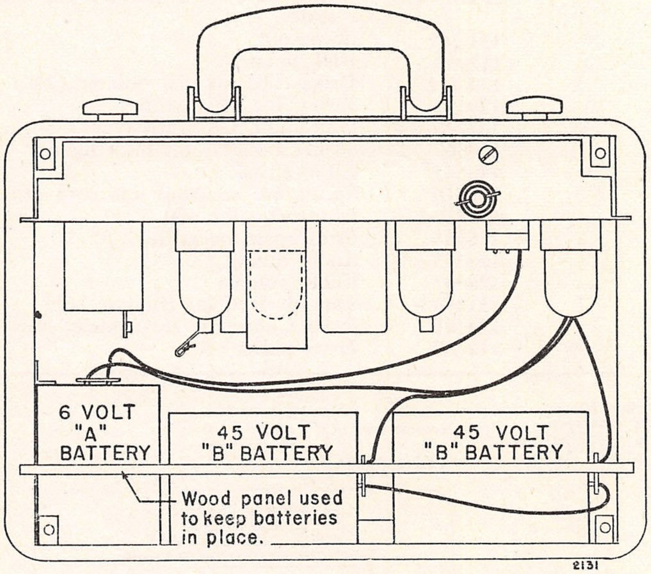
NOTES:
- VOLTAGES MEASURED WITH SET OPERATING ON AC, USING A 5,000-OHM-PER-VOLT VOLTMETER BETWEEN PINS DESIGNATED AND CHASSIS. LINE VOLTAGE 115 V.A.C.
WHERE NO READINGS ARE SHOWN, VOLTAGE IS ZERO.
A- CANNOT BE MEASURED WITH ABOVE VOLTMETER.
* USED AS TIE POINT.
RESISTOR VALUES ARE ½ WATT UNLESS OTHERWISE SHOWN.

## ELECTRICAL SPECIFICATIONS

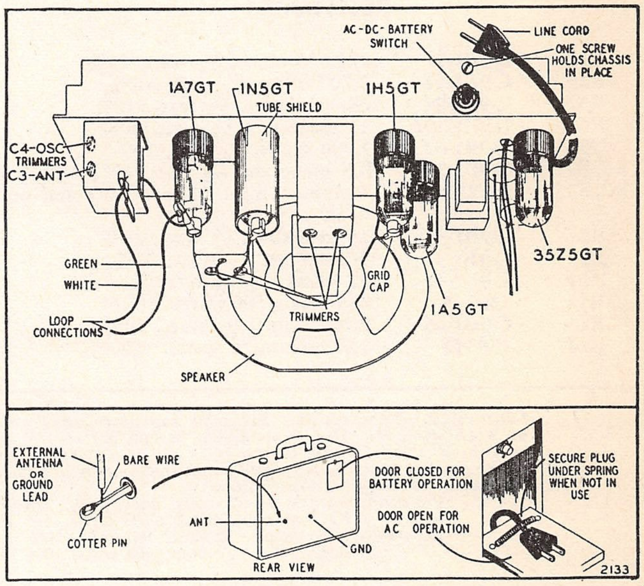
| | |
|---|---|
| **Power Supply** | 105 to 125 volts, DC or 50-60 cycle AC, 30 watts.<br>Battery: A—6 volts, 58 ma.<br>B—90 volts, 9 ma. |
| **Frequency Range** | 530 to 1650 kc. |
| **Intermediate Freq.** | 455 kc. |
| **Tuning** | Two-gang capacitor. |
| **Antenna** | Built-in loop. Provisions also for external antenna and ground. |
| **Speaker** | 5-inch; P.M.; voice coil impedance 3.2 ohms. |
| **Power Output** | 80 milliwatts undistorted.<br>180 milliwatts maximum. |
| **Sensitivity** | 30 microvolts average for 50-milliwatt output. |
| **Selectivity** | 43 kc broad at 1000 times signal at 1000 kc. |


Dial pointer
After stringing as shown, tune in station of a known frequency and set pointer at proper position. Apply a drop of glue to secure pointer to string.
Spring must take up all slack.
first
Turn pulley completely counter clockwise
70
60 55
2141

Replacement of Dial Pointer Drive Cord


6 VOLT "A" BATTERY
45 VOLT "B" BATTERY
45 VOLT "B" BATTERY
Wood panel used to keep batteries in place.
2131

Battery Installation


AC-DC-BATTERY SWITCH
LINE CORD
ONE SCREW HOLDS CHASSIS IN PLACE
1A7GT
1N5GT
TUBE SHIELD
1H5GT
C4-OSC
TRIMMERS
C3-ANT
GREEN
WHITE
LOOP CONNECTIONS
TRIMMERS
GRID CAP
1A5GT
35Z5GT
SPEAKER
EXTERNAL ANTENNA OR GROUND LEAD
BARE WIRE
COTTER PIN
ANT
GND
REAR VIEW
DOOR CLOSED FOR BATTERY OPERATION
DOOR OPEN FOR AC OPERATION
SECURE PLUG UNDER SPRING WHEN NOT IN USE
2133

Chassis View, Showing Tube Location

## ALIGNMENT PROCEDURE

- Output meter across 3.2-ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

| *SIGNAL GENERATOR* | | | | *TUNER SETTING* | *ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)* |
|---|---|---|---|---|---|
| *Frequency* | *Coupling Capacitor* | *Connection to Radio* | *Ground Connection* | | |
| 455 kc | .1 mf | 1A7GT grid cap* | Chassis | Rotor full open (plates out of mesh) | Input and output trimmers on IF cans |
| 1650 kc | .1 mf | 1A7GT grid cap* | Chassis | Rotor full open (plates out of mesh) | Oscillator trimmer C4 |
| 1400 kc† | 200 mmf | External antenna clip | External ground clip | 1400 kc | Antenna trimmer C3 |

* If loop is not connected when making this adjustment, substitute a 1-megohm resistor across the loop leads.

† For this adjustment chassis should be remounted in cabinet and loop connected. Antenna trimmer can be reached through a hole in the side of the cabinet.

MODEL 510, Series A

# W. T. GRANT CO.

## CAPACITORS

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| C2-A,<br>C2-B,<br>C3, C4 | B-8A-10246 | Two gang, including antenna and oscillator trimmers. Range of gang: 14-452 mmf (ant) and 10-198 (osc). |
| C16-A-B-C-D | 119-123 | Electrolytic; 20 mf x 50 volts; 40 mf x 150 volts; 200 mf x 10 volts; 40 mf x 150 volts. |
| C15 | C-8D-10813 | .05 mf x 400 volts tubular |
| C14 | C-8D-10789 | .002 mf x 600 volts tubular |
| C11 | C-8D-10771 | .1 mf x 200 volts tubular |
| C1, C6 | C-8D-10770 | .05 mf x 200 volts tubular |
| C10 | C-8D-10785 | .006 mf x 600 volts tubular |
| C7 | C-8D-10775 | .25 mf x 200 volts tubular |
| C8, C13 | C-8D-10761 | .01 mf x 400 volts tubular |
| C5, C12 | C-8F3-8 | .0001 mf x 500 volts 20 % mica |
| C9 | C-8F3-8 | .0001 mf x 500 volts 20% mica (Part of 2nd I.F. coil assembly.) |

## RESISTORS*

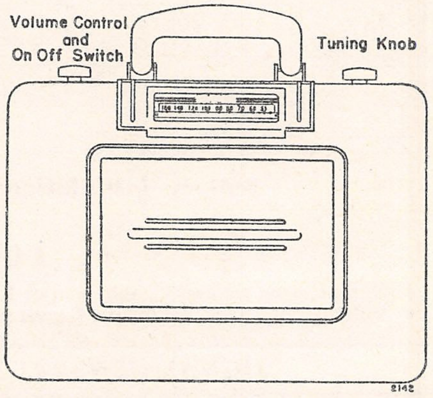
| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| R1 | C-9B1-27 | 220,000 ohms, ½ watt, 20% |
| R2 | C-9B1-67 | 2,700 ohms, ½ watt, 10% |
| R3 | C-9B1-84 | 68,000 ohms, ½ watt, 10% |
| R4 | C-9B1-302 | 15 megohms, ½ watt, 20% |
| R5 | C-9B1-62 | 1,000 ohms, ½ watt, 10% |
| R6, R10 | C-9B1-34 | 3.3 megohms, ½ watt, 20% |
| R7, S2 | 101252 | Volume contol (1 megohm) and on-off switch |
| R8 | C-9B1-37 | 10 megohms, ½ watt, 20% |
| R9 | C-9B1-31 | 1 megohm, ½ watt, 20% |
| R11 | C-9B1-42 | 22 ohms, ½ watt, 10% |
| R12 | 130343 | 545 ohms, 14 watts, 5% |
| R13 | C-9B1-66 | 2,200 ohms, ½ watt, 10% |
| R14 | 130344 | 1,975 ohms, 6 watts, 5% |

## COILS AND TRANSFORMERS

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| T1 | B-13E-10250 | Loop antenna assembly |
| T2 | A-13D-10239 | Oscillator coil |
| T3 | 108201 | Input I.F. transformer. Range of trimmers: 53-97 mmf each. |
| T4, C9 | 108200 | Output I.F. transformer. Range of trimmers: 39-71 mmf each. |
| T5 | 105127 | Output transformer |

## MISCELLANEOUS

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
|  | 114240B | Speaker, 5-inch, P.M. |
|  | 120406 | "B"-battery cable assembly |
|  | 120407 | "A"-battery cable assembly |
|  | 121171 | Tube socket |
| S1 | 125153 | Line-battery switch |
|  | 120417 | Spring for line-battery switch |
|  | 107-363 | Line cord and plug |
|  | 115396B | Tube shield |
|  | B-6D-11301 | Dial scale |
|  | 112925 | Diffuser |
|  | A-2M-7758 | Snap-in rivets for diffuser and dial scale |
|  | 131-307 | Cotter pin |
|  | 112922 | Dial pointer |
|  | 120-214 | Drive cord for dial pointer (20") |
|  | 120197 | Spring for drive cord |
|  | 107249 | Pilot light, 6-8 volts, type T-47 |
|  | 107362 | Socket assembly for pilot light |
|  | 128641 | Cabinet back |
|  | 120410 | Spring for securing line cord plug |
|  | 112910-1 | Escutcheon for dial |
|  | 128643 | Escutcheon for grille |
|  | 128645 | Knob, tuning |
|  | 128647 | Knob, volume |
|  | 131253 | Snap-in rivet, for trimmer hole |
|  | 13448B | Rubber grommet for trimmer hole |
|  | 112-928 | Drive pulley |



**BATTERY REPLACEMENT** — Run-down batteries are indicated when (1) the volume cannot be brought up to the desired level; (2) the tone of the radio is "mushy" (not clear); or (3) reception fails completely. If you are in doubt as to whether the batteries are faulty, have your radio dealer check them for you.

If the batteries need replacement, get two 45-volt "B" batteries (size: 3½" x 2¼" x 4½") and one 6-volt "A" battery (size: 2⅝" x 2⅝" x 4").

**PILOT LIGHT** — If the pilot lamp burns out, the set should not be operated on AC or DC power until a new lamp has been installed. Failure to heed this caution may result in a burned-out 35Z5GT tube.

**TUBES**—Tubes which have weakened with age may cause poor or erratic reception; therefore have the tubes tested periodically and replace those which are weak. To remove the tubes, first remove the back of the cabinet. Pull the grid caps from the tops of the 1A7GT, 1N5GT, and 1H5GT tubes (see Chassis View). Then remove the tube shields where present. When removing a tube, rock it back and forth gently while pulling it out of its socket.

When replacing tubes, grid caps, and shields, refer to the Chassis View illustration to make sure that the replacements are properly made.

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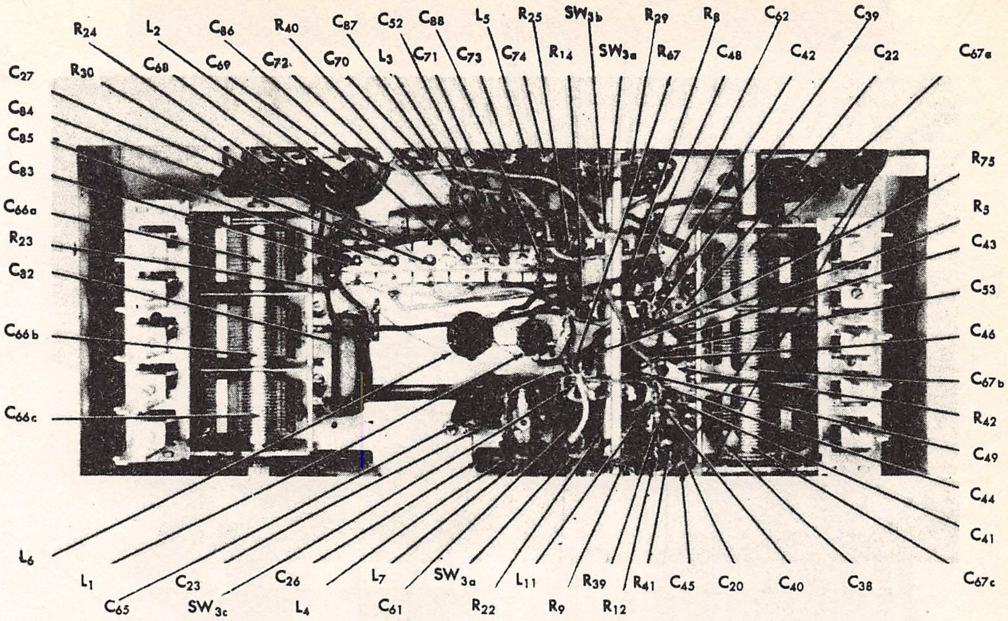
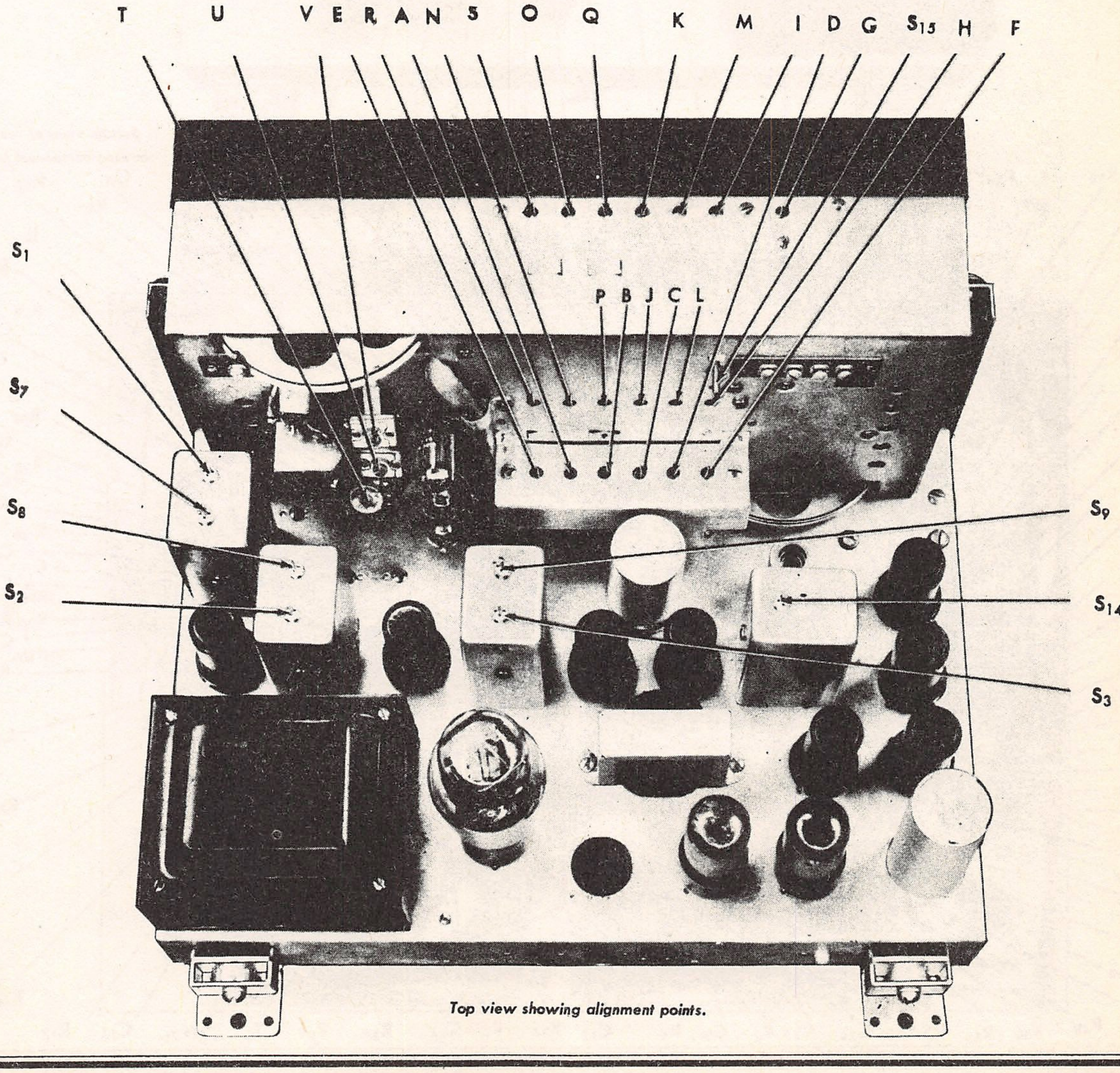
*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control, some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences follows:

Pre-standardized value—200,000 ohms, 20%, 1/3 watt
RMA value—220,000 ohms, 20%, 1/2 watt
Pre-standardized value—50 mmf, 500 volts, 20%
RMA value—47 mmf, 500 volts, 20%


$R_{24}$
$L_2$
$C_{86}$
$R_{40}$
$C_{87}$
$C_{52}$
$C_{88}$
$L_5$
$R_{25}$
$SW_{3b}$
$R_{29}$
$R_8$
$C_{62}$
$C_{39}$
$C_{27}$
$R_{30}$
$C_{68}$
$C_{69}$
$C_{72}$
$C_{70}$
$L_3$
$C_{71}$
$C_{73}$
$C_{74}$
$R_{14}$
$SW_{3a}$
$R_{67}$
$C_{48}$
$C_{42}$
$C_{22}$
$C_{67a}$
$C_{84}$
$C_{85}$
$C_{83}$
$C_{66a}$
$R_{23}$
$C_{32}$
$C_{66b}$
$C_{66c}$
$R_{75}$
$R_5$
$C_{43}$
$C_{53}$
$C_{46}$
$C_{67b}$
$R_{42}$
$C_{49}$
$C_{44}$
$C_{41}$
$L_6$
$L_1$
$C_{65}$
$C_{23}$
$SW_{3c}$
$C_{26}$
$L_4$
$L_7$
$C_{61}$
$SW_{3a}$
$R_{22}$
$L_{11}$
$R_9$
$R_{39}$
$R_{12}$
$R_{41}$
$C_{45}$
$C_{20}$
$C_{40}$
$C_{38}$
$C_{67c}$

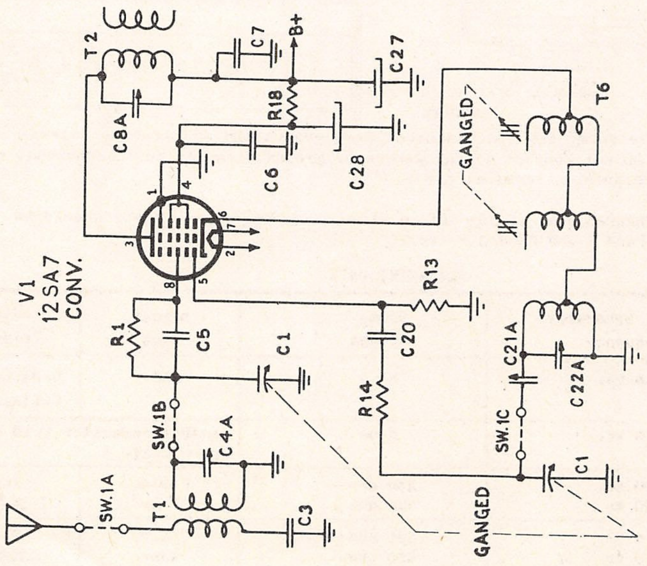
*Back view of R.F. chassis showing component location.*


T
U
V
E
R
A
N
S
O
Q
K
M
I
D
G
$S_{15}$
H
F
P
B
J
C
L
$S_1$
$S_7$
$S_8$
$S_2$
$S_9$
$S_{14}$
$S_3$

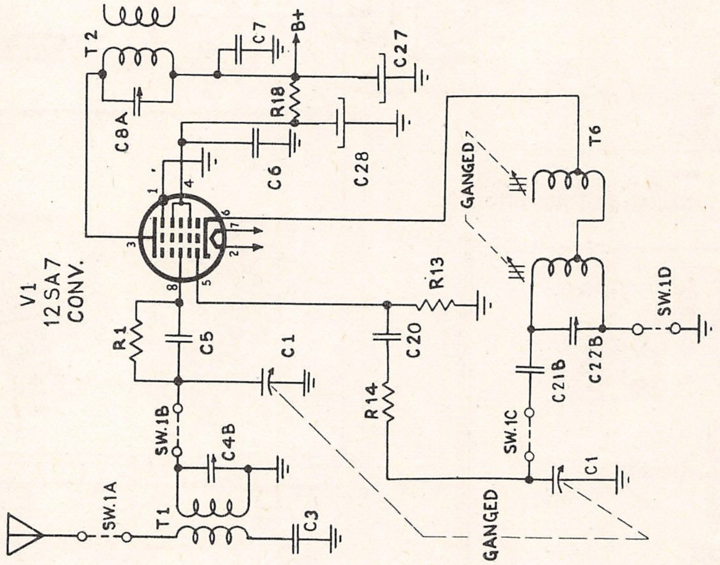
*Top view showing alignment points.*

MODEL EC-1B, Echophone

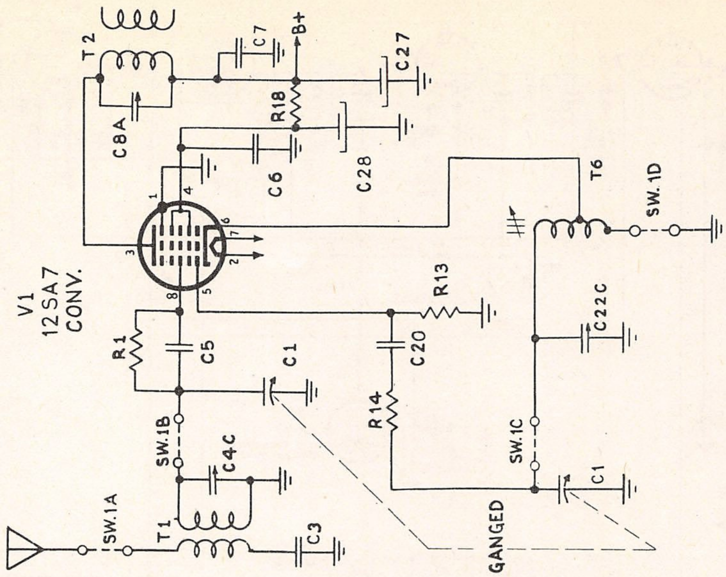
THE HALLICRAFTERS CO.


V1
12SA7
CONV.
T2
C7
B+
C27
C8A
R18
C28
C6
T6
GANGED
R13
R1
C5
C1
C20
C21A
C22A
R14
SW.1B
C4A
SW.1C
SW.1A
T1
C3
GANGED
1
3
4
5
6
7
2
8

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND


V1
12SA7
CONV.
T2
C7
B+
C27
C8A
R18
C28
C6
T6
GANGED
R13
R1
C5
C1
C20
SW.1D
C21B
C22B
R14
SW.1B
C4B
SW.1C
SW.1A
T1
C3
GANGED
1
3
4
5
6
7
2
8

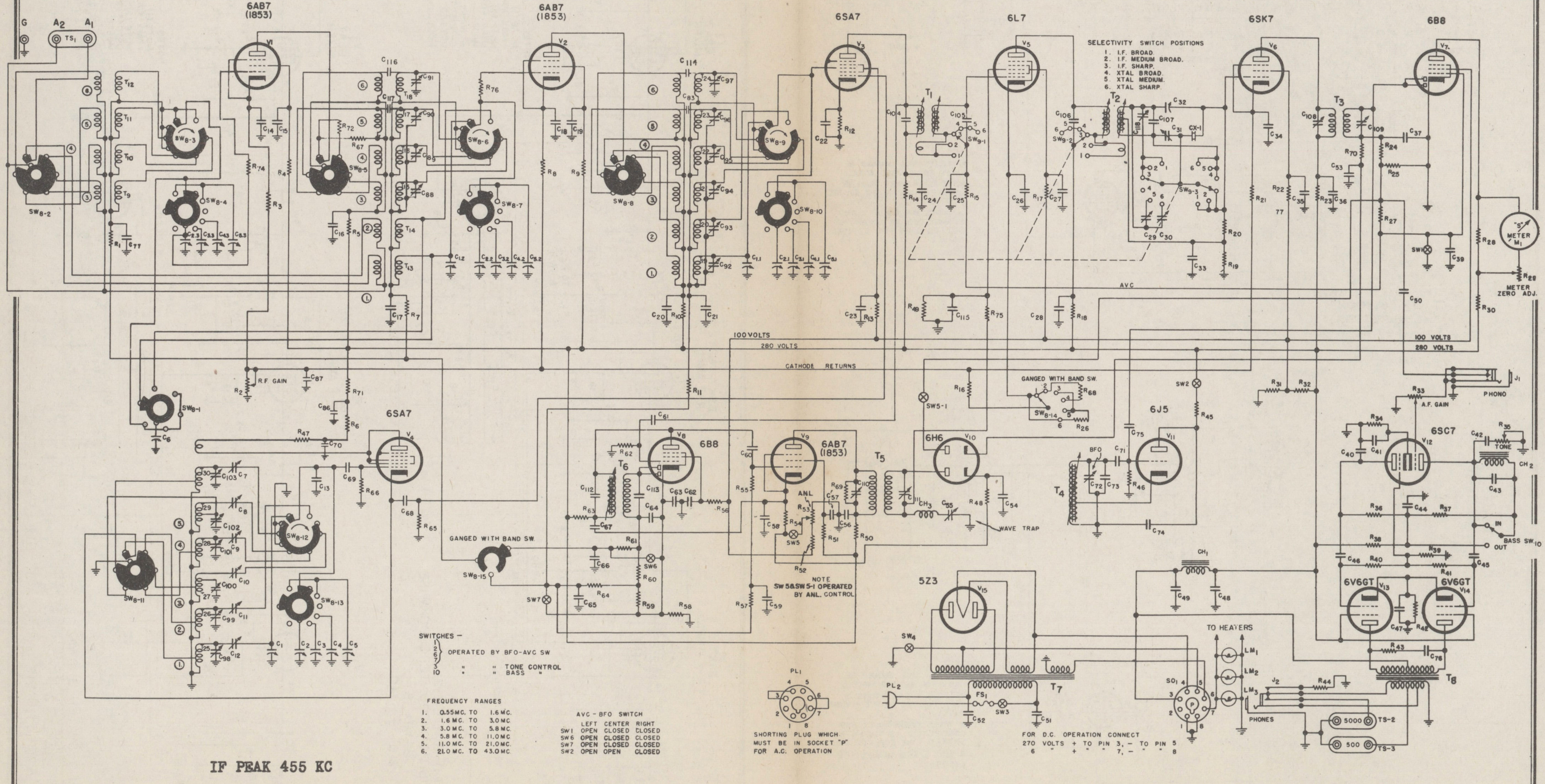
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BAND 2


V1
12SA7
CONV.
T2
C7
B+
C27
C8A
R18
C28
C6
T6
SW.1D
R13
R1
C5
C1
C20
C22C
R14
SW.1B
C4C
SW.1C
SW.1A
T1
C3
GANGED
1
3
4
5
6
7
2
8

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
BAND 3

THE HALLICRAFTERS CO.

**MODEL SX-28A, Super Skyrider**


G
A2
A1
TS1
6AB7 (1853)
V1
6AB7 (1853)
V2
6SA7
V3
6L7
V5
6SK7
V6
6B8
V7
6SA7
V4
6B8
V8
6AB7 (1853)
V9
6H6
V10
6J5
V11
6SC7
V12
6V6GT
V13
6V6GT
V14
5Z3
V15
R.F. GAIN
AVC
100 VOLTS
280 VOLTS
CATHODE RETURNS
"S" METER M1
METER ZERO ADJ.
PHONO
A.F. GAIN
TONE
BASS SW.10
IN
OUT
GANGED WITH BAND SW.
ANL
WAVE TRAP
BFO
TO HEATERS
PHONES
PL1
PL2
SO1
T7
T8
5000
TS-2
500
TS-3

SELECTIVITY SWITCH POSITIONS
1. I.F. BROAD.
2. I.F. MEDIUM BROAD.
3. I.F. SHARP.
4. XTAL BROAD.
5. XTAL MEDIUM.
6. XTAL SHARP.

NOTE
SW 5 & SW 5-1 OPERATED BY ANL. CONTROL

SWITCHES —
1, 2, 6, 7 } OPERATED BY BFO-AVC SW
3 " " TONE CONTROL
10 " " BASS "

FREQUENCY RANGES

| | | | |
|---|---|---|---|
| 1. | 0.55 MC. | TO | 1.6 MC. |
| 2. | 1.6 MC. | TO | 3.0 MC. |
| 3. | 3.0 MC. | TO | 5.8 MC. |
| 4. | 5.8 MC. | TO | 11.0 MC. |
| 5. | 11.0 MC. | TO | 21.0 MC. |
| 6. | 21.0 MC. | TO | 43.0 MC. |

AVC - BFO SWITCH

| | LEFT | CENTER | RIGHT |
|---|---|---|---|
| SW1 | OPEN | CLOSED | CLOSED |
| SW6 | OPEN | CLOSED | CLOSED |
| SW7 | OPEN | CLOSED | CLOSED |
| SW2 | OPEN | OPEN | CLOSED |

SHORTING PLUG WHICH MUST BE IN SOCKET "P" FOR A.C. OPERATION

FOR D.C. OPERATION CONNECT
270 VOLTS + TO PIN 3, — TO PIN 5
6 " + " " 7, — " " 8

**IF PEAK 455 KC**

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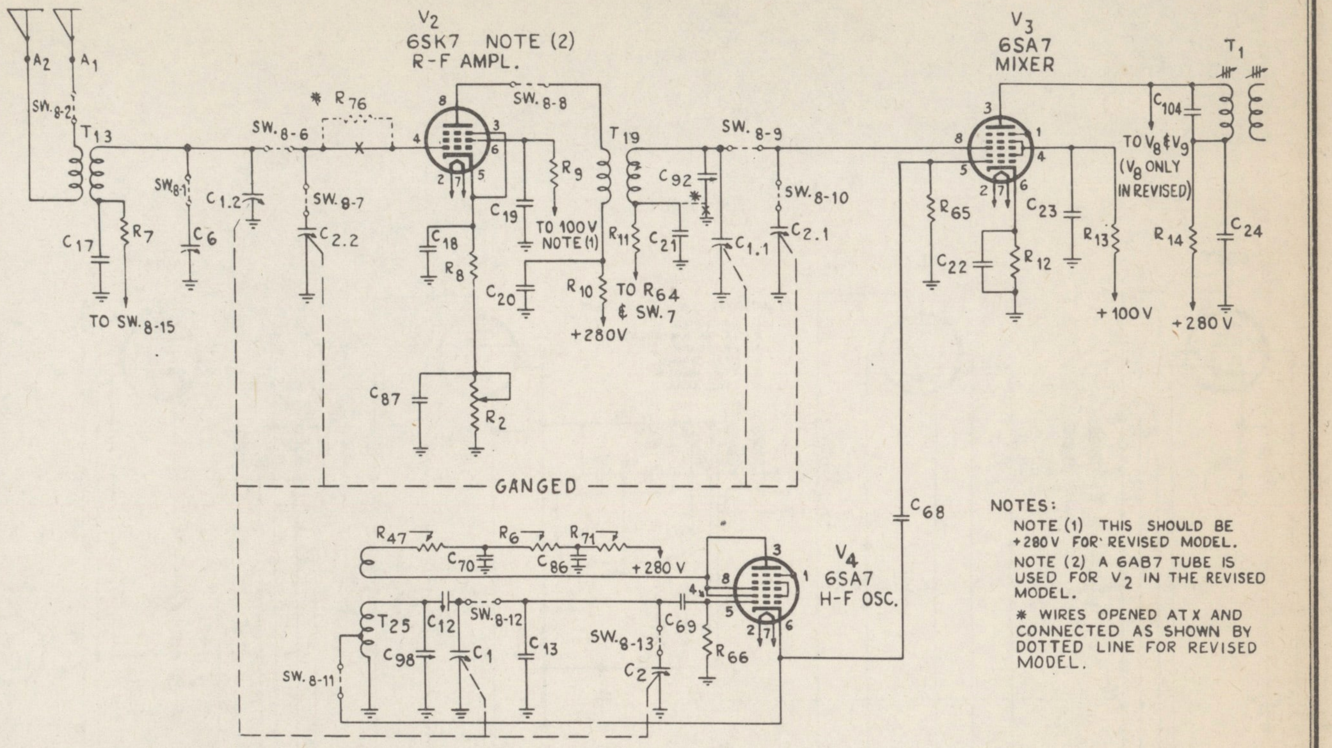
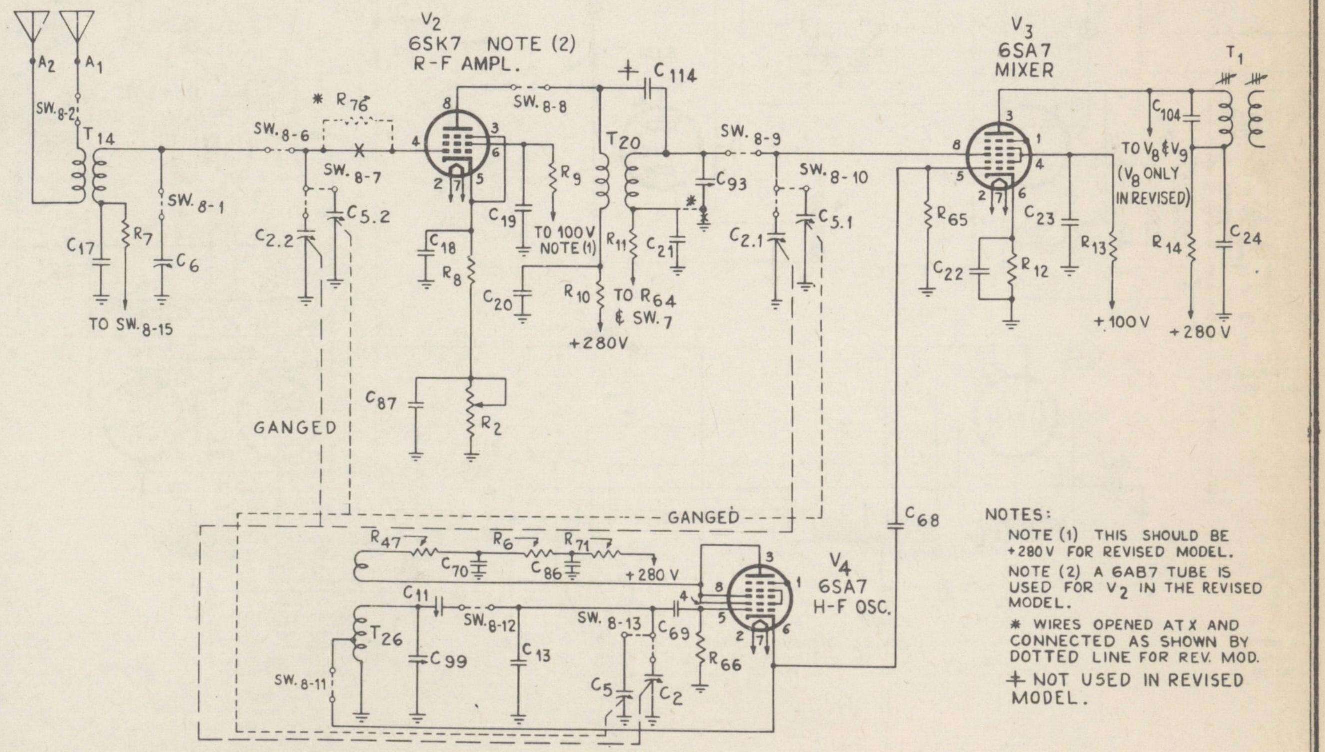
# THE HALLICRAFTERS CO.

MODEL SX-28A,
Super Skyrider


A2
A1
SW. 8-2
T13
SW. 8-1
C1.2
C6
C17
R7
TO SW. 8-15
SW. 8-6
* R76
X
SW. 8-7
C2.2
V2
6SK7 NOTE (2)
R-F AMPL.
SW. 8-8
C18
R8
C19
R9
TO 100 V NOTE (1)
C20
R10
+280V
T19
R11
C21
TO R64 & SW. 7
C92
*
SW. 8-9
C1.1
SW. 8-10
C2.1
C87
R2
GANGED
V3
6SA7
MIXER
R65
C22
R12
C23
R13
+100V
C104
TO V8 & V9
(V8 ONLY IN REVISED)
R14
C24
+280V
T1
C68
R47
C70
R6
C86
R71
+280 V
V4
6SA7
H-F OSC.
R66
T25
C12
SW. 8-12
C98
C1
C13
SW. 8-13
C69
C2
SW. 8-11

NOTES:
NOTE (1) THIS SHOULD BE +280V FOR REVISED MODEL.
NOTE (2) A 6AB7 TUBE IS USED FOR $V_2$ IN THE REVISED MODEL.
* WIRES OPENED AT X AND CONNECTED AS SHOWN BY DOTTED LINE FOR REVISED MODEL.

BAND-SWITCH SHOWN
AT 1ST POSITION
BAND 1 - BROADCAST
550-1600 KC.

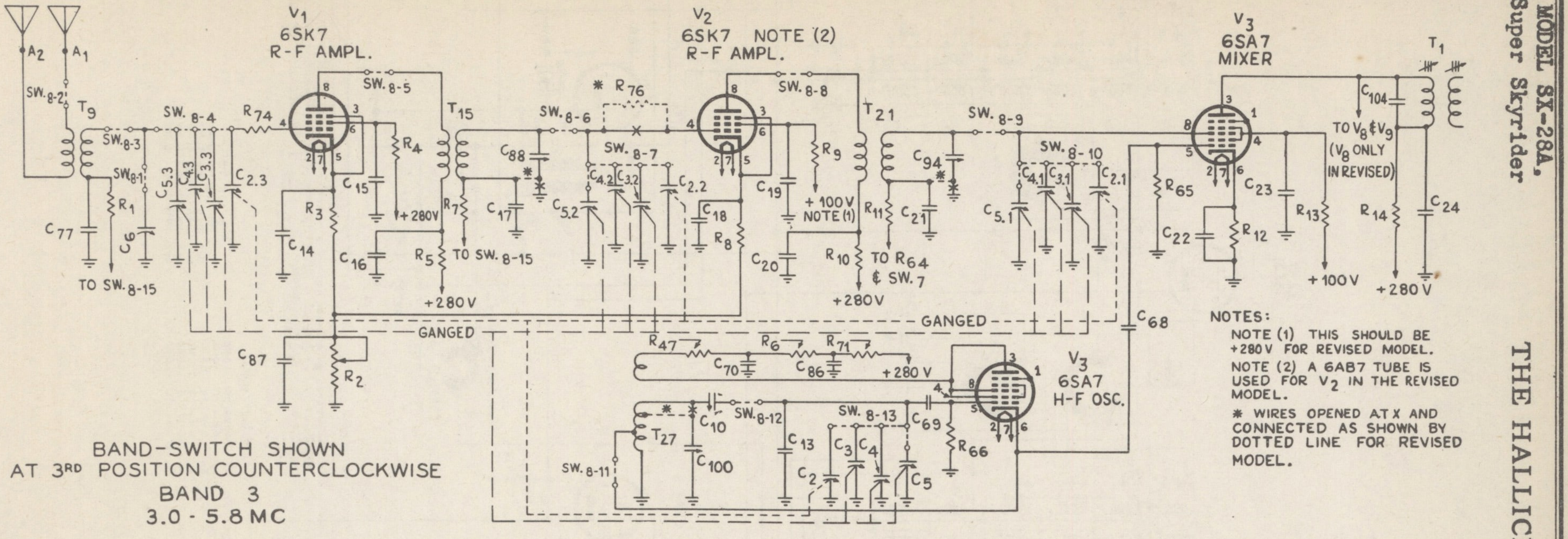

A2
A1
SW. 8-2
T14
SW. 8-1
C6
C17
R7
TO SW. 8-15
SW. 8-6
* R76
X
SW. 8-7
C2.2
C5.2
GANGED
V2
6SK7 NOTE (2)
R-F AMPL.
SW. 8-8
C114
C18
R8
C19
R9
TO 100 V NOTE (1)
C20
R10
+280V
T20
R11
C21
TO R64 & SW. 7
C93
*
SW. 8-9
SW. 8-10
C2.1
C5.1
C87
R2
GANGED
V3
6SA7
MIXER
R65
C22
R12
C23
R13
+100V
C104
TO V8 & V9
(V8 ONLY IN REVISED)
R14
C24
+280 V
T1
C68
R47
C70
R6
C86
R71
+280 V
V4
6SA7
H-F OSC.
C11
SW. 8-12
SW. 8-13
C69
R66
T26
C99
C13
C5
C2
SW. 8-11

NOTES:
NOTE (1) THIS SHOULD BE +280V FOR REVISED MODEL.
NOTE (2) A 6AB7 TUBE IS USED FOR $V_2$ IN THE REVISED MODEL.
* WIRES OPENED AT X AND CONNECTED AS SHOWN BY DOTTED LINE FOR REV. MOD.
‡ NOT USED IN REVISED MODEL.

BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE
BAND 2 - BROADCAST
1.6 - 3.0 MC.

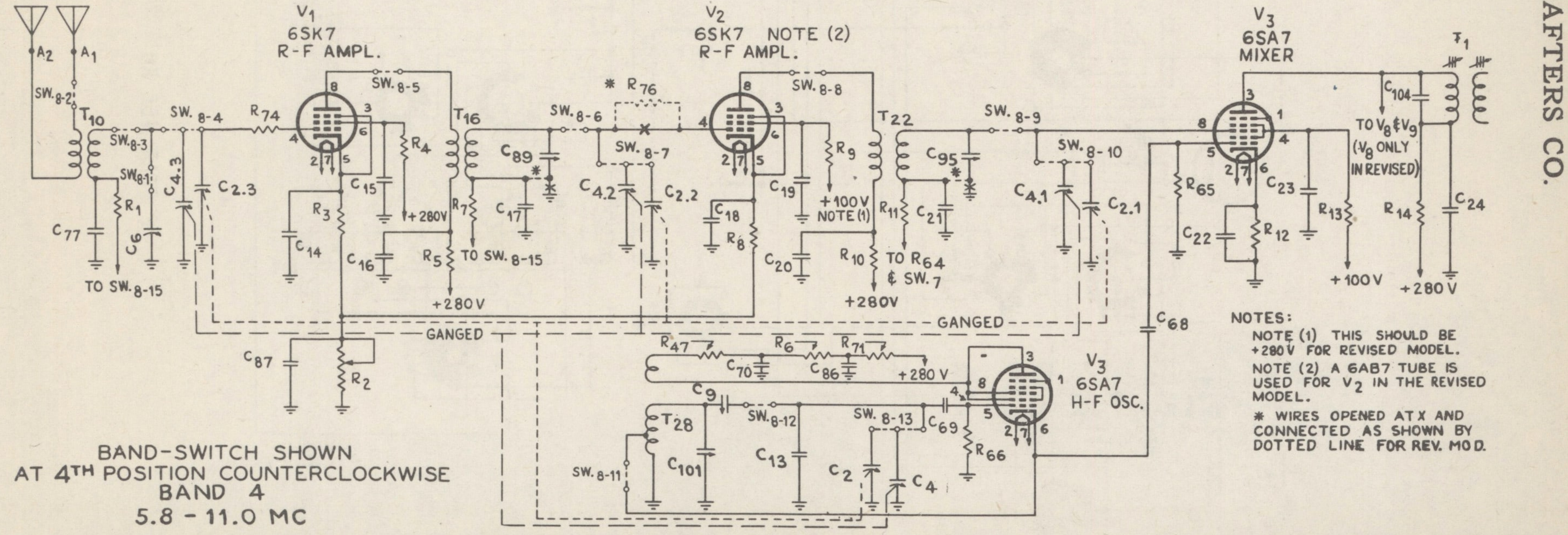
**MODEL SX-28A, Super Skyrider**

## THE HALLICRAFTERS CO.


A2
A1
SW. 8-2
T9
SW. 8-3
SW. 8-1
R1
C77
C6
TO SW. 8-15
SW. 8-4
C5.3
C4.3
C3.3
C2.3
R74
V1
6SK7
R-F AMPL.
SW. 8-5
C15
R4
+280V
R3
C14
C16
T15
R7
R5
TO SW. 8-15
+280V
C17
C88
* R76
SW. 8-6
SW. 8-7
C5.2
C4.2
C3.2
C2.2
C18
R8
V2
6SK7 NOTE (2)
R-F AMPL.
SW. 8-8
C19
R9
+100V
NOTE (1)
C20
R10
T21
R11
C21
TO R64
& SW. 7
+280V
C94
SW. 8-9
SW. 8-10
C5.1
C4.1
C3.1
C2.1
V3
6SA7
MIXER
R65
C22
R12
C23
R13
+100V
C104
TO V8 & V9
(V8 ONLY
IN REVISED)
R14
C24
+280V
T1
GANGED
C68
C87
R2
R47
C70
R6
C86
R71
+280 V
C10
C100
T27
SW. 8-11
SW. 8-12
C13
SW. 8-13
C2
C3
C4
C5
C69
R66
V3
6SA7
H-F OSC.

BAND-SWITCH SHOWN
AT 3RD POSITION COUNTERCLOCKWISE
BAND 3
3.0 - 5.8 MC

NOTES:
NOTE (1) THIS SHOULD BE +280V FOR REVISED MODEL.
NOTE (2) A 6AB7 TUBE IS USED FOR $V_2$ IN THE REVISED MODEL.
* WIRES OPENED AT X AND CONNECTED AS SHOWN BY DOTTED LINE FOR REVISED MODEL.


A2
A1
SW. 8-2
T10
SW. 8-3
SW. 8-1
R1
C77
C6
TO SW. 8-15
SW. 8-4
C4.3
C2.3
R74
V1
6SK7
R-F AMPL.
SW. 8-5
C15
R4
+280V
R3
C14
C16
T16
R7
R5
TO SW. 8-15
+280V
C17
C89
* R76
SW. 8-6
SW. 8-7
C4.2
C2.2
C18
R8
V2
6SK7 NOTE (2)
R-F AMPL.
SW. 8-8
C19
R9
+100V
NOTE (1)
C20
R10
T22
R11
C21
TO R64
& SW. 7
+280V
C95
SW. 8-9
SW. 8-10
C4.1
C2.1
V3
6SA7
MIXER
R65
C22
R12
C23
R13
+100V
C104
TO V8 & V9
(V8 ONLY
IN REVISED)
R14
C24
+280V
T1
GANGED
C68
C87
R2
R47
C70
R6
C86
R71
+280 V
C9
T28
C101
SW. 8-11
SW. 8-12
C13
SW. 8-13
C2
C4
C69
R66
V3
6SA7
H-F OSC.

BAND-SWITCH SHOWN
AT 4TH POSITION COUNTERCLOCKWISE
BAND 4
5.8 - 11.0 MC

NOTES:
NOTE (1) THIS SHOULD BE +280V FOR REVISED MODEL.
NOTE (2) A 6AB7 TUBE IS USED FOR $V_2$ IN THE REVISED MODEL.
* WIRES OPENED AT X AND CONNECTED AS SHOWN BY DOTTED LINE FOR REV. MOD.

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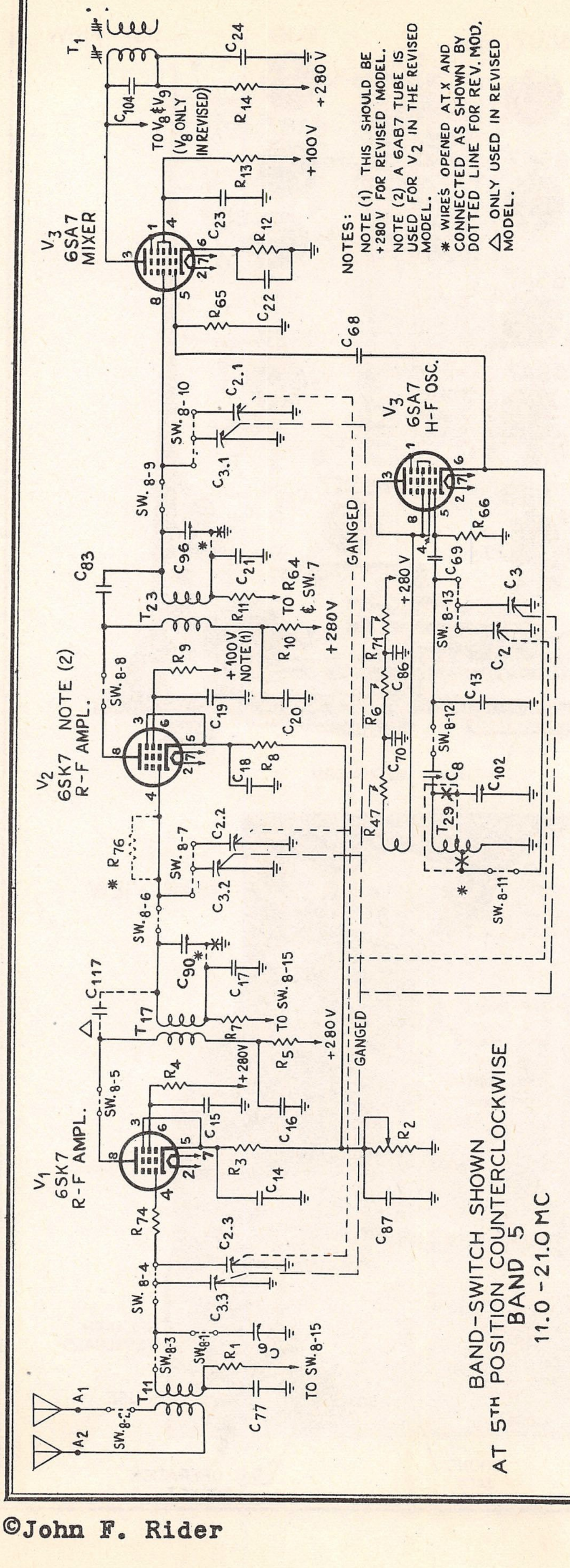
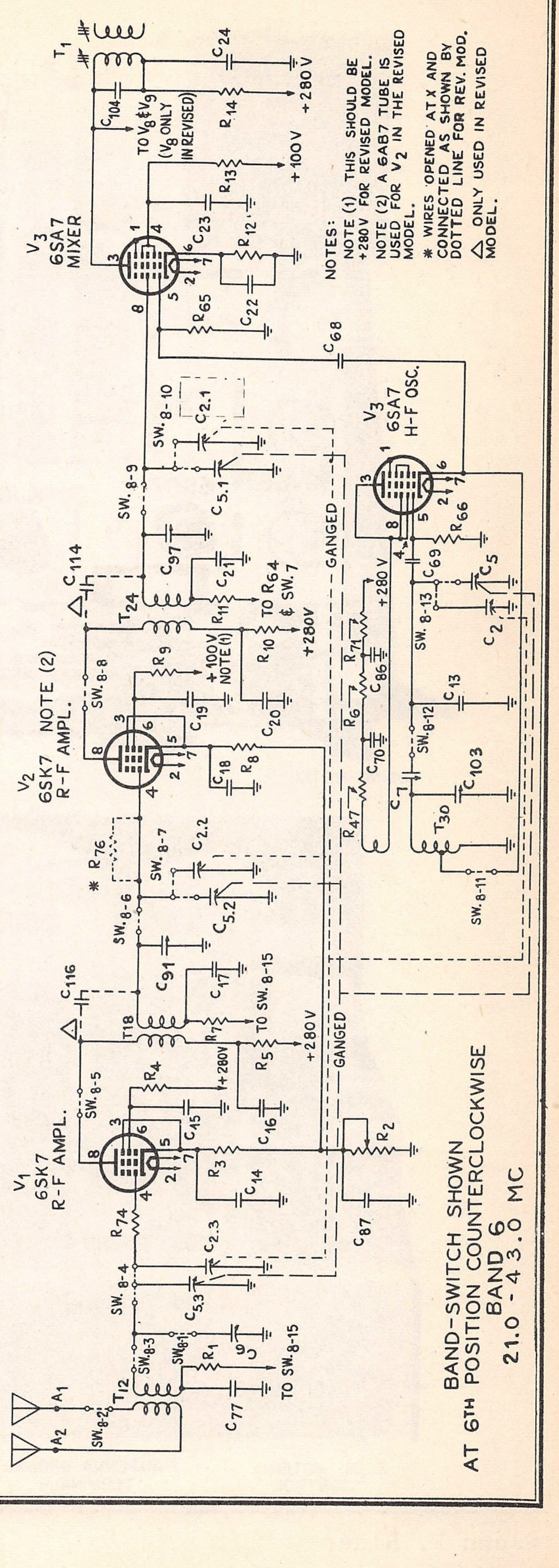
# THE HALLICRAFTERS CO.

## MODEL SX-28A, Super Skyrider

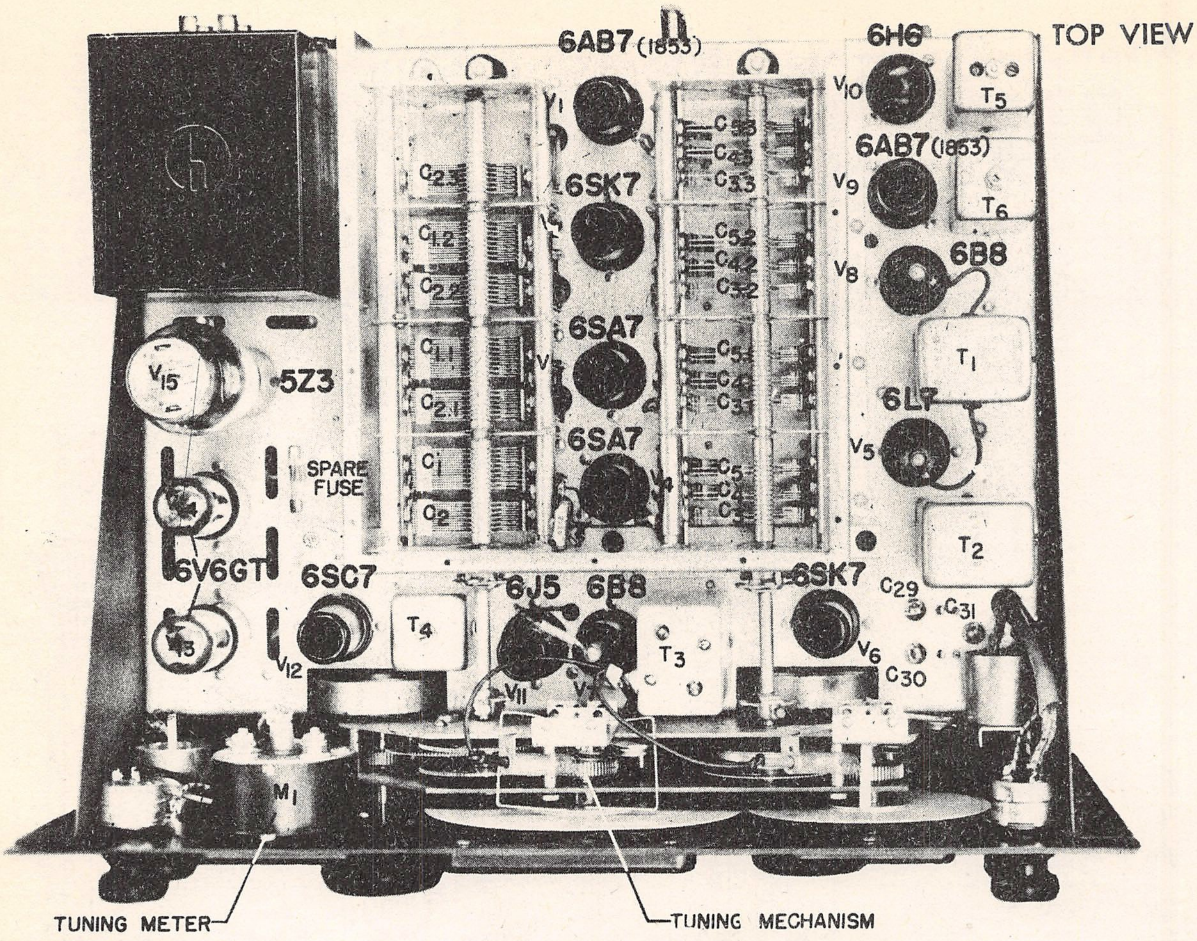

V1 6SK7 R-F AMPL.
V2 6SK7 NOTE (2) R-F AMPL.
V3 6SA7 MIXER
V3 6SA7 H-F OSC.
T1
T11
T17
T23
T29
C104
C24
R14
R13
R12
C23
C22
R65
C68
C2.1
C3.1
C96
C21
C83
C19
C20
C18
R8
C2.2
C3.2
R76
C90
C17
C117
C15
C16
C14
R3
R4
R5
R7
R74
C2.3
C3.3
R1
C77
R2
C87
R9
R10
R11
R66
C69
C3
C2
C13
C8
C102
R71
C86
R6
C70
R47
SW. 8-2
SW. 8-3
SW. 8-4
SW. 8-5
SW. 8-6
SW. 8-7
SW. 8-8
SW. 8-9
SW. 8-10
SW. 8-11
SW. 8-12
SW. 8-13
SW 8-1
TO SW. 8-15
TO R64 & SW. 7
GANGED
A1
A2
+280V
+100V
+100V NOTE (1)
TO V8 & V9 (V8 ONLY IN REVISED)
NOTES:
NOTE (1) THIS SHOULD BE +280V FOR REVISED MODEL.
NOTE (2) A 6AB7 TUBE IS USED FOR V2 IN THE REVISED MODEL.
* WIRES OPENED AT X AND CONNECTED AS SHOWN BY DOTTED LINE FOR REV. MOD.
△ ONLY USED IN REVISED MODEL.

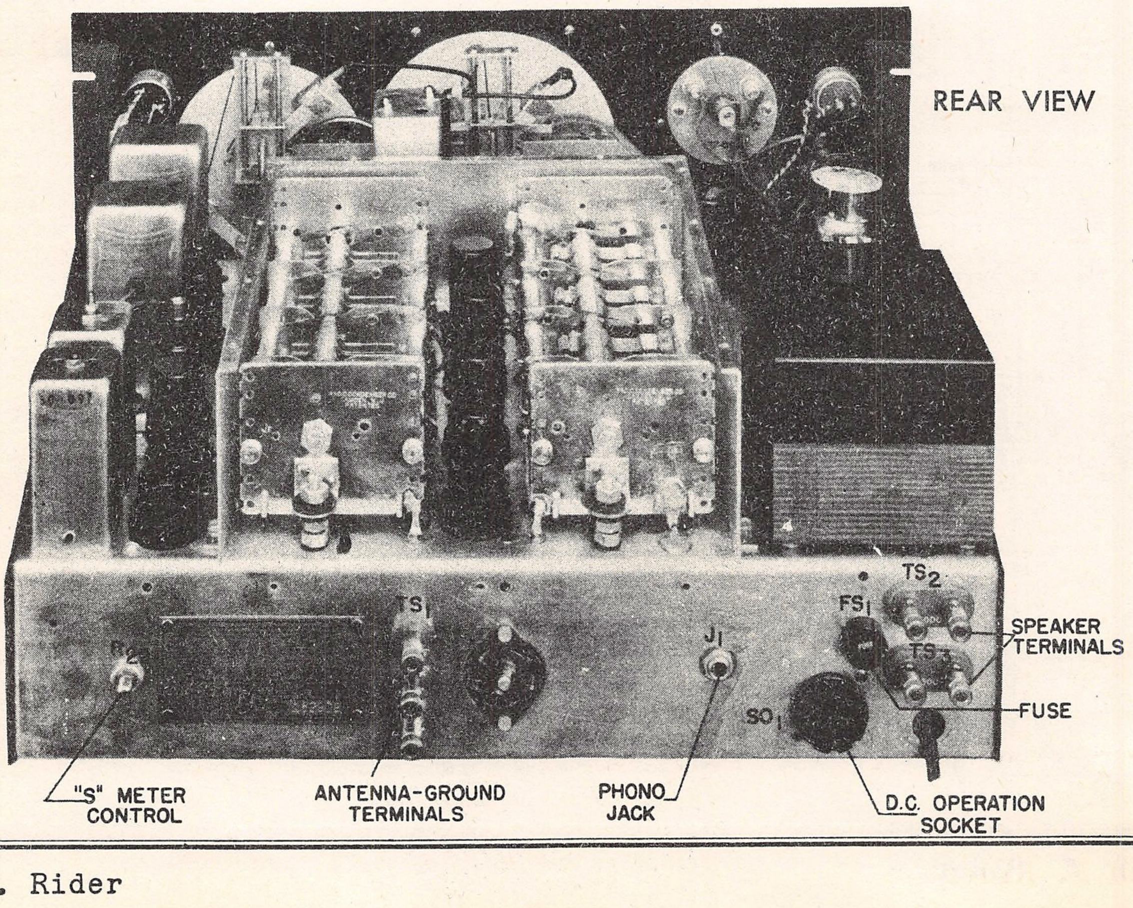
BAND-SWITCH SHOWN AT 5TH POSITION COUNTERCLOCKWISE
BAND 5
11.0 - 21.0 MC


V1 6SK7 R-F AMPL.
V2 6SK7 NOTE (2) R-F AMPL.
V3 6SA7 MIXER
V3 6SA7 H-F OSC.
T1
T12
T18
T24
T30
C104
C24
R14
R13
R12
C23
C22
R65
C68
C2.1
C5.1
C97
C21
C114
C19
C20
C18
R8
C2.2
C5.2
R76
C91
C17
C116
C15
C16
C14
R3
R4
R5
R7
R74
C2.3
C5.3
R1
C77
R2
C87
R9
R10
R11
R66
C69
C5
C2
C13
C7
C103
R71
C86
R6
C70
R47
SW. 8-2
SW. 8-3
SW. 8-4
SW. 8-5
SW. 8-6
SW. 8-7
SW. 8-8
SW. 8-9
SW. 8-10
SW. 8-11
SW. 8-12
SW. 8-13
SW 8-1
TO SW. 8-15
TO R64 & SW. 7
GANGED
A1
A2
+280V
+100V
+100V NOTE (1)
TO V8 & V9 (V8 ONLY IN REVISED)
NOTES:
NOTE (1) THIS SHOULD BE +280V FOR REVISED MODEL.
NOTE (2) A 6AB7 TUBE IS USED FOR V2 IN THE REVISED MODEL.
* WIRES OPENED AT X AND CONNECTED AS SHOWN BY DOTTED LINE FOR REV. MOD.
△ ONLY USED IN REVISED MODEL.

BAND-SWITCH SHOWN AT 6TH POSITION COUNTERCLOCKWISE
BAND 6
21.0 - 43.0 MC

## THE HALLICRAFTERS CO.


TOP VIEW
6AB7 (1853)
$V_1$
6H6
$V_{10}$
$T_5$
6AB7 (1853)
$V_9$
$T_6$
6SK7
$C_{2.3}$
$C_{1.2}$
$C_{2.2}$
$C_{5.3}$
$C_{4.3}$
$C_{3.3}$
$C_{5.2}$
$C_{4.2}$
$C_{3.2}$
$V_8$
6B8
6SA7
$C_{1.1}$
$C_{2.1}$
$C_{5.1}$
$C_{4.1}$
$C_{3.1}$
$T_1$
6L7
$V_5$
$V_{15}$
5Z3
SPARE FUSE
$C_1$
$C_2$
6SA7
$C_5$
$C_4$
$C_3$
$T_2$
$V_{14}$
6V6GT
$V_{13}$
$V_{12}$
6SC7
$T_4$
6J5
6B8
$V_{11}$
$V_7$
$T_3$
6SK7
$C_{29}$
$C_{31}$
$V_6$
$C_{30}$
$M_1$
TUNING METER
TUNING MECHANISM


REAR VIEW
$TS_2$
$FS_1$
$TS_3$
SPEAKER TERMINALS
FUSE
$TS_1$
$R_2$
$J_1$
$SO_1$
"S" METER CONTROL
ANTENNA-GROUND TERMINALS
PHONO JACK
D.C. OPERATION SOCKET

# THE HALLICRAFTERS CO.

## MODEL SX-28A, Super Skyrider

### TERMINALS AND CONNECTIONS ON REAR OF RECEIVER

### (1) SPEAKER

On the rear apron of the receiver's chassis appear two terminal strips for connecting either a 500 or 5000 ohm speaker to the receiver. Should a matching HALLICRAFTERS Bass-Reflex speaker be used with the receiver, it should be connected to the 5000 ohm terminals. The 500 ohm terminals can be connected to a speaker or other load of that impedance value.

### (2) ANTENNA

To the terminals marked A1-A2 and G should be connected the antenna you have chosen to use with the model SX-28-A receiver.

Very satisfactory results throughout the tuning range of the SX-28-A will be obtained with a conventional inverted "L" Marconi type of antenna 75 to 100 feet long including lead-in. This antenna should be erected as high as possible and removed from surrounding objects. Be sure that the antenna is insulated from the ground at all points. When this type of antenna is used it is connected to terminal A-1. The Jumper between A-2 and G should remain connected.

In the event a doublet antenna is used with the model SX-28-A SUPER SKYRIDER receiver, the two wires of the doublet lead-in should be connected to terminals A1 and A2. The Jumper between A2 and G can remain connected or removed, depending upon its effect on favorable reception.

A ground can be used if desired and should be connected to the G terminal. Connecting the receiver to a good ground (cold water pipe or 6 foot rod driven in moist soil) might improve reception and reduce noise. Under normal conditions no noticeable difference will exist so a ground is suggested only if it aids reception.

Should you wish to have a separate antenna for some one short wave frequency or band, a half-wave antenna cut to the proper length for the desired frequency will prove very effective. The following formula will give the length of the ½ wavelength antenna depending on the desired frequency.

$$\text{Length in feet} = \frac{463}{\text{frequency in megacycles.}}$$

or, for example, a half wave 40 meter antenna would be—$\frac{463}{7}$= 66.14 feet long.

The antenna should preferably be of solid soft drawn enameled copper wire for ease in handling. The center of the wire is cut and an insulator inserted at that point. The twisted pair, or open wire transmission line, is then soldered to each 33 foot length, after the enamel has been scraped off, directly on either side of this center insulator. The other end of the transmission line should be connected to A1 and A2 on the receiver. It should be remembered that such an antenna has directional properties broadside to its length and should be so oriented if maximum pickup from a certain direction is to be expected.

In designing transmission line systems for a more accurate match of the line to the antenna input circuit, it will be helpful to know that the approximate antenna input impedance of the receiver is 400 ohms.

### (3) PHONO-JACK

The Phono-Jack enables you to use the high fidelity audio amplifier of the receiver for phonograph record or transcription play-back purposes. A high impedance crystal or magnetic pick-up arm should be used for this purpose and connected to a standard headphone plug. This plug is then inserted in the PHONO-JACK when record playing is desired. The receiver is inoperative to radio signals, when the plug is in the phono-jack.

The volume of the audio amplifier is varied by rotating the AF Gain control until the proper level is obtained. Removal of the plug from the Phono-Jack once more places the RF and IF portions of the receiver in operation.

### (4) DC POWER SOCKET

The octal socket on the rear of the chassis is used when it is necessary to furnish power to the receiver from a direct current source. For conventional AC operation, the shorting plug must remain in the DC OPERATION SOCKET. The shorting plug is removed for battery or vibrapack operation. A similar plug to the shorting plug is then wired, as shown in Fig. 13, and inserted in the octal socket.

A "B" supply capable of delivering 270 volts at 150 milliamperes is necessary for successful operation. Refer to the section on receiver specifications for the total battery drain for DC operation.

In addition to its function as connector for a DC supply, this socket also serves as an outlet for a remote stand-by switch. If the remote stand-by switch or relay is connected between pins #1 and #5 on the shorting plug and the SEND-RECEIVE switch on the front panel of the receiver is set at SEND, the remote switch or relay will control the operation of the receiver in the same manner as the SEND-RECEIVE switch.

### (5) "S" METER ZERO SET

"S" METER CONTROL is obtained by varying the knurled knob appearing on the left hand chassis apron edge. This control enables you to properly set the "S" Meter to zero. In order to make the adjustment correctly, the RF GAIN CONTROL must be advanced clockwise as far as it will go. In addition, the switch directly below the bandspread hand-wheel must be in the AVC—ON Position. When these conditions have been complied with, remove the antenna from the Receiver and then adjust the S meter control until the S meter reads zero. Reconnecting the antenna to the receiver will then make the meter indicate the relative carrier strength of each incoming signal as various signals are tuned in.

---

### B OPERATION

Each control of the Model SX-28-A SUPER SKYRIDER receiver performs a definite function that contributes to the outstanding reception capabilities of the unit. Full appreciation of the receiver is to be expected only after you have become familiar with each of the controls and the effect their operation has on the receiver's performance.

The large calibrated main dial shows the frequencies covered throughout the 6 band, 550 kc to 43 mc frequency range of the reciever. They are as follows:

Band 1—550 to 1,600 kilocycles
Band 2— 1.6 to 3.0 megacycles
Band 3— 3.0 to 5.8 megacycles
Band 4— 5.8 to 11.0 megacycles
Band 5— 11.0 to 21.0 megacycles
Band 6— 21. to 43. megacycles

(1) The BAND SWITCH, directly below the main dial, will place the proper set of coils in the circuit to cover the desired frequency. The main dial is turned by the large handwheel which is equipped with a micrometer scale for maximum accuracy in resetting or logging purposes. Of particular interest is the locking clutch which will be found directly below the handwheel. This feature will allow you to lock the main dial after a desired signal has been tuned in. Subsequent movement of the handwheel will not detune the receiver because the control is provided with a clutch which disengages the handwheel once the dial lock has been set.

The International Shortwave broadcast bands are indicated on the main dial by heavier lines showing the frequencies on which these transmissions will be heard.

The Amateur band setting positions of the main dial are indicated by a small 0 appearing over the red numbers which identify each amateur band. The hairline on the main dial window should be set so that it intersects this small circle when the main dial is placed in position for the desired amateur band.

(2) The BANDSPREAD dial is calibrated for the 10-20-40 and 80 meter amateur bands. When tuning on the 160 meter band the main dial should be used.

**Note:** The calibration on the main dial will be accurate *only* if the bandspread condenser is set at minimum capacity which is indicated by a setting of 100 on the bandspread logging scale. It should be recognized that if the bandspread condenser is left at any other setting but 100, that small amount of bandspread condenser capacity, added to the main tuning condenser capacity, would throw off the main tuning dial calibration because the receiver is calibrated with the Bandspread condenser set at minimum capacity. The portions of the amateur bands on which type A3, or telephone, transmissions will be heard are underscored with another dark line.

The numbered outer edge of the bandspread dial will prove to be of great help for logging or pre-setting purposes when the bandspread tuning control is used for easier tuning on frequencies other than those covered bv the amateur bands.

When "bandspreading" any frequency throughout the tuning range of the receiver remember the main dial must then be set to a slightly higher frequency than the desired signal. The difference depends on the amount of bandspread condenser capacity used and the frequency of the received signal.

When switching from one range to another, an indicator moves vertically behind both the main and bandspread dials. Tuning fatigue is thereby greatly minimized by focusing attention on only the frequencies covered by that particular setting of the bandswitch.

The translucent, indirectly lighted dials are easily read and so arranged that parallax is reduced to an absolute minimum.

To operate the receiver adjust the following controls in the order in which they are mentioned:

(3) The TONE CONTROL turns the receiver *on* and *off* and in addition emphasizes either the base or treble frequencies to the extent required by various receiving conditions. The effect the Tone Control has on the fidelity of reproduction is shown in Fig. 10.

(4) Place the SEND-RECEIVE switch in the RECEIVE position—have the ANL control off (turned to the left until the switch operates).

Place the bandswitch in position .55 to 1.65 mc, which will then enable you to tune in stations on the standard Broadcast Band.

(5) Rotate the RF GAIN control to the right until #9 on the skirt of the control appears under the panel marker. (The RF Gain must be full ON as above indicated before the S meter will indicate correctly.) So that the S meter will be properly connected in the circuit, the AVC-BFO switch appearing to the lower right of the bandspread handwheel, must be in the AVC ON position.

(6) Note: The *Antenna Trimmer* control is operated on all Bands. Proper adjustment of this control is indicated by the maximum signal.

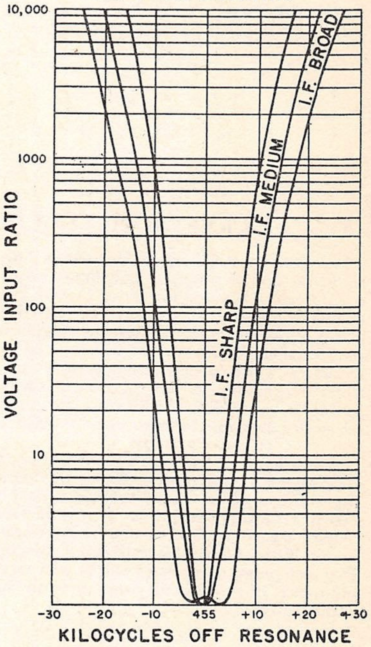
(7) After complying with the above conditions, the AF GAIN control should be advanced to the right until the desired volume is obtained. Tuning the receiver by operating the main dial handwheel will now allow you to pick up stations throughout the .55 to 1.65 mc tuning range of the Broadcast band. Maximum deflection of the S Meter will indicate when each station is accurately tuned in.

When covering the short-wave or higher frequency bands the above procedure should be followed—except that greater care should be used because it is so easy to completely pass over a station.

The other controls on the model SX-28-A SUPER SKYRIDER receiver will enable you to obtain the best results from the receiver once you have become used to their effects on the reception of various types of signals.

(8) The SELECTIVITY control acts as a shutter or gate and varies the width of the path on which signals reach the second detector of the receiver. Six different selectivity steps are provided so that you can successfully cope with different degrees of interference. Reference to Fig. 1 and Fig. 4 will show, graphically, how the control trims the width of the signal so that what interference might be present in the signal's skirts or sidebands is effectively clipped off. Should an interfering signal lap over into the desired signal, adjustment of the SELECTIVITY control, will reduce that interference.

FIG. 1—I. F. SELECTIVITY



Once more refer to Fig. 1 and Fig. 4 and recognize the fact that with the control set in the BROAD IF position, the signal proper and all its parts, which are combined in the side bands, or skirts, will be passed to the 2nd detector, audio amplifier, and then Speaker. As the selectivity of the receiver is increased from BROAD-IF to XTALSHARP, the gate, or admittance path, is so narrowed that only the main portion of the signal is allowed to pass through. This fact and its effect on the quality of reproduction is readily appreciated by listening to a signal and noting the reduction in higher frequency response in the more selective settings of the switch. (See Fig. 10 and Fig. 11)

At this point, it is suggested that the CRYSTAL SHARP setting be used only in cases of extreme interference—the receiver must then be tuned exactly to the signal. Only then will the signal be intelligible because you have clipped off its sidebands in which the sibilants and overtones are embodied.

The CRYSTAL SHARP position of the selectivity switch is to be used principally for the reception of code, or CW, signals. By proper associated operation of the CRYSTAL PHASING control true single signal operation and the maximum in selectivity can be obtained (crystal circuit discussed in detail in the summary of related circuits). See Fig. 3.

(3)

## THE IF AMPLIFIER

The IF Amplifier of the Model SX-28-A was designed with a view towards permanency of adjustment under conditions of extreme changes in temperature and humidity as well as unusual mechanical vibration.

The first two IF Transformers are permeability tuned. In comparing this type of transformer with one having compression mica tuning condensers, it must be remembered that it takes many more turns of the adjusting screw to cause the equivalent change in tuning of the permeability tuned type. Hence a slight change in the position of the screw will have negligible effect upon the tuning. The adjusting screw is under spring tension thereby making it impossible to turn under vibration.

The diode transformer is air-tuned with two variable condensers each with a lump capacity of 50 mmf and variable of 50 mmf. These air trimmers are also under spring tension so that they can withstand considerable vibration. Being of the air tuned type, their capacity change is negligible with wide changes in humidity. Reference to the Schematic will show that the IF transformers are expanded in two steps—thereby enabling medium or full reproduction of the higher frequencies to be obtained.

(4)

## VARIABLE SELECTIVITY

Six ranges of selectivity are provided in the model SX-28-A receiver. They are:

1—Broad IF—(for high fidelity reception)
2—Medium IF—(more selectivity—less highs)
3—Sharp IF—(reduces annoying interference—far less highs)
4—Crystal Broad—(Similar to Sharp IF but cleaner cutting of side bands)
5—Crystal Medium—(next selectivity step to #4—greatly increased sideband cutting—more pronounced crystal "Slot" for interference—very little highs present)
6—Crystal Sharp—(position of extreme selectivity—practically no sideband content—very pronounced crystal "slot")

The graphic effects of the different steps of selectivity on a signal are shown in Fig. 1 and Fig. 4.

(5b)

## CRYSTAL

The CRYSTAL FILTER and holder are wired directly into the receiver and do not plug in as heretofore. In this manner exceptional crystal filter action is obtained because of the elimination of the capacity and losses of a socket. So mounting the crystal prevents possible change in polarity which would occur if the crystal were improperly inserted in the circuit. The size of the crystal has been carefully determined to allow the BROAD CRYSTAL position to tune as broadly as possible. The capacity of the crystal holder has been reduced to a minimum through the use of a specially designed polystyrene holder.

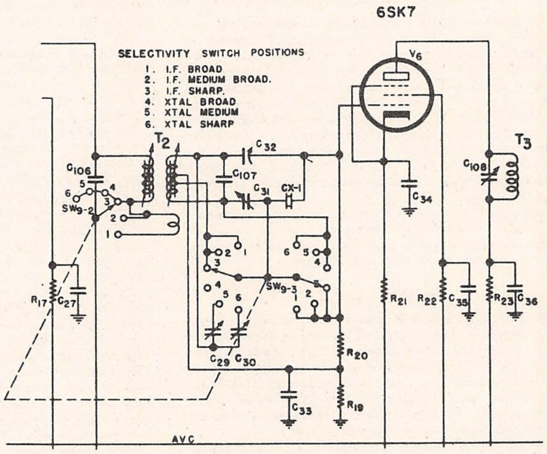
(5)

## CRYSTAL FILTER CIRCUIT

In positions 1, 2, 3 the crystal is short circuited. In position 4 the short across the crystal is opened and the iron core in the secondary of the transformer is adjusted for Broad Crystal Action and at this point is accurately tuned to the crystal frequency. Due to the close coupling of the secondary to the crystal, the sharply rising resonance curve of the crystal causes, in contrast, a sharply falling resonance curve in the secondary. The combined action of these two characteristics results in a relatively broad resonance curve for the CRYSTAL BROAD selectivity setting. In the MEDIUM CRYSTAL No. 5 position, $C_{29}$ is adjusted for selectivity midway between the BROAD and CRYSTAL SHARP settings. (See Fig. 2 and Fig. 4)

In position 6, or CRYSTAL SHARP, the trimmer $C_{30}$ is adjusted for the Sharpest crystal action. Under this condition, the Secondary is slightly detuned from the resonant crystal frequency sufficiently so that its resonance curve is not greatly affected by the crystal but still coupled tightly enough so that it can transfer energy to the crystal circuit. When this point is reached it is indicated by a rise in the output. Two such points of increased output will normally occur—one for each adjustment of the secondary on either side of the resonant frequency of the crystal.

FIG. 2—CRYSTAL FILTER SCHEMATIC



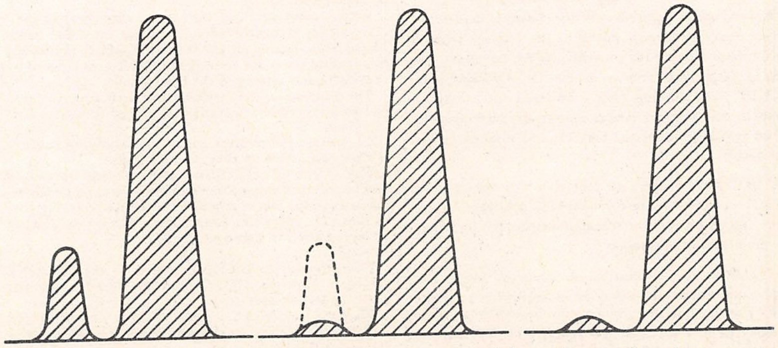
(5a)

## SINGLE SIGNAL ADJUSTMENT

It is extremely simple to attain single signal reception with the SX-28-A. First, turn on the BFO to the desired Beat Note and turn the selectivity switch to the XTAL SHARP position. Pick a good solid CW signal, preferably a commercial station because a commercial is likely to stay on long enough for you to complete the phasing adjustment for single signal reception.

You will find on tuning across this signal that it has two amplitudes. Tune first to the weaker of these two amplitudes. Now, turn the PHASING control until this weaker of the two amplitudes is reduced to a minimum. (If the weaker amplitude appears on the right the above procedure still holds.) Then tune to stronger of the two amplitudes and adjust the BFO control to a tone most pleasing to you. This adjustment for single signal selectivity will hold with no further adjustment unless you change the phasing control. (See Fig. 3.)

FIG. 3—SINGLE SIGNAL OPERATION



With Selective Switch in XTAL Sharp position identify the weaker amplitude—Tune Receiver to the weaker.

Adjust phasing control carefully until this weaker amplitude is reduced to a minimum.

Retune Receiver to the stronger amplitude and then adjust pitch control until you get note most pleasing to copy.

## (9) CRYSTAL PHASING CONTROL

The Phasing Control is in the circuit on three positions of the selectivity control namely—XTAL Sharp, XTAL Medium and XTAL Broad.

The control is used to remove heterodyne interference as well as to minimize other forms of interference having a predominance of high frequency components—such as static and interference from electrically operated devices.

(10) The A.N.L., or *Automatic Noise Limiter*, materially contributes to the satisfactory operation of the receiver by limiting objectionable interference caused by ignition systems or other man made causes of electrical disturbances. With the A.N.L. control retarded to the left as far as it will go, or until the A.N.L. switch is heard to operate—the noise limiter circuit is not functioning. Turning the control to the right closes the switch which is mounted on the control. The noise limiter is now operating. Progressively turning the control clockwise varies the threshold at which the noise limiter starts to take hold. The setting at which the control will be left depends entirely on the type and amount of interference present as well as the signal strength. The noise limiter should be judiciously adjusted because through its operation the desired signal can even be eliminated or badly distorted which destroys its usefulness. Only after you have become familiar with the operation of this control by actual practice can you determine how far it should be advanced before the best compromise between noise and signal is obtained. (See Fig. 6.)

(11) The AVC-BFO OFF-ON switch performs a dual function. The AVC circuit should be operating for the reception of telephone, or modulated, signals in order to reduce fading to a minimum. As previously mentioned, the functioning of the S Meter is dependent upon AVC action so the switch must be in the AVC ON position when the S meter is used to measure relative carrier intensity.

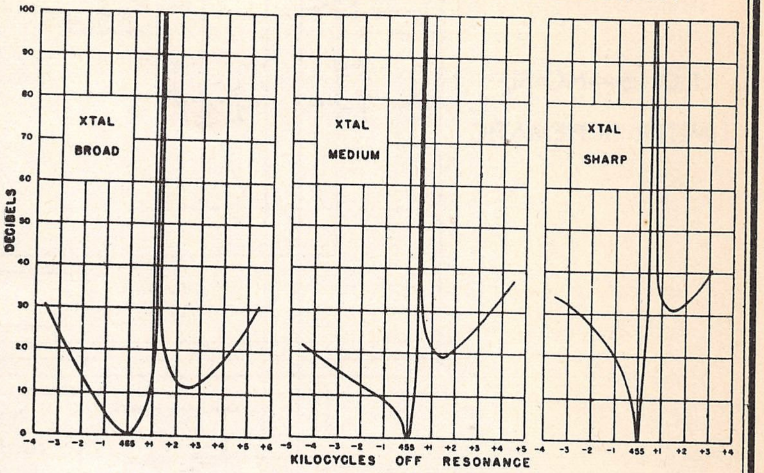
Inasmuch as the AVC circuit levels all signals to a predetermined value (See Fig. 7) no one signal can overload the receiver and cause distortion. At times, in searching for distant or weak signals, it might be desirous to use the full sensitivity of the Model SX-28-A. In that case place the AVC switch in the AVC OFF position. Remember that with the receiver operating with no AVC action, strong signals will overload the input circuit with resultant distortion. Under such a condition of operation the sensitivity of the set must be then controlled, manually, by properly retarding the RF Gain control until you have reached the point below which overloading takes place.

The other function of this switch is to turn on the Beat Frequency oscillator. When receiving code signals, a beat note is absolutely essential. With the BFO switch in the ON position, each signal tuned in will be accompanied with a beat note or whistle. For proper adjustment of the BFO control which appears directly under the TONE CONTROL the following procedure is suggested. Set the BFO control to zero, now tune in a signal either voice or code. If a code signal is received, only the carrier or thump of the signal will be audible because no beat note is present. Be sure that you have the signal accurately resonated. Now, without retuning the receiver, rotate the BFO control until a beat note of the desired pitch is obtained. You now have introduced a beat note which differs from the IF frequency of the receiver, namely 455 kc, by the frequency of the audible signal. Variation of the BFO control will allow you to change the pitch, or frequency, of the oscillator which will prove to be of help under various conditions of interference.

(12) Directly under the BFO control will be seen the BASS IN-OUT Switch. With this switch in the BASS IN position you will have normal audio fidelity. Placing the switch in the BASS OUT position, the audio filter $CH_2$ is inserted. The effect of this filter on the band of frequencies passed is shown Fig. 11. This filter will contribute greatly to the intelligibility of the received signal when the receiver is operated in the advanced positions of selectivity.

(13) The Head Phone Jack is connected to a tap on the output transformer. The signal in the headphones is of the proper volume for satisfactory communications reception. Since no direct current is present in the headphone circuit crystal type phones can be used.

FIG. 4—CRYSTAL SELECTIVITY



## (1) THE 2-STAGE PRESELECTOR

The RF AMPLIFIER, or pre-selector, of the Model SX-28-A SUPER SKYRIDER has 1-6AB7, 1-6SK7 tubes in cascade on Bands 3, 4, 5, and 6. On Bands 1 and 2 more than one stage is unnecessary to obtain the required image ratio and reduction of spurious interference. With two RF stages using three pre-selection circuits, the band width would be narrowed to such an extent that even expanding the IF Amplifier to its utmost would still not provide high-fidelity reception. The modern communications receiver requires two stages of preselection on the higher frequencies to accomplish only one primary object —satisfactory image rejection.

The Model SX-28-A has an image ration of 20 to 1 at 28 mc—350 to 1 at 14 mc and a proportionately increasing ratio as the frequency is lowered. While the two RF stages are principally needed to obtain such image ratios they also perform two other useful functions—more favorable signal to noise ratio and slightly increased selectivity.

Examining the coil assembly will immediately show how rigidly it is constructed and what care has been taken to completely shield each section from the other. The manner in which the RF and antenna coils are tuned on bands 3, 4, 5, and 6 will be interesting. Rather than push turns to compensate for variations in inductance, each coil is permeability tuned. This results in exact adjustment of inductance with improved tracking and gain as the result. On Bands 1 and 2 the inductance of the antenna coils is sufficiently large so that lead length differences do not cause any noticeable inductance change.

## 2) THE OSCILLATOR AND CONVERTER

A separate 6SA7 tube is used as the High Frequency Oscillator in the Model SX-28-A SUPER SKYRIDER. This tube proves desirable in this function because of its very high value of transconductance which enables the oscillator to operate with very little coupling to the coil. This feature reduces the unfavorable effects of tube variations and voltage fluctuations on the tuned circuit. The HF Oscillator is coupled to the 6SA7 converter tube at the Cathode Tap—a point where variations of operating parameters of the converter tube will least affect the 6SA7 Oscillator. A 6SA7 tube is used in the Mixer Circuit because tests indicated that changes in operating voltages caused less reflection in the injector grid loading than would occur in most converter tubes. Another feature in favor of the 6SA7 tube is that a negative loading is applied to the tuned circuit feeding its control grid. This characteristic improves the gain and selectivity of the tuned circuit which in turn improves the image and signal to noise ratio.

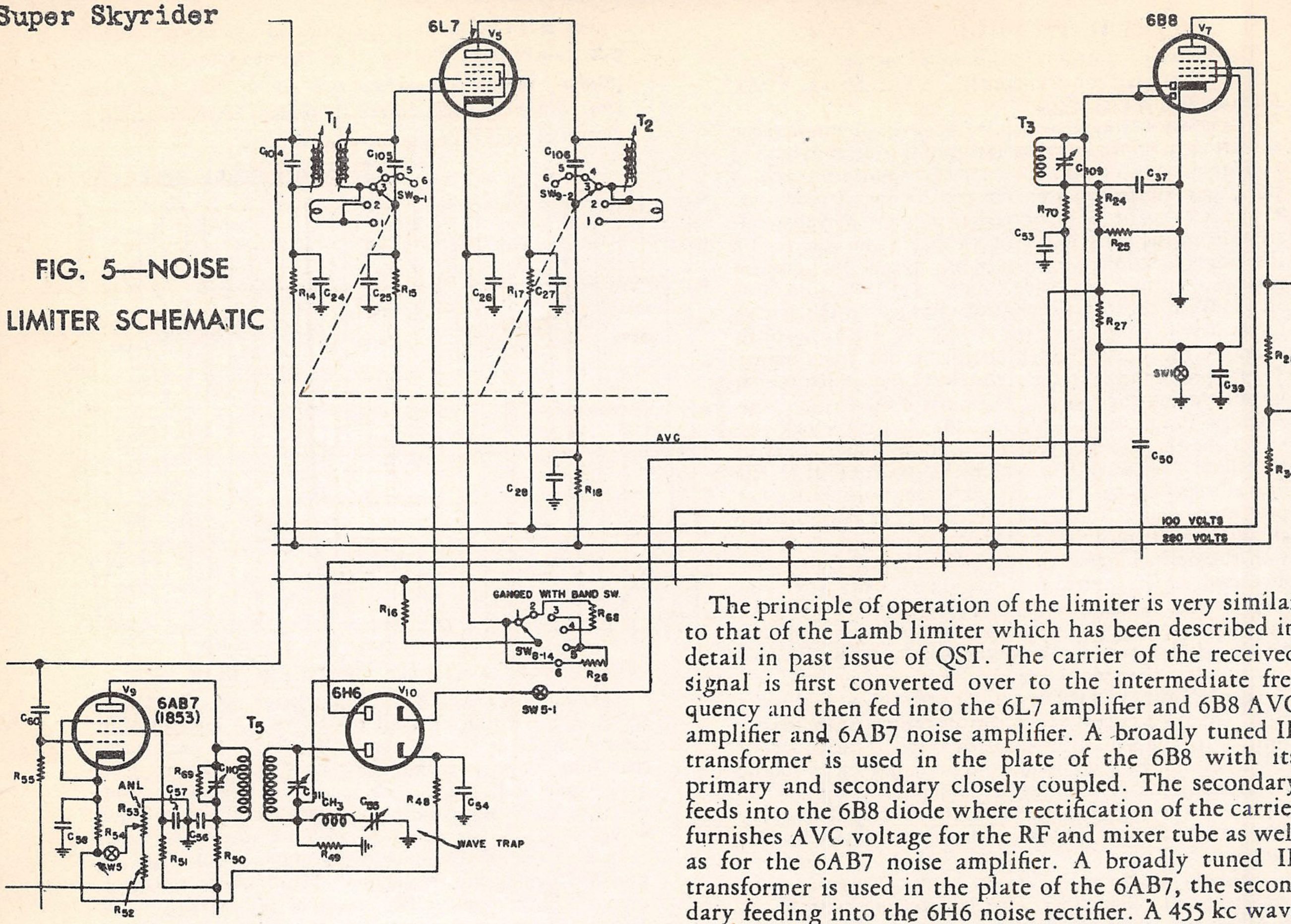
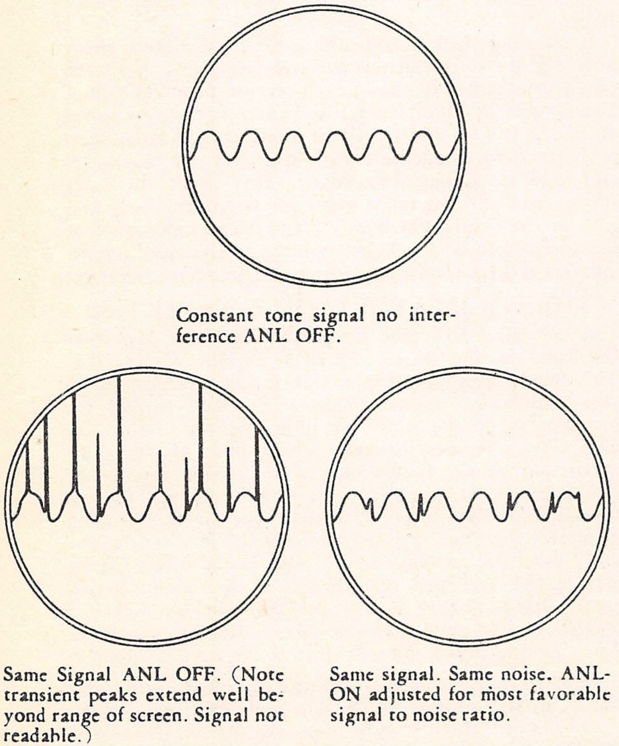


FIG. 5—NOISE LIMITER SCHEMATIC

The principle of operation of the limiter is very similar to that of the Lamb limiter which has been described in detail in past issue of QST. The carrier of the received signal is first converted over to the intermediate frequency and then fed into the 6L7 amplifier and 6B8 AVC amplifier and 6AB7 noise amplifier. A broadly tuned IF transformer is used in the plate of the 6B8 with its primary and secondary closely coupled. The secondary feeds into the 6B8 diode where rectification of the carrier furnishes AVC voltage for the RF and mixer tube as well as for the 6AB7 noise amplifier. A broadly tuned IF transformer is used in the plate of the 6AB7, the secondary feeding into the 6H6 noise rectifier. A 455 kc wave trap (CH4 and C55) is used which allows the passage of the higher audio frequencies without attenuation. In the form of further explanation of our approach toward noise elimination, it must be remembered that noise in general is composed of a random mixture of high and low frequencies. Of this mixture the predominating higher frequencies are the most objectionable. It is to our advantage to retain the high frequency components. Thus, these transients will be allowed to rise to a point far above the carrier level with the result that they will be applied to the injector grid of the 6L7 tube without being reduced in value. Transients, such as ignition interference having a steep wave front, consist largely of high frequency components. The voltage applied to the grid of the 6L7 tube has a negative polarity because of the 6H6 noise rectifier. By varying the ANL control, we raise or lower the negative voltage applied to the 6L7 tube until it is barely sufficient to overcome the noise impulses applied to the grid of this tube without allowing the modulation peaks of the carrier to become badly distorted.

If the noise limiter adjustment permits too great a value of transient voltage to be applied to the 6L7 injector grid, detection will take place and rectified components of this modulated carrier will appear in the 6L7 plate circuit. This effect will appear as distortion in the output of the receiver. If, on the other hand, not enough noise voltage is applied, then the momentary decrease in sensitivity will not be great enough to stop the noise from getting through and some of it will appear in the plate circuit of the 6L7 tube and consequently in the output of the receiver. As a result the noise limiter must be carefully adjusted to the particular carrier and noise level being received. (See Fig. 6)

FIG. 6—NOISE LIMITER ACTION



Constant tone signal no interference ANL OFF.

Same Signal ANL OFF. (Note transient peaks extend well beyond range of screen. Signal not readable.)

Same signal. Same noise. ANL-ON adjusted for most favorable signal to noise ratio.

# THE HALLICRAFTERS CO.

**MODEL SX-28A,**
**Super Skyrider**

The following measurements made with a 20,000 ohms per volt meter and taken from the socket terminal indicated to ground or receiver chassis. Antenna and ground were disconnected from the receiver when these measurements were taken and the RF and AF gain controls set at maximum. "DL" means Dead Lug but will indicate voltage when used as a tie. Normal tolerance allows a variation of ±10% from the indicated values.

| TUBE | FUNCTION | SOCKET TERMINALS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Cap. |
| $V_1$-6AB7 | RF Amp. (1) | ... | ... | ... | 0.1 | 4.15 | 170 | 6.3 | 227 | ....... |
| $V_2$-6SK7 | RF Amp. (2) | ... | ... | 4.35 | 0.1 | 4.35 | 105 | 6.3 | 279 | ....... |
| $V_3$-6SA7 | Mixer | ... | ... | 250 | 100 | 0.12 | 4.1 | 6.3 | ... | ....... |
| $V_4$-6SA7 | HF Osc. | ... | ... | 116 | 116 | 0.3 | ... | 6.3 | 116 | ....... |
| $V_5$-6L7 | IF Amp. (1)<br>Noise Limiter | ... | ... | 245 | 102 | ... | ... | 6.3 | 4 | −.075 |
| $V_6$-6SK7 | IF Amp. 2 | ... | ... | 4 | ... | 4 | 107.5 | 6.3 | 235 | ....... |
| $V_7$-6B8 | 2nd Det.<br>S Meter Tube | ... | ... | 17.2 | −.255 | −.255 | 108 | 6.3 | ... | −.17 |
| $V_8$-6B8 | AVC Amp. | ... | ... | 225.5 | 0.2 | 0.2 | 107 | 6.3 | 2 | ....... |
| $V_9$-6AB7 | Noise Amp. | ... | ... | ... | .07 | 1.1 | 150 | 6.3 | 225 | ....... |
| $V_{10}$-6H6 | Noise Rectifier | ... | ... | ... | .1 | ... | 17.6 DL | 6.3 | —.1 | ....... |
| $V_{11}$-6J5 | Beat Osc. | ... | ... | 140 | ... | −7.4 | ... | 6.3 | ... | BFO ON ONLY FOR TEST |
| $V_{12}$-6SC7 | 1st Audio Amp. | ... | 140 | ... | ... | 137 | 1.4 | 6.3 | ... | ....... |
| $V_{13}$-6V6GT | P.P. Audio Amp. | ... | ... | 310 | 290 | ... | 198 DL | 6.3 | 17 | ....... |
| $V_{14}$-6V6GT | P.P. Audio Amp. | ... | ... | 310 | 290 | ... | ... | 6.3 | 17 | ....... |
| $V_{15}$-5Z3 | Rectifier * | 320 | 340 AC | 340 AC | 320 | ... | ... | ... | ... | ....... |

* 5 V. AC between Terminals 1 & 4

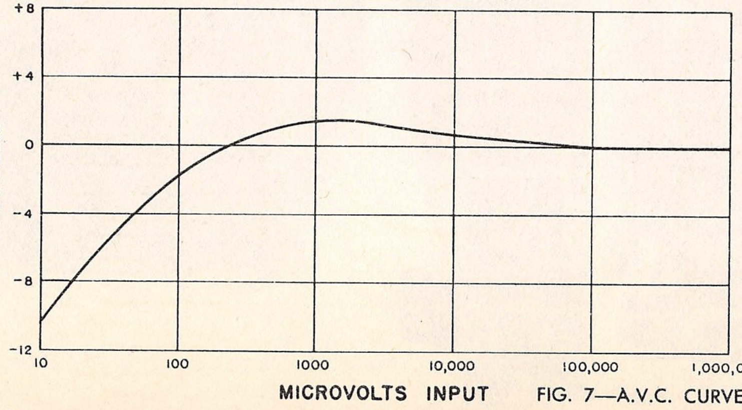


FIG. 7—A.V.C. CURVE—AT 3 MC.

FIG. 10—AUDIO FIDELITY CURVE

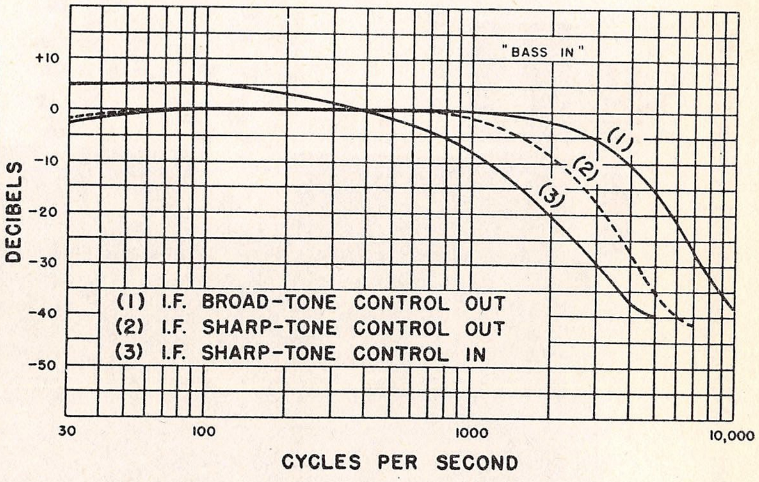


FIG. 11—AUDIO FILTER CURVE

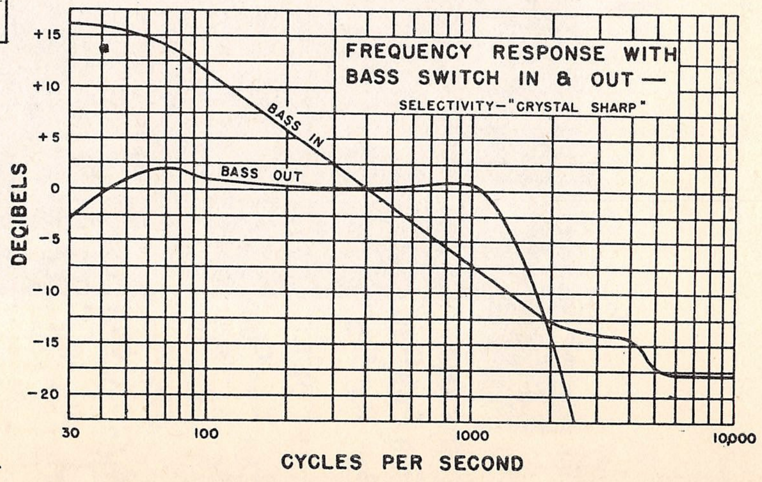
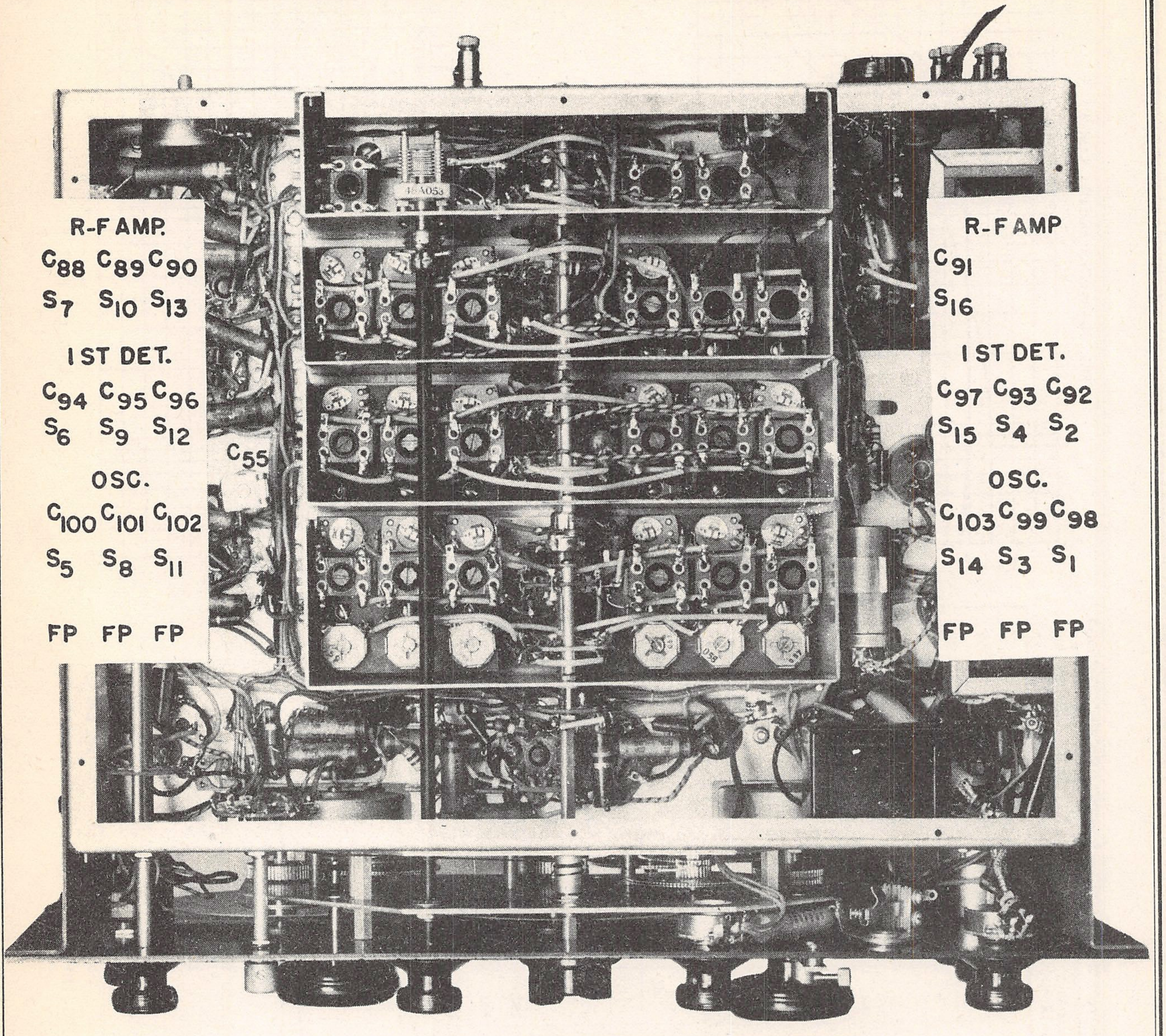
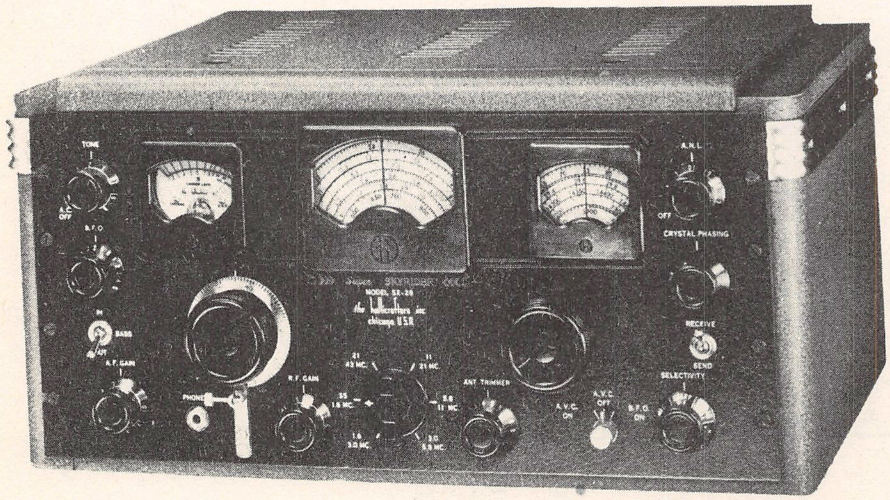


FIG. 12—RF AND OSC ADJUSTMENT LOCATION AND ALIGNMENT PROCEDURE


R-F AMP.
$C_{88}$ $C_{89}$ $C_{90}$
$S_{7}$ $S_{10}$ $S_{13}$
1 ST DET.
$C_{94}$ $C_{95}$ $C_{96}$
$S_{6}$ $S_{9}$ $S_{12}$
$C_{55}$
OSC.
$C_{100}$ $C_{101}$ $C_{102}$
$S_{5}$ $S_{8}$ $S_{11}$
FP FP FP
R-F AMP
$C_{91}$
$S_{16}$
1 ST DET.
$C_{97}$ $C_{93}$ $C_{92}$
$S_{15}$ $S_{4}$ $S_{2}$
OSC.
$C_{103}$ $C_{99}$ $C_{98}$
$S_{14}$ $S_{3}$ $S_{1}$
FP FP FP


TONE
B.F.O.
A.F. GAIN
PHONES
R.F. GAIN
SKYRIDER
MODEL SX-28
the hallicrafters inc
chicago U.S.A.
ANT TRIMMER
A.V.C.
B.F.O.
A.N.L.
CRYSTAL PHASING
RECEIVE
SEND
SELECTIVITY

# THE HALLICRAFTERS CO.

MODEL SX-28A,
Super Skyrider

**Equipment Needed for Aligning:**

1—An all wave signal generator which will provide an accurately calibrated signal at the test frequencies indicated.

2—Output indicating meter connected to 5000 ohm output terminals.

3—Non-metallic screw driver.

4—Dummy antenna of 200 mmf and also 400 ohm carbon resistor.

Setting of controls prior to alignment—IF and RF.

Tone control at maximum high frequency position (#9)—BFO at 0—Bass switch at Bass IN—AF Gain at #9—RF Gain at #9—Band switch—IF alignment position .55 to 1.6 band—RF alignment depending on band aligned.

Selectivity control at sharp IF—Send-Receive switch in Receive—Crystal phasing at #3 on left side—ANL—OFF at 0—AVC OFF.

**Important:** Have bandspread control so logging scale reads 100.

Antenna trimmer adjusted for Maximum gain at each RF alignment point on all bands.

(1) **455 KC—IF Alignment:** Tune main dial to 1400 kc on .55 to 1.6 mc band. Connect the hot lead from the signal generator to 6SA7 mixer terminal #8—Ground to chassis. Roughly adjust the aligning screws of T1, the lower screw of which is accessible through hole in right mounting bracket, for maximum gain. Now adjust lower screw on T2 (do not adjust upper screw). Also adjust C31 and the air trimmer condensers at the top of T3 for maximum gain. (See Fig. 8 for location of IF adjustments)

Switch to Crystal Broad Position—Turn on BFO and adjust to a tone of about 1000 cycles. Vary the frequency of the signal generator while adjusting the top screw on T2 until the output goes through a maximum, dips down and starts going up again. Adjust the phasing control for maximum selectivity and then back off the top screw on T2 until the output reaches a minimum value between the two maximum values first noted. The frequency of the signal generator should be varied over a small range while adjusting the top screw of T2. A swishing note, in contrast to the usual sharp crystal tone will be apparent when the correct adjustment has been reached.

Switch to "Xtal Sharp" and adjust $C_{30}$ for maximum output while varying signal generator frequency. Two points of maximum output will be noted corresponding to two adjustments of $C_{30}$. Either one of these points may be used at which to leave $C_{30}$. a sharply peaked tone will result at the correct adjustment.

Switch to "Xtal Medium" and adjust $C_{29}$ till the output is midway between the outputs reached while aligning the "Xtal Sharp" and "Xtal Broad" positions. The apparent sharpness of tone should be midway between the "Sharp" and "Broad" positions.

Switch again to "Xtal Sharp" and set the signal generator to exact crystal frequency. Set BFO front panel control to a tone of approximately 1000 cycles. Switch again to "Sharp IF" and carefully realign the IF transformers as earlier described in the first paragraph of these instructions.

(2) **BFO Adjustment:** Set front panel control to zero—BFO switch ON—Signal Generator tuned to crystal frequency —selectivity switch in IF Sharp position—now, adjust screw on top of T4, after loosening lock nut, to zero best. (See Fig. 8)

(3) **Noise Limiter and AVC Amplifier Adjustment:** Have the controls set as before except that the AVC switch is now in the ON position. Connect a high resistance type voltmeter across R49 which is connected between terminal #5 of the 6L7 tube and chassis. Connect a 50,000 ohm resistor across primary of T5 (Red and Blue leads) Set generator at 455 kc as for IF alignment. Connect generator to grid of 6AB7 tube (pin #4). Rotate ANL control all the way to the right, or position #9. Adjust screws on top of T5 for maximum indication on DC meter connected across R47. Reconnect generator, as for IF alignment, to mixer grid of 6SA7 tube. Remove 50,000 ohm resistor which was inserted across primary of T5 during alignment. Remove grid clip off top of 6L7 tube. With generator set at 455 kc and ANL control at extreme right adjust wave trap trimmer C55 for minimum signal as indicated on output meter. (See Fig. 8 and Fig. 12 for location of adjustments).

With generator connected to 6SA7 mixer grid as above, replace 6L7 grid and turn ANL control to extreme left until switch clicks. Connect high resistance DC meter across 6B8 diode filter condenser C64. Adjust screw on top of T6 for maximum indication on DC meter across C64.

(4) For RF and oscillator adjustment location and alignment procedure see Fig. 12.

Connect hot lead of signal generator to $A_1$—through dummy antenna shown in table. Leave jumper connected between $A_2$ and G Ground of Generator to Chassis. "FP" indicates fixed pad—*do not adjust.*

| Band | Rec. Dial Setting | Sig. Gen. Freq. | Dummy Antenna | HIGH FREQUENCY END | | LOW FREQUENCY END | |
|---|---|---|---|---|---|---|---|
| | | | | Adjust Osc. With | Adjust Trimmers for Max. Gain | Adjust Osc. With | Permeability Tuned By |
| 1 | 1.5 mc | 1.5 mc | 200 mmf | $C_{98}$ | $C_{92}$ | .... | ......... |
| 1 | .6 | .6 | 200 mmf | .... | .......... | $S_1$ | $S_2$ |
| 2 | 3.0 | 3.0 | 400 ohms | $C_{99}$ | $C_{93}$ | .... | ......... |
| 2 | 1.8 | 1.8 | 400 ohms | .... | .......... | $S_3$ | $S_4$ |
| 3 | 5.4 | 5.4 | 400 ohms | $C_{100}$ | $C_{94}$ $C_{88}$ | .... | ......... |
| 3 | 3.0 | 3.0 | 400 ohms | .... | .......... | $S_5$ | $S_6$ $S_7$ |
| 4 | 10.0 | 10.0 | 400 ohms | $C_{101}$ | $C_{95}$ $C_{89}$ | .... | ......... |
| 4 | 7.0 | 7.0 | 400 ohms | .... | .......... | $S_8$ | $S_9$ $S_{10}$ |
| 5 | 20.0 | 20.0 | 400 ohms | $C_{102}$ | $C_{96}$ $C_{90}$ | .... | ......... |
| 5 | 12.0 | 12.0 | 400 ohms | .... | .......... | $S_{11}$ | $S_{12}$ $S_{13}$ |
| 6 | 36.0 | 36.0 | 400 ohms | $C_{103}$ | $C_{97}$ $C_{91}$ | .... | ......... |
| 6 | 24.0 | 24.0 | 400 ohms | .... | .......... | $S_{14}$ | $S_{15}$ $S_{16}$ |

## AVC ACTION

A double AVC system is used. The RF and mixer tubes are operated by the broadly tuned carrier coming through only three tuned IF circuits. The final signal however passes through six-tuned IF circuits. As a result, when the signal is slightly detuned, the receiver output has dropped considerably while the AVC action has dropped but very little. This results in a reduction of between-station noise and a more sharply defined aural tuning action.

## "S" OR SIGNAL INTENSITY METER

The approximate DB per S unit equivalent is 6 DB's. As is known, a DB, or decibel, is a unit of change in signal level and is defined as being the least detectable change the average ear can appreciate when listening to a single pitched tone. 3DB is the least change the ear detects when listening to sounds varying in both amplitude and pitch. By comparison, a variation of one S unit on the meter will indicate a change of two detectable steps in signal level. Quantitatively, a DB gain or loss is equal to $20 \log_{10}\left(\frac{E_1}{E_2}\right)$ where $E_1$ = input voltage and $E_2$ = output voltage.

## THE SECOND DETECTOR

As will be noted, a diode type of second detector is used in the Model SX-28-A. Its choice was prompted by the fact that such a detector is capable of handling large percentages of modulation with very little distortion. This is due to the output of the diode being easily filtered (IF Removed). In addition, the rectified output contains a DC component which can be used for AVC purposes.

## THE BEAT FREQUENCY OSCILLATOR

The BFO is turned on with the switch below the bandspread handwheel and adjusted by the skirted knob directly below the tone control. The BFO circuit, as will be seen by referring to Fig. 13, is the well known Hartley oscillator. It will be noticed that a plate dropping resistor is used to compensate for plate voltage variations. An increase in receiver voltage causes an increase in the plate current of the oscillator. This increase in turn causes the voltage drop across the resistor to increase, thus maintaining a more constant voltage at the plate of the beat oscillator tube. A favorable ratio of capacity to inductance is used. The fixed tank capacity has been artifically aged by alternately exposing it to very high and then low temperatures. In this manner any residual strains of the component parts are removed and the capacity of the condenser remains constant. The BFO coil is permeability tuned which further removes the possibility of drift which would occur should a compression variable be used to resonate the circuit.

Proper location of the Beat Oscillator tube and its associated components plus excellent shielding and mechanical rigidity do much to keep stray fields from being established. Little BFO leakage is to be expected in the Model SX-28-A so "tweets" or BFO harmonics will not prove to be bothersome.

## THE AUDIO AMPLIFIER

The second or output stage of the audio amplifier in the Model SX-28-A receiver uses two 6V6GT tubes connected in push-pull. These tubes are driven by the 6SC7 double triode. One of the triode sections of the 6SC7 tube is used as the inverter to the 6V6GT tubes. A portion of the signal from the plate circuit of the first 6SC7 triode is fed to the grid of the other 6SC7 triode Section, thereby giving two output voltages in opposite phase suitable for exciting the push-pull 6V6GT output amplifier.

## THE POWER SUPPLY

The power supply in the Model SX-28-A is quite normal except that it supplies voltage for the 6V6GT output tubes directly from the rectifier or before the filter system. Voltage fluctuations in the receiver are greatly reduced—increasing the audio output of the receiver and stabilizing the operation of all circuits.

The filter circuit consisting of a total of 60 mfds of capacity plus an additional filter in the 6SC7 plate supply and a 12 henry choke keep the hum level of the receiver in excess of 60 DB below maximum output. The power transformer is built to withstand continuous operation at 250 degrees F but has been designed to run at approximately 160 degrees F under normal conditions.

## SPECIFICATIONS

Tubes:

| | |
|---|---|
| 1—6AB7 | 1st RF Amplifier |
| 1—6SK7 | 2nd RF Amplifier |
| 1—6SA7 | Mixer |
| 1—6SA7 | HF Oscillator |
| 1—6L7 | 1st IF Amplifier Noise Limiter |
| 1—6SK7 | 2nd IF Amplifier |
| 1—6B8 | 2nd Detector and S meter tube |
| 1—6B8 | AVC Amplifier |
| 1—6AB7 | Noise Amplifier |
| 1—6H6 | Noise Rectifier |
| 1—6J5 | Beat-Oscillator |
| 1—6SC7 | 1st Audio Amplifier |
| 2—6V6GT | Push-Pull Output Amplifiers |
| 1—5Z3 | Rectifier |

Power Consumption—at 117 volts—60 cycles—138 watts

Power Consumption—DC operation—18 amp. at 6 volts or 108 watts

Power Output —8 watts undistorted

Sensitivity—(for 500 milliwatts output) varies between the limits of 6 to 20 microvolts over the entire frequency range of the receiver.

| | 2 x | 1000 x |
|---|---|---|
| Selectivity—IF broad (high fidelity) | 12 kc | 36 kc |
| IF Sharp | 4.1 kc | 22 kc |

Frequency Range RF—Note: These are the actual frequencies covered corresponding to nominal figures indicated on the front panel.

550 to 1,620 kilocycles
1.5 to 3.1 megacycles
2.9 to 5.9 megacycles
5.75 to 11.5 megacycles
10.3 to 21.5 megacycles
20.4 to 43 megacycles

Frequency response AF (audio filter out—broad IF—tone control high)-70 to 3000 cycles ± 2½ DB

Speaker Output Impedances—5000 and 500 ohms

Intermediate Frequency—455 kc

Table cabinet dimensions—20½" long x 10" high x 14¾" deep

Relay Rack dust cover dimensions—14¾" deep x 17⅜" long x 8¾" high

Panel dimensions—19" x 8¾"

Chassis dimensions—17⅜" x 13½"

Weight—(unpacked)—75 lbs. packed 87 lbs.

# MODEL SX-28A,
## Super Skyrider

# THE HALLICRAFTERS CO.

| REF. SYMBOL | NAME OF PART AND DESCRIPTION | MFR. CODE | CONTR'S. PART NO. |
|---|---|---|---|
| $R_1$ | Resistor, 100,000 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE104K |
| $R_2$ | Resistor, variable, 10,000 ohm ± 20% carbon, type 35 | CT | 25C066 |
| $R_3$ | Resistor, 330 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE331K |
| $R_4$ | Resistor, 27,000 ohm ± 10%, 1 watt, carbon | ASA | RC31AE273K |
| $R_5$ | Resistor, 1000 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE102K |
| $R_6$ | Resistor, 6,800 ohm ± 10%, 2 watt, carbon | ASA | RC41AE682K |
| $R_7$ | Same as $R_1$ | | |
| $R_8$ | Same as $R_3$ | | |
| $R_9$ | Same as $R_5$ | | |
| $R_{10}$ | Resistor, 2700 ohm, ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE272K |
| $R_{11}$ | Same as $R_1$ | | |
| $R_{12}$ | Resistor, 390 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE391K |
| $R_{13}$ | Same as $R_5$ | | |
| $R_{14}$ | Same as $R_{10}$ | | |
| $R_{15}$ | Same as $R_1$ | | |
| $R_{16}$ | Resistor, 270 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE271K |
| $R_{17}$ | Same as $R_5$ | | |
| $R_{18}$ | Same as $R_{10}$ | | |
| $R_{19}$ | Same as $R_1$ | | |
| $R_{20}$ | Resistor, 470,000 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE474K |
| $R_{21}$ | Resistor, 270 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE271K |
| $R_{22}$ | Same as $R_5$ | | |
| $R_{23}$ | Same as $R_{10}$ | | |
| $R_{24}$ | Same as $R_1$ | | |
| $R_{25}$ | Same as $R_{20}$ | | |
| $R_{26}$ | Resistor, 1,000 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE102K |
| $R_{27}$ | Same as $R_{20}$ | | |
| $R_{28}$ | Resistor, 100 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE101K |
| $R_{29}$ | Resistor, variable, 500 ohm ± 20%, carbon, type 25 | CT | 25C022 |
| $R_{30}$ | Resistor, 27,000 ohm ± 10%, 2 watt, carbon | ASA | RC41AE273K |
| $R_{31}$<br>$R_{32}$ | Resistor, two sections; section #1 ($R_{31}$), 11,000 ohm ± 10%, $1\frac{1}{2}$ watts; section #2 ($R_{32}$) 4,000 ohm ± 10%, 7 watts; metal clad, wire wound | CS | 24A046 |
| $R_{33}$ | Resistor, variable, 500,000 ohm ± 20%, carbon | CT | 25C065 |
| $R_{34}$ | Same as $R_5$ | | |
| $R_{35}$ | Resistor, variable, 500,000 ohm ± 20%, carbon type AE-35-500M | CT | 25C064 |
| $R_{36}$, | Same as $R_1$ | | |
| $R_{37}$ | Same as $R_1$ | | |
| $R_{38}$ | Resistor, 47,000 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE473K |
| $R_{39}$ | Resistor, 180,000 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE184K |
| $R_{40}$ | Resistor, 270,000 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE274K |
| $R_{41}$ | Same as $R_{40}$ | | |
| $R_{42}$ | Resistor, 220 ohm ± 10%, 2 watt, wire wound, type BW2 | IRC | 24BV221E |
| $R_{43}$ | Resistor, 20,000 ohm ± 5%, 2 watt, carbon | ASA | RC41AE203J |
| $R_{44}$ | Resistor, 5,000 ohm ± 20%, 10 watt, wire wound, viterous enamel, type CC | U | 24BG502F |
| $R_{45}$ | Same as $R_{43}$ | | |
| $R_{46}$ | Same as $R_{38}$ | | |
| $R_{47}$ | Resistor, 10 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE100K |
| $R_{48}$ | Same as $R_1$ | | |
| $R_{49}$ | Resistor, 1 megohm ± 10%, $\frac{1}{2}$ watt carbon, | ASA | RC21AE105K |
| $R_{50}$ | Resistor, 560 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE561K |
| $R_{51}$ | Resistor, 20,000 ohm ± 5%, 1 watt, carbon | ASA | RC31AE203J |
| $R_{52}$ | Same as $R_{38}$ | | |
| $R_{53}$ | Resistor, variable, 50,000 ohm ± 20%, carbon with DPST switch, type WR-35 | CT | 25C067 |
| $R_{54}$ | Resistor, 33 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE330K |
| $R_{55}$ | Same as $R_{20}$ | | |
| $R_{56}$ | Same as $R_5$ | | |
| $R_{57}$ | Same as $R_1$ | | |
| $R_{58}$ | Resistor, 180 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE181K |
| $R_{59}$ | Same as $R_1$ | | |
| $R_{60}$ | Same as $R_{40}$ | | |
| $R_{61}$ | Same as $R_{20}$ | | |
| $R_{62}$ | Same as $R_{20}$. Part of transformer $T_1$. Shown for reference only. | | |
| $R_{63}$ | Same as $R_{10}$ | | |
| $R_{64}$ | Same as $R_{20}$ | | |
| $R_{65}$ | Same as $R_{38}$ | | |
| $R_{66}$ | Same as $R_{38}$ | | |
| $R_{67}$ | Same as $R_{50}$ | | |
| $R_{68}$ | Resistor, 1,200 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE122K |
| $R_{69}$ | Same as $R_1$ | | |
| $R_{70}$ | Same as $R_{49}$ | | |
| $R_{71}$ | Resistor, 4700 ohm ± 10%, 1 watt, carbon | ASA | RC31AE472K |
| $R_{72}$ | Same as $R_{50}$ | | |
| $R_{73}$ | Not used | | |
| $R_{74}$ | Same as $R_{47}$ | | |

| REF. SYMBOL | NAME OF PART AND DESCRIPTION | MFR. CODE | CONTR'S. PART NO. |
|---|---|---|---|
| $C_1$<br>$C_{1.1}$<br>$C_{1.2}$<br>$C_2$<br>$C_{2.1}$<br>$C_{2.2}$<br>$C_{2.3}$ | Capacitor, variable, 4 unit gang, each unit consists of 2 sections, except unit 4 at rear which contains only one section (section #2), air dielectric, special; Section #1-min. cap. 16.3 mmfd., max. cap. 187.5 mmfd. ($C_1$, $C_{1.1}$, $C_{1.2}$); Section #2-min. cap. 21.5 mmfd., max. cap. 250.0 mmfd. ($C_2$, $C_{2.1}$, $C_{2.2}$, $C_{2.3}$). | RC | 48B050 |
| $C_3$<br>$C_{3.1}$<br>$C_{3.2}$<br>$C_{3.3}$<br>$C_4$<br>$C_{4.1}$ | Capacitor, variable, 4 unit gang, each unit consists of 3 sections, air dielectric, special; Section #1-min. cap. 6 mmfd., max. cap. 16 mmfd. ($C_3$, $C_{3.1}$, $C_{3.2}$, $C_{3.3}$); Section #2-min. cap. 6.5 mmfd., max. cap. 21.5 mmfd. ($C_4$, $C_{4.1}$, $C_{4.2}$, $C_{4,3}$); Section #3-min. cap. 6.5 mmfd., max. cap. 27 mmfd. ($C_5$, $C_{5.1}$, $C_{5.2}$, $C_{5.3}$) | RC | 48B051 |
| $C_{4.2}$<br>$C_{4.3}$<br>$C_5$<br>$C_{5.1}$ | Capacitor, variable, 4 unit gang, each unit consists of 3 sections, air dielectric, special; Section #1-min. cap. mmfd., max. cap. 16 mmfd. ($C_3$, $C_{3.1}$, $C_{3.2}$, $C_{3.3}$); Section #2-min. cap. 6.5 mmfd., max. cap. 2.5 mmfd. ($C_4$, $C_{4.1}$, $C_{4.2}$, $C_{4.3}$) Section #3-min. cap. 6.5 mmfd., max. cap. 27 mmfd. ($C_5$, $C_{5.1}$, $C_{5.2}$, $C_{5.3}$) | RC | 48B051 |
| $C_6$ | Capacitor, variable, min. cap. 3.5 mmfd., max. cap. 50 mmfd., air dielectric, ceramic insulation, type 22 | RC | 48A053 |
| $C_7$ | Capacitor, 2980 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special | UE | 44B110 |
| $C_8$ | Capacitor, 2400 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special | UE | 44B109 |
| $C_9$ | Capacitor, 2240 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special | UE | 44B108 |
| $C_{10}$ | Capacitor, 1700 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special | UE | 44B107 |
| $C_{11}$ | Capacitor, 822 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special | UE | 44B106 |
| $C_{12}$ | Capacitor, 541 mmfd. adjustable ± 5%, mica dielectric, steel mtg. frame, special | UE | 44B105 |
| $C_{13}$ | Capacitor, adjustable, 5 mmfd. ± 0.2 mmfd. at 25° C., capacity change -0.02 mmfd. per ° C., type S-2739 | UE | 44A062 |
| $C_{14}$ | Capacitor, 0.02 mfd. -10 + 40%, 400 V. D-C working, paper dielectric | SP | 46AW203J |
| $C_{15}$ | Same as $C_{14}$ | | |
| $C_{16}$ | Capacitor, fixed, 0.02 mfd. - 10 + 40%, 600 V. D-C working, paper dielectric | SP | 46AY203J |
| $C_{17}$ | Capacitor, fixed, 0.05 mfd. - 10 + 40%, 200 V. D-C working, paper dielectric | SP | 46AU503J |
| $C_{18}$ | Same as $C_{14}$ | | |
| $C_{19}$ | Same as $C_{14}$ | | |
| $C_{20}$ | Same as $C_{16}$ | | |
| $C_{21}$ | Same as $C_{17}$ | | |
| $C_{22}$ | Same as $C_{14}$ | | |
| $C_{23}$ | Same as $C_{14}$ | | |
| $C_{24}$ | Same as $C_{16}$ | | |
| $C_{25}$ | Capacitor, fixed, 2200 mmfd. ± 10%, 500 V. D-C working, mica dielectric | ASA | CM30A222K |
| $C_{26}$ | Same as $C_{17}$ | | |
| $C_{27}$ | Same as $C_{14}$ | | |
| $C_{28}$ | Same as $C_{16}$ | | |
| $C_{29}$ | Capacitor, variable, min. cap. 2 mmfd., max. cap. 6 mmfd., ceramic dielectric, special mtg. bracket, type B-820-202 | CRL | 44A079 |
| $C_{30}$ | Capacitor, variable, min. cap. 4 mmfd., max. cap. 20 mmfd., ceramic dielectric, special mtg bracket, type B-820-304 | CRL | 44A078 |
| $C_{31}$ | Same as $C_{30}$ | | |
| $C_{32}$ | Capacitor, variable, min. cap. 3.0 mmfd., max. cap. 25 mmfd., air dielectric, ceramic insulation, type 22-7 | RC | 48A039 |
| $C_{33}$ | Same as $C_{14}$ | | |
| $C_{34}$ | Same as $C_{17}$ | | |
| $C_{35}$ | Same as $C_{14}$ | | |
| $C_{36}$ | Same as $C_{16}$ | | |
| $C_{37}$ | Capacitor, fixed, 47 mmfd. ± 10%, 500 V. D-C working, mica dielectric | ASA | CM20A470K |
| $C_{38}$ | Not used | | |
| $C_{39}$ | Same as $C_{14}$ | | |

# THE HALLICRAFTERS CO.

## MODEL SX-28A, Super Skyrider

| REF. SYMBOL | NAME OF PART AND DESCRIPTION | MFR. CODE | CONTR'S. PART NO. |
|---|---|---|---|
| $C_{40}$ | Capacitor, fixed, 470 mmfd. ± 10%, 500 V. D-C working, mica dielectric | ASA | CM35A512J |
| $C_{41}$ | Capacitor, fixed, one unit of dual unit, 40 mfd. - 10 + 40%, 25 V. D-C working, electrolytic (See $C_{44}$) | | |
| $C_{42}$ | Same as $C_{16}$ | | |
| $C_{43}$ | Capacitor, fixed, 5100 mmfd. ± 5%, 300 V. D-C working, mica dielectric | ASA | CM20A471K |
| $C_{44}$ | Capacitor, fixed, one unit of dual unit, 10 mfd. - 10 + 40%, 300 V. D-C working, electrolytic (See $C_{41}$) | SP | 42A032 |
| $C_{45}$ | Capacitor, fixed, 0.05 mfd. - 10 + 40%, 400 V. D-C working, paper dielectric | SP | 46AW503J |
| $C_{46}$ | Same as $C_{45}$ | | |
| $C_{47}$ | Capacitor, fixed, one unit of dual unit, 40 mfd. - 10 + 40%, 5 V. D-C working, electrolytic (See $C_{48}$) | SP | 42A031 |
| $C_{48}$ | Capacitor, fixed, one unit of dual unit, 30 mfd. - 10 + 40%, 400 V. D-C working, electrolytic in same container with $C_{47}$ | | |
| $C_{49}$ | Capacitor, fixed, 30 mfd. - 10 + 40%, 450 V. D-C working, electrolytic, type D8290 | SP | 42A030 |
| $C_{50}$ | Same as $C_{14}$ | | |
| $C_{51}$ | Capacitor, fixed, 0.01 mfd. - 10 + 40%, 600 V. D-C working, paper dielectric | SP | 46AY103J |
| $C_{52}$ | Same as $C_{51}$ | | |
| $C_{53}$ | Same as $C_{17}$ | | |
| $C_{54}$ | Same as $C_{45}$ | | |
| $C_{55}$ | Capacitor, variable, compression type, 50 mmfd. (nominal), mica dielectric, type SW-1530 | SWI | 53A012 |
| $C_{56}$ | Same as $C_{16}$ | | |
| $C_{57}$ | Same as $C_{14}$ | | |
| $C_{58}$ | Same as $C_{17}$ | | |
| $C_{59}$ | Same as $C_{17}$ | | |
| $C_{60}$ | Same as $C_{37}$ | | |
| $C_{61}$ | Capacitor, fixed, 250 mmfd. ± 20%, 500 V. D-C working, mica dielectric, type 1468. Part of transformer $T_1$. Shown for reference only. | | |
| $C_{62}$ | Same as $C_{14}$ | | |
| $C_{63}$ | Same as $C_{17}$ | | |
| $C_{64}$ | Capacitor, fixed, 100 mmfd. ± 10%, 500 V. D-C working, mica dielectric | ASA | CM20A101K |
| $C_{65}$ | Same as $C_{14}$ | | |
| $C_{66}$ | Same as $C_{17}$ | | |
| $C_{67}$ | Same as $C_{16}$ | | |
| $C_{68}$ | Same as $C_{37}$ | | |
| $C_{69}$ | Same as $C_{37}$ | | |
| $C_{70}$ | Same as $C_{25}$ | | |
| $C_{71}$ | Same as $C_{64}$ | | |
| $C_{72}$ | Capacitor, variable, min. cap. 5 mmfd., max. cap. 25 mmfd., air dielectric, special | RC | 48A064 |
| $C_{73}$ | Capacitor, fixed, 500 mmfd. ± 5%, 500 V. D-C working, silver mica, type 1469, Part of transformer $T_4$. Shown for reference only. | A | 47BT501D |
| $C_{74}$ | Capacitor, fixed, 0.01 mfd. -10 + 40%, 600 V. D-C working, paper dielectric, braided leads, type AB | SP | 46A021 |
| $C_{75}$ | Capacitor, 2 mmfd., twisted leads | | |
| $C_{76}$ | Same as $C_{25}$ | | |
| $C_{77}$ | Same as $C_{17}$ | | |
| $C_{78}$ | Not used | | |
| $C_{79}$ | Not used | | |
| $C_{80}$ | Not used | | |
| $C_{81}$ | Not used | | |
| $C_{82}$ | Not used | | |
| $C_{83}$ | Capacitor, fixed, 2.5 mmfd. ± 20%, 500 V. D-C working, bakelite dielectric | | 49A001 |
| $C_{84}$ | Not used | | |
| $C_{85}$ | Not used | | |
| $C_{86}$ | Same as $C_{40}$ | | |
| $C_{87}$ | Capacitor, fixed, 0.25 mfd. - 10 + 40%, 200 V. D-C working, paper dielectric | SP | 46AT254J |
| $C_{88}$ | Capacitor, variable, min. cap. 4 mmfd., max. cap. 20 mmfd., ceramic insulation, temp. coeff. - 0.005 mmfd mmfd/ ° C., type 820-B | CRL | 44A102 |
| $C_{89}$ | Same as $C_{88}$ | | |
| $C_{90}$ | Same as $C_{88}$ | | |
| $C_{91}$ | Same as $C_{88}$ | | |
| $C_{92}$ | Capacitor, variable, min. cap. 2.5 mmfd., max. cap. 6 mmfd., ceramic insulation, temp. coeff. 0.0005 mmfd. mmfd/ ° C, special | CRL | 44A119 |
| $C_{93}$ | Same as $C_{88}$ | | |
| $C_{94}$ | Same as $C_{88}$ | | |
| $C_{95}$ | Same as $C_{88}$ | | |
| $C_{96}$ | Same as $C_{88}$ | | |
| $C_{97}$ | Same as $C_{88}$ | | |
| $C_{98}$ | Same as $C_{88}$ | | |
| $C_{99}$ | Same as $C_{88}$ | | |
| $C_{100}$ | Same as $C_{88}$ | | |
| $C_{101}$ | Same as $C_{88}$ | | |
| $C_{102}$ | Same as $C_{88}$ | | |
| $C_{103}$ | Same as $C_{88}$ | | |
| $C_{104}$<br>$C_{105}$ | Capacitor, fixed, 275 mmfd., silver mica. Part of transformer $T_1$. Shown for reference only. | | |
| $C_{106}$ | Capacitor, fixed, 125 mmfd., silver mica. Part of transformer $T_2$. Shown for reference only. | | |
| $C_{107}$ | Capacitor, fixed, 85 mmfd., silver mica. Part of transformer $T_2$. Shown for reference only. | | |
| $C_{108}$<br>$C_{109}$ | Capacitor assembly; fixed capacitor, 25 mmfd. ± 5%, silver mica; variable capacitor, min. cap. 70 mmfd., max. cap. 90 mmfd., ceramic dielectric; both capacitors connected in parallel to form assembly. Part of transformer $T_3$. Shown for reference only. | | |
| $C_{110}$<br>$C_{111}$ | Capacitor, variable, compression type, 80 mmfd., (nominal), mica dielectric. Part of transformer $T_5$. Shown for reference only. | | |
| $C_{112}$ | Capacitor, fixed, 100 mmfd. ± 10%, 500 V. D-C working mica. Part of transformer $T_6$. Shown for reference only. | | |
| $C_{113}$ | Capacitor, fixed, 25 mmfd. ± 10%, 500 V. D-C working, mica. Part of transformer $T_6$. Shown for reference only. | | |
| $C_{114}$ | Capacitor, fixed, 10 mmfd. ± 10%, 500 V. D-C working, ceramic dielectric, -0.00075 mmfd./mmfd./deg. Cent. temp. coeff., type class D modified | CRL | 47A041 |
| $T_1$ | Transformer, I-F, 455KC, primary and secondary tuned by adjustable iron core, secondary has expander winding, special. | SI | 50B082 |
| $T_2$ | Transformer, I-F, 455KC, primary and secondary tuned by adjustable iron core, secondary tapped for crystal filter and variable band width, primary has expander winding, special | SI | 50B081 |
| $T_3$ | Transformer, I-F, 455KC, primary and secondary tuned by variable capacitor, iron core coils, type 3365 | SWI | 50B083 |
| $T_4$ | Transformer, 455KC, tuned by adjustable iron core, special | SWI | 54B014 |
| $T_5$ | Transformer, I-F, 455KC, primary and secondary tuned by variable capacitor, iron core coils special | SWI | 50B097 |
| $T_6$ | Transformer, I-F, 455KC, primary tuned by adjustable iron core, secondary untuned air core, special | SWI | 50B080 |
| $T_7$ | Transformer, power, standard; primary, 117 V. A-C, single phase, 50/60 cycles; secondary, 580 V. A-C @ 185 ma., center tapped; 6.3 V. A-C @ 5.5 amperes, 5 V. A-C @ 3 amperes, type 6K53 | GT | 52B033 |
| | Transformer, power, universal; primary, 117/230 V A-C, single phase, 50/60 cycles; secondary-same as standard transformer, type 9G62 | GT | 52B034 |
| $T_8$ | Transformer, A-F; primary, 10,000 ohm winding center tapped; secondary, 5000 ohm winding tapped at 500 and 100 ohms, iron core, type 3A347 | GT | 55B009 |
| $T_9$ | Transformer, R-F, range 3.0-5.8 megacycles, air core, special | SWI | 51B568 |
| $T_{10}$ | Transformer, R-F, range 5.8-11.5 megacycles, air core, special | SWI | 51B569 |
| $T_{11}$ | Transformer, R-F, range 10.5-21 megacycles, air core, special | SWI | 51B570 |
| $T_{12}$ | Transformer, R-F, range 21-43 megacycles, air core, special | SWI | 51B571 |
| $T_{13}$ | Transformer, R-F, range .55-1.6 megacycles, air core, special | SWI | 51B566 |
| $T_{14}$ | Transformer, R-F, range, 1.6-3.0 megacycles, air core, special | SWI | 51B567 |
| $T_{15}$ | Transformer, R-F, range, 3.0-5.8 megacycles, adjustable iron core, special | SWI | 51B572 |
| $T_{16}$ | Transformer, R-F, range 5.8-11.5 megacycles, adjustable iron core, special | SWI | 51B573 |
| $T_{17}$ | Transformer, R-F, range 10.5-21 megacycles, adjustable iron core, special | SWI | 51B574 |
| $T_{18}$ | Transformer, R-F, range 21-42 megacycles, adjustable iron core, special | SWI | 51B575 |
| $T_{19}$ | Transformer, R-F, range .55-1.6 megacycles, adjustable iron core, special | SWI | 51B576 |
| $T_{20}$ | Transformer, R-F, range 1.6-3.0 megacycles, adjustable iron core, special | SWI | 51B577 |
| $T_{21}$ | Transformer, R-F, range 3.0-5.8 megacycles, adjustable iron core, special | SWI | 51B578 |
| $T_{22}$ | Transformer, R-F, range 5.8-11.5 megacycles adjustable iron core, special | SWI | 51B579 |
| $T_{23}$ | Transformer, R-F, range 10.5-21 megacycles, adjustable iron core, special | SWI | 51B580 |
| $T_{24}$ | Transformer, R-F, range 21-42 megacycles, adjustable iron core, special | SWI | 51B581 |
| $T_{25}$ | Transformer, R-F, range,.55-1.6 megacycles, adjustable iron core, special | SWI | 51B582 |
| $T_{26}$ | Transformer, R-F, range 1.6-3.0 megacycles, adjustable iron core, special | SWI | 51B583 |
| $T_{27}$ | Transformer, R-F, range 3-5.8 megacycles, adjustable iron core, special | SWI | 51B584 |
| $T_{28}$ | Transformer, R-F, range 5.8-11.5 megacycles, adjustable iron core, special | SWI | 51B585 |

## MODEL SX-28A, Super Skyrider

## THE HALLICRAFTERS CO.

| REF. SYMBOL | NAME OF PART AND DESCRIPTION | MFG. CODE | CONTR'S' PART NO. |
|---|---|---|---|
| $T_{29}$ | Transformer, R-F, range 10.5-21 megacycles, adjustable iron core, special | SWI | 51B586 |
| $T_{30}$ | Transformer, R-F, range 21-42 megacycles, adjustable iron core, special | SWI | 51B587 |
| $SO_1$ | Socket, octal, female, low loss mica-filled bakelite insulation, type MIP8T | AP | 6A042 |
| $TS_1$ | Terminal strip, black bakelite, marked "$A_2$" "$A_1$", special | H | 8A039 |
| $TS_2$ | Terminal strip, black bakelite, marked "5000", special | H | 8A040 |
| $TS_3$ | Terminal strip, black bakelite, marked "500", special | H | 8A041 |
| $CH_1$ | Inductor, 13 henries ± 10%, @ 100 milliamperes D-C, d-c resistance 300 ohms ± 10%, iron core, type 1D25 | GT | 56B008 |
| $CH_2$ | Inductor, 4 henries ± 10% d-c resistance 220 ohms ± 10%, iron core, type 10C5 | ST | 55A010 |
| $CH_3$ | Inductor, universal winding, iron core, designed to resonate at 455KC with 47 mmfd. ± 7% across the coil, type 774 | SWI | 53B012 |
| $J_1$ | Jack, single circuit, switching type, single pole double throw, 1 pair contacts normally closed, bushing 3/8-32 x 5/16" long, type 503C | U | 36B003 |
| $J_2$ | Jack, switching type, single pole double throw, 1 pair contacts normally closed, bushing 3/8-32 x 3/8" long, type ST-627A | U | 36B011 |
| $FS_1$ | Fuse, 1.5 amperes @ 250 V., 4AG, glass enclosed, type 1041 | LF | 39A320 |
| $PL_1$ | Plug, octal, male, bakelite body, jumpers connect terminals 6 and 7, and terminals 3 and 4, type CP-8 | AP | 35A003 |
| $PL_2$ | Plug and line cord assemble, 2 conductor rubber covered #18 copper stranded wire moulded rubber plug at one end, length 6 feet | E | 87A078 |
| $M_1$ | Meter 0.5 milliamperes, 8.8 ohms internal resistance, pointer swing 90 degrees, special mtg bracket, special | BE | 82A070 |
| $CX_1$ | Crystal, frequency 455KC ± 5KC, type CF6 | BL | 19A123 |
| $SW_1$<br>$SW_2$ | Switch, rotary selector, single section, 3 position, shorting type rotar contacts, bakelite wafer, shaft 2-1/16" long x 1/4" dia., bushing 1/4" deep, type H | OM | 60B052 |
| $SW_3$ | Switch, SPST, toggle action, located on rear of resistor $R_{35}$ | | |
| $SW_4$ | Switch, SPST, bat handle toggle, rated 3 amperes @ 250 V., type 21350GA | HH | 60A103 |
| $SW_5$<br>$SW_{5-1}$ | Switch, DPST, toggle action, located on the rear of resistor $R_{53}$ | | |
| $SW_6$<br>$SW_7$ | Same as $SW_1$ | | |
| $SW_{8-1}$<br>$SW_{8-2}$<br>$SW_{8-3}$<br>$SW_{8-4}$ | Switch, rotary selector, 3 section, 6 position, bakelite wafers, sections are assembled to struts, type H | OM | 62B025 |
| $SW_{8-5}$<br>$SW_{8-6}$<br>$SW_{8-7}$ | Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts, type 18908-H2 | OM | 62B013 |
| $SW_{8-8}$<br>$SW_{8-9}$<br>$SW_{8-10}$ | Same as $SW_{8-5}$, $SW_{8-6}$ and $SW_{8-7}$ | | |
| $SW_{8-11}$<br>$SW_{8-12}$<br>$SW_{8-13}$ | Switch, rotary selector, 2 section, 6 position, bakelite wafers, sections are assembled to struts type H | OM | 62B015 |
| $SW_{8-14}$<br>$SW_{8-15}$ | Switch, rotary selector, single section, 6 position, shorting type rotor contacts, bakelite wafer, type 23586-H | OM | 62B023 |
| $SW_{9-1}$<br>$SW_{9-2}$<br>$SW_{9-3}$ | Switch, rotary selector, 3 section, 6 position, shorting type rotor, contacts, bakelite wafers, shaft 2-3/8" long x 1/4" dia., bushing 1/4" deep, type 22659-H3 | OM | 60B048 |
| $SW_{10}$ | Switch, SPDT, bat handle toggle, rated 1 ampere @ 250 V. and 3 amperes @ 125 V., type 20994KF | HH | 60A102 |
| $LM_1$ | Lamp 6.3 V. @ 250 milliamperes, bayonet base type 44 | GE | 39A003 |
| $LM_2$ | Same as $LM_1$ | | |
| $LM_3$ | Lamp, 6.3 V. @ 150 milliamperes, bayonet base type 47 | GE | 39A004 |

| REF. SYMBOL | NAME OF PART AND DESCRIPTION | MFR. CODE | CONTR'S. PART NO. |
|---|---|---|---|
| $V_1$ | Tube, pentode type 6AB7 | RCA | 90X6AB7 |
| $V_2$ | Tube, triple-grid super-control amplifier, type 6SK7 | RCA | 90X6SK7 |
| $V_3$ | Tube, multi-electrode pentagrid converter, type 6SA7 | RCA | 90X6SA7 |
| $V_4$ | Same as $V_3$ | | |
| $V_5$ | Tube, multi-electrode pentagrid mixer amplifier, type 6L7 | RCA | 90X6L7 |
| $V_6$ | Same as $V_2$ | | |
| $V_7$ | Tube, duplex-diode pentode, type 6B8 | RCA | 90X6B8 |
| $V_8$ | Same as $V_7$ | | |
| $V_9$ | Same as $V_1$ | | |
| $V_{10}$ | Tube, twin diode, type 6H6 | RCA | 90X6H6 |
| $V_{11}$ | Tube, triode, type 6J5 | RCA | 90X6J5 |
| $V_{12}$ | Tube, twin triode, type 6SC7 | RCA | 90X6SC7 |
| $V_{13}$ | Tube, beam power amplifier, type 6V6GT | RCA | 90X6V6GT |
| $V_{14}$ | Same as $V_{13}$ | | |
| $V_{15}$ | Tube, full wave high vacuum rectifier; type 5Z3 | RCA | 90X5Z3 |

### TROPICALIZED PARTS LIST

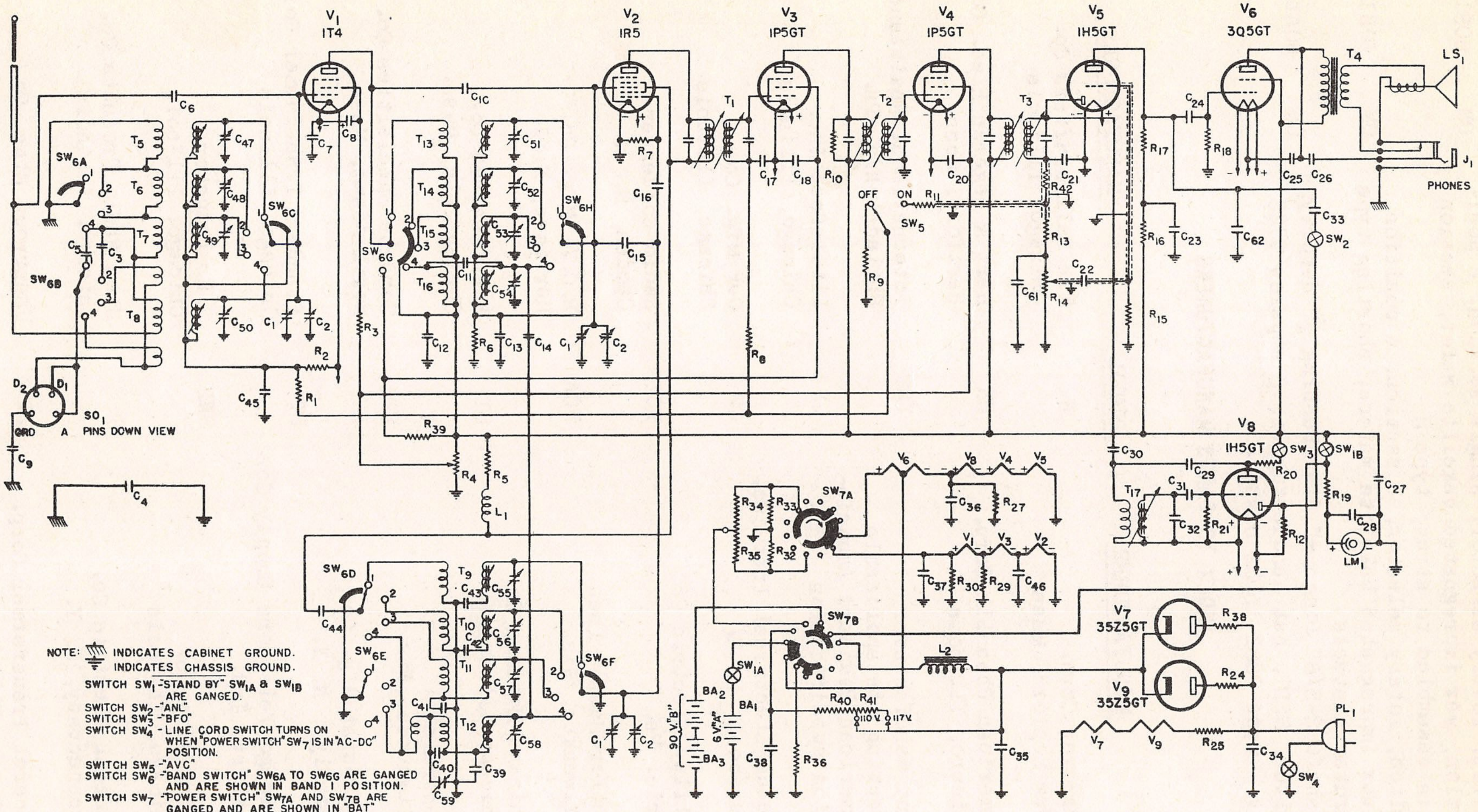
| REF. SYMBOL | NAME OF PART AND DESCRIPTION | MFR. CODE | CONTR'S. PART NO. |
|---|---|---|---|
| $R_{31}$<br>$R_{32}$ | Resistor, two sections; section #1 ($R_{31}$) 10,000 ohm ± 10%, 2 watts; section #2 ($R_{32}$) 4,000 ohm ± 10%, 8 watts; metal clad, wire wound, type MW 5 | IRC | 24A822 |
| $T_3$ | Transformer, I-F, 455 KC., primary and secondary tuned by adjustable capacitors, fixed iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2002, special | SWI | 50B132 |
| $T_4$ | Transformer, 455 KC., tuned by adjustable iron core, winding vacuum wax impregnated and dipped in zophar #1598, special | SWI | 54B020 |
| $T_5$ | Transformer, I-F, 455 KC., primary and secondary tuned by adjustable capacitors, air core, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2002, trimmers heat cycled at nominal capacity setting (80 mmfd.) and humidity stablizied, special | SWI | 50B131 |
| $T_6$ | Transformer, I-F, 455 KC., primary tuned by adjustable iron core, secondary untuned air core, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2002, special | SWI | 50B130 |
| $T_7$ | Transformer, power, standard; primary, 115 V. A-C, single phase, 50/60 cycles; secondary #1, to provide 290 V. A-C @185 milliamperes with a 5Z3 rectifier and a 30 mfd. input capacitor, center tapped; secondary #2, 6.3 V. A-C @5.5 amperes; secondary #3, 5 V. A-C @3 amperes; windings and core vacuum wax impregnated; transformer potted in a high melting point compound, type 6K64 | GT | 52B045 |
| $T_8$ | Transformer, A-F; primary, 10,000 ohm winding, center tapped; secondary, 5000 ohm winding tapped at 500 and 100 ohms, iron core, entire unit dipped in Korite #4, type 3A517 | GT | 55B052 |
| $CH_1$ | Inductor, 13 henries, ± 15% @100 milliamperes D-C, d-c resistance 300 ohms ± 10%, iron core, winding impregnated with vacuum wax, entire unit dipped in Korite #4, type 1D34 | GT | 56B035 |
| $SW_1$<br>$SW_2$ | Switch, rotary selector, single section, 3 position, shorting type rotor contacts, wax impregnated bakelite wafer, shaft 2-5/16" long x ¼" dia., bushing ¼" deep, type H | OM | 60B144 |
| $SW_4$ | Switch, SPST, bat handle toggle, rated 3 amperes @250 V., type 8280 15/32 bushing | CH | 60A138 |
| $SW_6$<br>$SW_7$ | Switch, rotary selector, single section, 3 position, shorting type rotor contacts, wax impregnated bakelite wafer, shaft 2-5/16" long x ¼" dia., bushing ¼" deep, type H | OM | 60B144 |
| $SW_{8-1}$<br>$SW_{8-2}$<br>$SW_{8-3}$<br>$SW_{8-4}$ | Switch, rotary selector, 3 section, 6 position, wax impregnated bakelite wafers, sections are assembled to struts, type H | OM | 62B033 |
| $SW_{8-5}$<br>$SW_{8-6}$<br>$SW_{8-7}$ | Switch, rotary selector, 2 section, 6 position, wax impregnated bakelite wafers, sections are assembled to struts, type H | OM | 62B031 |
| $SW_{8-8}$<br>$SW_{8-9}$<br>$SW_{8-10}$ | Switch, rotary selector, 2 section, 6 position, wax impregnated bakelite wafers, sections are assembled to struts, type H | OM | 62B031 |
| $SW_{8-11}$<br>$SW_{8-12}$<br>$SW_{8-13}$ | Switch, rotary selector, 2 section, 6 position, wax impregnated bakelite wafers, sections are assembled to struts, type H | OM | 62B032 |

| | | | |
|---|---|---|---|
| $SW_{8-14}$<br>$SW_{8-15}$ | Switch, rotary selector, single section, 6 position, wax impregnated bakelite wafer, section is assembled to strut, type H | OM | 60B135 |
| $SW_{9-1}$<br>$SW_{9-2}$<br>$SW_{9-3}$ | Switch, rotary selector, 3 section, 6 position, wax impregnated bakelite wafers, shorting type rotar contacts shaft 2-5/8" long x $\frac{1}{4}$" dia., bushing $\frac{1}{4}$" deep, type | OM | 60B134 |
| $SW_{10}$ | Switch, SPDT, bat handle toggle, 3 amperes @125 V., type 8282 15/32 bushing | CH | 60A139 |

## INDEX TO PARTS MANUFACTURERS

| SYMBOL | MANUFACTURER | SYMBOL | MANUFACTURER |
|---|---|---|---|
| A | Aerovox Corp.<br>New Bedford, Mass. | H | The Hallicrafters Co.<br>Chicago, Illinois |
| AP | American Phenolic Corp.<br>Cicero, Illinois | HH | Hart & Hegeman Elec. Co.<br>Hartford, Conn. |
| ASA | Any manufacturer meeting the applicable American Standard Association specification | IRC | International Resistance Co.<br>Philadelphia, Pa. |
| BE | Beede Electrical Inst. Co.<br>Penacook, N. H. | LF | Littlefuse Inc.<br>Chicago, Illinois |
| BL | Bliley Electric Co.<br>Erie, Pa. | OM | Oak Mfg. Co.<br>Chicago, Illinois |
| CH | Cutler-Hammer Inc.<br>Milwaukee, Wis. | RC | Radio Condenser<br>Camden, N. J. |
| CM | Chicago Molding Co.<br>Chicago, Illinois | RCA | R.C.A. Mfg. Co.<br>Harrison, N. J. |
| CRL | Centralab<br>Milwaukee, Wis. | SI | F.W. Sickles Co.<br>Springfield, Mass. |
| CS | Clarostat Mfg. Co.<br>Brooklyn, N. Y. | SP | Sprague Specialties Co.<br>North Adams, Mass. |
| CT | Chicago Telephone Supply Co.<br>Elkhart, Ind. | ST | Standard Transformer Corp.<br>Chicago, Illinois |
| E | Essex Wire Co.<br>Chicago, Illinois | SWI | S.W. Inductor<br>Chicago, Illinois |
| GE | General Electric Co.<br>Schenectady, N. Y. | U | Utah Radio Products Co.<br>Chicago, Illinois |
| GT | General Transformer Corp.<br>Chicago, Illinois | UE | Underwood Elec. Co.<br>Chicago, Illinois |

# THE HALLICRAFTERS CO.


V1
IT4
V2
IR5
V3
IP5GT
V4
IP5GT
V5
IH5GT
V6
3Q5GT
V8
IH5GT
V7
35Z5GT
V9
35Z5GT
LS1
J1
PHONES
T4
SW2
SW3
SW1B
SW1A
SW4
SW5
OFF
ON
SW6A
SW6B
SW6C
SW6D
SW6E
SW6F
SW6G
SW6H
SW7A
SW7B
SO1
A
PINS DOWN VIEW
D1
D2
GRD
PL1
LM1
L1
L2
BA1
BA2
BA3
90 V "B"
6 V "A"
110 V
117 V

NOTE: ⏚ INDICATES CABINET GROUND.
⏚ INDICATES CHASSIS GROUND.

SWITCH SW$_1$ - "STAND BY" SW$_{1A}$ & SW$_{1B}$ ARE GANGED.
SWITCH SW$_2$ - "ANL"
SWITCH SW$_3$ - "BFO"
SWITCH SW$_4$ - LINE CORD SWITCH TURNS ON WHEN "POWER SWITCH" SW$_7$ IS IN "AC-DC" POSITION.
SWITCH SW$_5$ - "AVC"
SWITCH SW$_6$ - "BAND SWITCH" SW$_{6A}$ TO SW$_{6G}$ ARE GANGED AND ARE SHOWN IN BAND 1 POSITION.
SWITCH SW$_7$ - "POWER SWITCH" SW$_{7A}$ AND SW$_{7B}$ ARE GANGED AND ARE SHOWN IN "BAT" POSITION. ONE STEP TO RIGHT FOR "OFF" POSITION. TWO STEPS TO RIGHT FOR "AC-DC" POSITION.

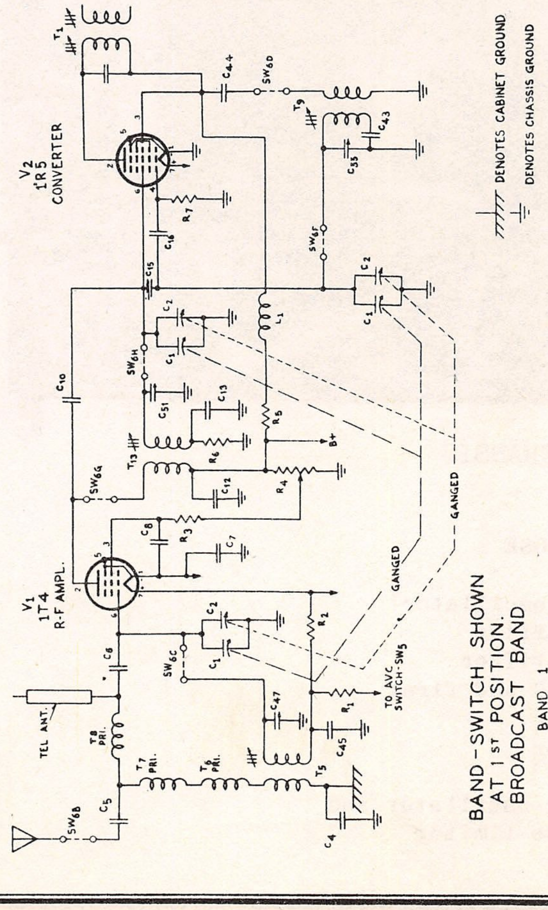
RESISTOR R$_4$ - "R-F GAIN" CONTROL
RESISTOR R$_{14}$ - "A-F GAIN" (VOLUME) CONTROL

INTERMEDIATE FREQUENCY — 455 KC

IF PEAK
455 KC

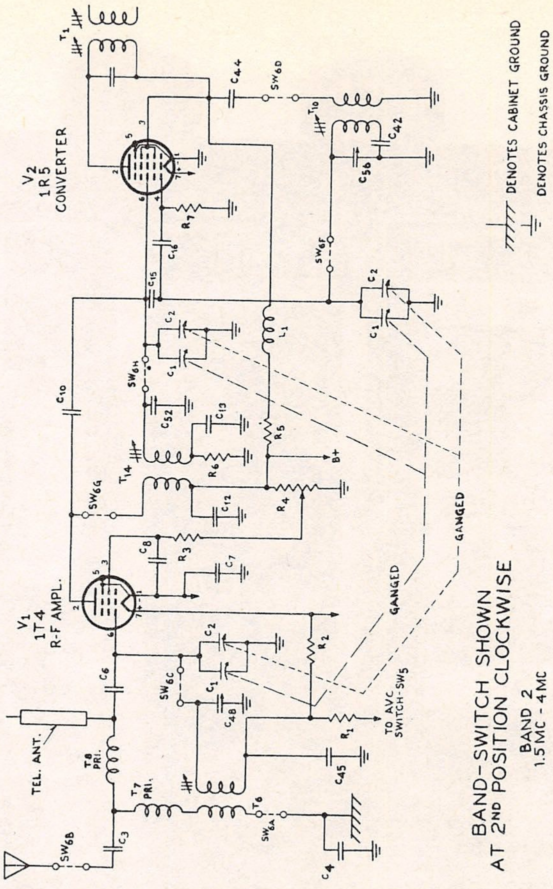
June 9, 1944

# THE HALLICRAFTERS CO. MODEL S-39, Skyranger


V2
1R5
CONVERTER
V1
1T4
R-F AMPL.
T1
C44
SW6D
T9
C43
C55
C16
R7
SW6F
C15
C2
C1
L1
SW6H
C10
C51
C13
R5
B+
T13
R6
C12
R4
SW6G
C8
R3
C7
R2
C6
SW6C
C47
R1
TO AVC SWITCH-SW5
TEL. ANT.
T8 PRI.
T7 PRI.
T6 PRI.
T5
C45
C5
SW6B
C4
GANGED
DENOTES CABINET GROUND
DENOTES CHASSIS GROUND

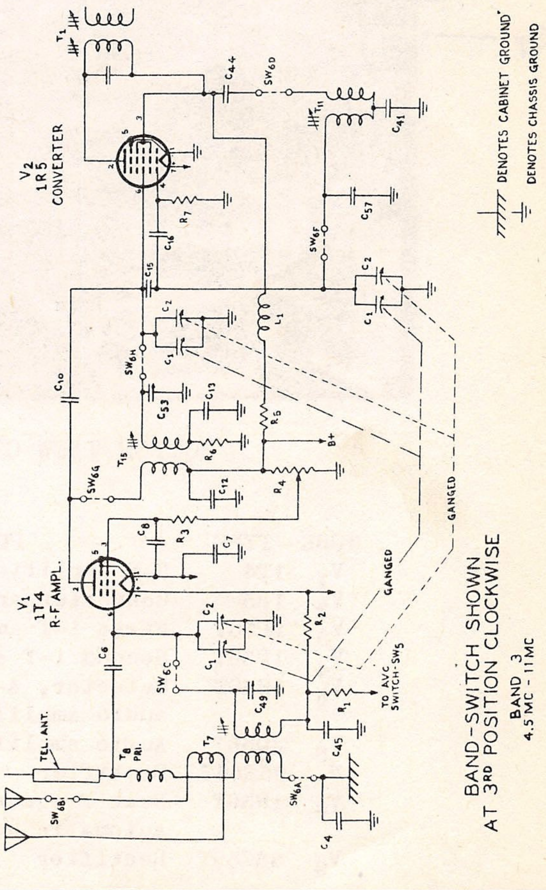
BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND

BAND 1
550 KC - 1450 KC


V2
1R5
CONVERTER
V1
1T4
R-F AMPL.
T1
C44
SW6D
T10
C42
C56
C16
R7
SW6F
C15
C2
C1
L1
SW6H
C10
C52
C13
R5
B+
T14
R6
C12
R4
SW6G
C8
R3
C7
R2
C6
SW6C
C48
R1
TO AVC SWITCH-SW5
TEL. ANT.
T8 PRI.
T7 PRI.
T6
C45
SW6A
C3
SW6B
C4
GANGED
DENOTES CABINET GROUND
DENOTES CHASSIS GROUND

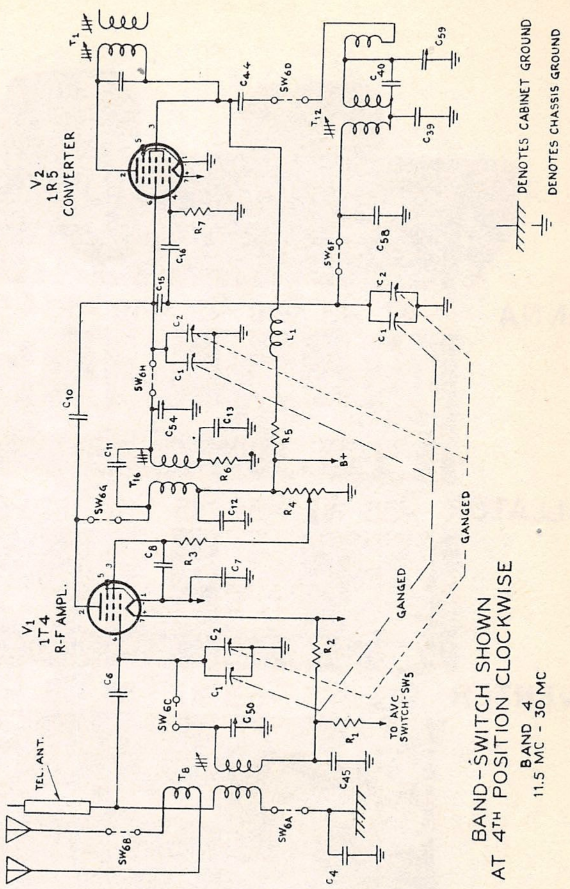
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE

BAND 2
1.5MC - 4MC


V2
1R5
CONVERTER
V1
1T4
R-F AMPL.
T1
C44
SW6D
T11
C41
C57
C16
R7
SW6F
C15
C2
C1
L1
SW6H
C10
C53
C13
R5
B+
T15
R6
C12
R4
SW6G
C8
R3
C7
R2
C6
SW6C
C49
R1
TO AVC SWITCH-SW5
TEL. ANT.
T8 PRI.
T7
C45
SW6A
SW6B
C4
GANGED
DENOTES CABINET GROUND
DENOTES CHASSIS GROUND

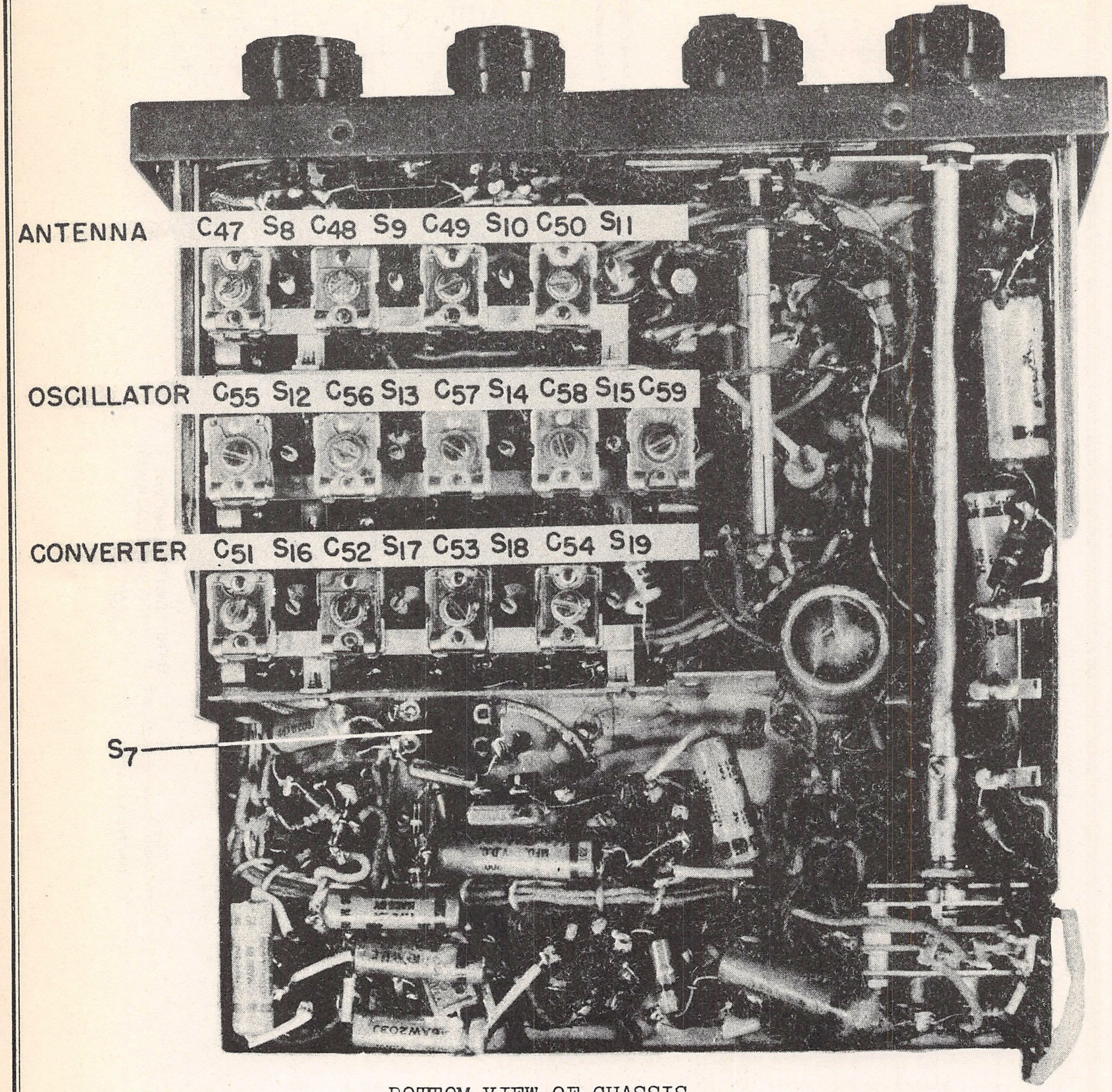
BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE

BAND 3
4.5 MC - 11MC


V2
1R5
CONVERTER
V1
1T4
R-F AMPL.
T1
C44
SW6D
T12
C40
C59
C39
C58
C16
R7
SW6F
C15
C2
C1
L1
SW6H
C10
C54
C11
C13
R5
B+
T16
R6
C12
R4
SW6G
C8
R3
C7
R2
C6
SW6C
C50
R1
TO AVC SWITCH-SW5
TEL. ANT.
T8
C45
SW6A
SW6B
C4
GANGED
DENOTES CABINET GROUND
DENOTES CHASSIS GROUND

BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE

BAND 4
11.5 MC - 30 MC


ANTENNA
C47 S8 C48 S9 C49 S10 C50 S11
OSCILLATOR
C55 S12 C56 S13 C57 S14 C58 S15 C59
CONVERTER
C51 S16 C52 S17 C53 S18 C54 S19
S7

BOTTOM VIEW OF CHASSIS

| TUBE | TYPE | PURPOSE |
|---|---|---|
| $V_1$ | 1T4 | R-F amplifier |
| $V_2$ | 1R5 | Converter and oscillator |
| $V_3$ | 1P5GT | First i-f amplifier |
| $V_4$ | 1P5GT | Second i-f amplifier |
| $V_5$ | 1H5GT | Detector, A-V-C and first audio amplifier |
| $V_6$ | 3Q5GT | Audio amplifier |
| $V_7$ | 35Z5GT | Rectifier |
| $V_8$ | 1H5GT | Beat frequency oscillator and automatic noise limiter |
| $V_9$ | 35Z5GT | Rectifier |

## F-4. TABLE OF TUBE SOCKET VOLTAGES

Measured from socket pin to ground with 1000 ohm-per-volt meter
All voltages are D-C unless otherwise specified.

| Tube | Pin Number 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Cap. |
|---|---|---|---|---|---|---|---|---|---|
| Battery Supply | | | | | | | | | |
| $V_1$ 1T4 | 2.62 | 87 | 84 | NC | 2.62 | 0 | 4.1 | X | X |
| $V_2$ 1R5 | 0 | 65 | 65 | 0 | 0 | 0 | 1.5 | X | X |
| $V_3$ 1P5GT | 0 | 2.7 | 87 | 60 | NC | †1.5 | 1.5 | NC | 0 |
| $V_4$ 1P5GT | 0 | 2.8 | 88 | 88 | NC | X | 1.4 | NC | 0 |
| $V_5$ 1H5GT | 0 | 1.45 | 62 | NC | 0 | X | 0 | NC | 0 |
| $V_6$ 3Q5GT | NC | 7.4 | 84 | 88 | 0 | X | 4.4 | 5.9 | X |
| $V_7$ 35Z5GT | NC | 0 | NC | X | 0 | X | 0 | 0 | X |
| $V_8$ 1H5GT | 0 | 4.4 | *70 | NC | 0 | X | 2.8 | NC | 3.5 |
| $V_9$ 35Z5GT | NC | 0 | NC | X | 0 | X | 0 | 0 | X |
| 117 Volts AC | | | | | | | | | |
| $V_1$ 1T4 | 2.6 | 103 | 92 | NC | 2.7 | 0 | 4.2 | X | X |
| $V_2$ 1R5 | 0 | 75 | 75 | 0 | 0 | 0 | 1.5 | X | X |
| $V_3$ 1P5GT | 0 | 2.5 | 105 | 75 | NC | †1.45 | 1.45 | NC | 0 |
| $V_4$ 1P5GT | 0 | 2.95 | 102 | 105 | NC | X | 1.55 | NC | 0 |
| $V_5$ 1H5GT | 0 | 1.5 | 70 | NC | 0 | X | 0 | NC | 0 |
| $V_6$ 3Q5GT | NC | 7.6 | 100 | 110 | 0 | X | 4.6 | 6.1 | X |
| $V_7$ 35Z5GT | NC | 0 | 7.8 A-C | X | 114A-C | X | 33.5 A-C | 110 | X |
| $V_8$ 1H5GT | 0 | 4.3 | *82.5 | NC | 0 | X | 2.95 | NC | 3.5 |
| $V_9$ 35Z5GT | †115 A-C | 33.5 A-C | 43 A-C | X | 114A-C | †115 A-C | 65 A-C | 110 | X |
| 120 Volts DC | | | | | | | | | |
| $V_1$ 1T4 | 2.8 | 103 | 92 | NC | 2.8 | 0 | 4.2 | X | X |
| $V_2$ 1R5 | 0 | 72 | 72 | 0 | 0 | 0 | 1.5 | X | X |
| $V_3$ 1P5GT | 0 | 2.8 | 103 | 72 | NC | †1.5 | 1.5 | NC | 0 |
| $V_4$ 1P5GT | 0 | 3.2 | 102 | 102 | NC | X | 1.6 | NC | 0 |
| $V_5$ 1H5GT | 0 | 1.6 | 87 | NC | 0 | X | 0 | NC | 0 |
| $V_6$ 3Q5GT | NC | 7.7 | 100 | 103 | 0 | X | 4.8 | 6.3 | X |
| $V_7$ 35Z5GT | NC | 0 | 7.3 | X | 118 | X | 35. | 110 | X |
| $V_8$ 1H5GT | 0 | 4.8 | *85 | NC | 0 | X | 3.2 | NC | 4 |
| $V_9$ 35Z5GT | †120 | 35 | 43 | X | 118 | 120 | 70 | 110 | X |

NC - No Connection.
X - No Pin.
* - With BFO switch at ON.
† - Tie Lug.

## E-1. RECEIVER ALIGNMENT -

(a) Equipment needed to align the receiver -
Signal generator to cover 455 KC to 30 MC
Non-metallic screwdriver
Output meter with a phone plug connector
.1 mfd. condenser
6.5 mmfd. condenser. (Dummy antenna)

(b) Setting of controls for I-F alignment -
ANL, AVC and BFO switches at OFF
STAND BY switch it ON
A.F. and R.F. GAIN controls set at maximum gain
BAND SWITCH at #1 Band
POWER SWITCH at BAT. (power cord removed from wall socket)
BANDSPREAD TUNING at "0"
Telescoping antenna completely collapsed.

(c) I-F alignment (455 KC) -
Remove top and bottom cover for access to internal components
Have external antenna plug $PL_2$ out of socket $SO_1$
Connect "hot" lead of signal generator through the .1 mfd condenser to the lug on rear stator section of main tuning condenser ($C_1$).

Connect "ground" lead of signal generator to chassis
Plug output meter plug in the phone jack ($J_1$)
Set MAIN TUNING dial at 1500 KC - Band #1
Tune signal generator to 455 KC.
Adjust slugs $S_1$ to $S_6$ inclusive for maximum output. Refer to figure 4 for location of the adjusting screws on transformers $T_1$, $T_2$ and $T_3$.

Repeat adjustments of slugs $S_1$ to $S_6$ to peak all the i-f transformers for maximum output.

(d) B-F-O adjustment -
Without disconnecting the signal generator, after completing the i-f transformer alignment, adjust the BFO transformer as follows:

Set BFO switch at ON
Remove modulation from the signal generator
Adjust tuning slug $S_7$ to desired pitch (Approx. 1000 cycles).
Slug $S_7$ is located under the chassis just in back of the coil shield plate.

Note: It is possible to adjust the B-F-O pitch without the use of the signal generator. Tune in a c-w signal to exact resonance with the BFO switch set at OFF. Set BFO switch at ON and adjust pitch to the tone desired by turning slug $S_7$. Replace top cover after aligning the I-F and B-F-O transformers.

(e) Setting of controls for R-F alignment -
ANL, AVC and BFO switches at OFF
STAND BY switch at ON
A.F. and R.F. GAIN controls set at maximum gain
BAND SWITCH at Band to be aligned (See alignment chart)
POWER SWITCH at BAT. (power cord removed from wall socket)
BANDSPREAD TUNING at "0"
Telescoping antenna is collapsed except for bottom section

(f) R-F alignment -
Leave output meter plug in phone jack ($J_1$)

Connect "Hot" lead of signal generator to extended section of the telescoping antenna through the 6.5 mmfd dummy antenna condenser.

Connect ground side of generator to chassis
Have external antenna plug $PL_2$ out of socket $SO_1$
Set MAIN TUNING dial of receiver and signal generator frequency as shown in the alignment chart.

Adjust trimmers ($C_{47}$ to $C_{58}$) and slugs ($S_8$ to $S_{19}$) in the order shown on the alignment chart. (See figure 5 for location of adjustment screws).

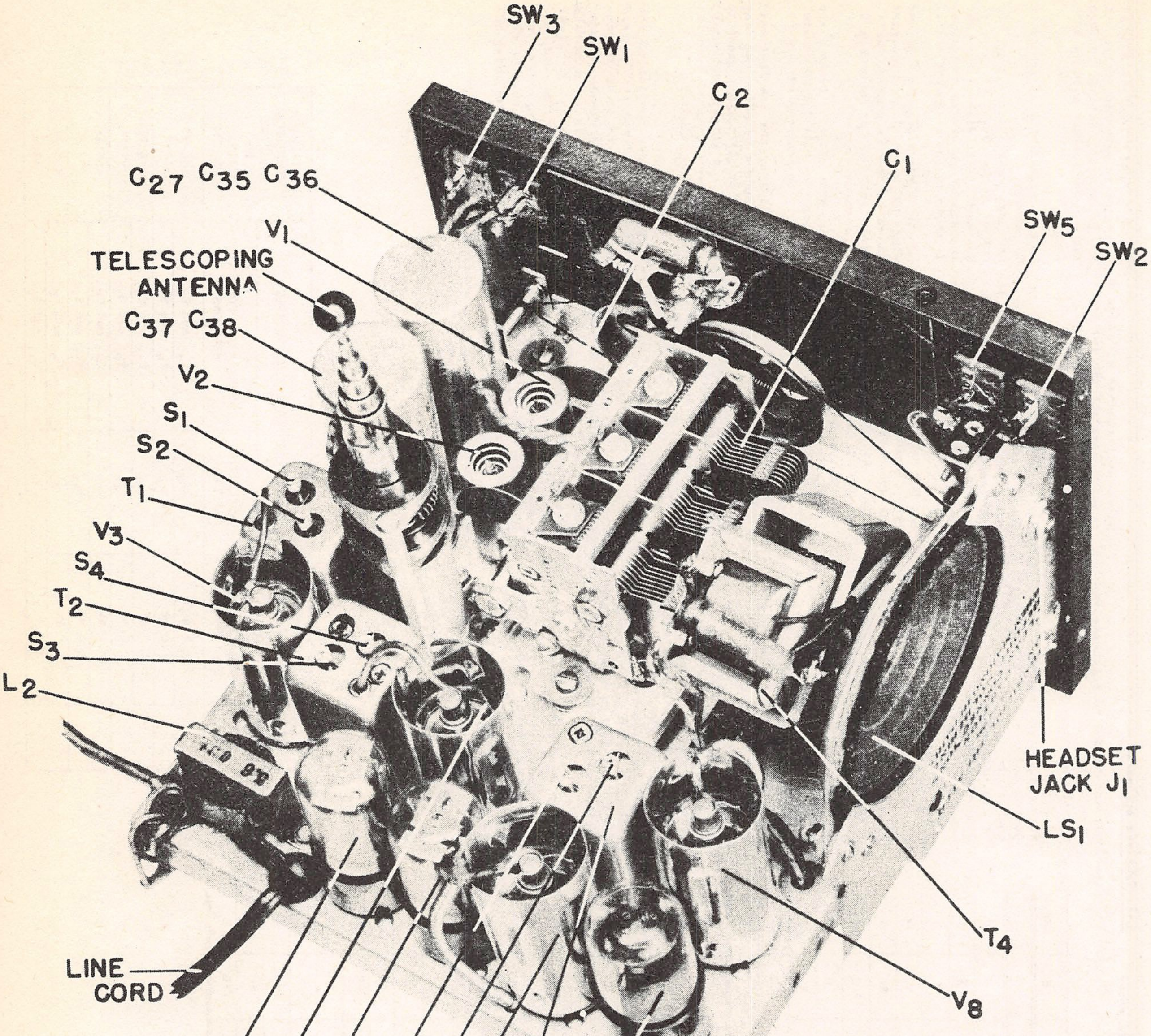
Note: When aligning bands 3 and 4 "rock" the MAIN TUNING control slightly to peak the adjustment.

When aligning the low frequency end of band 4 by adjusting slug $S_{15}$, the oscillator may cease to function. A slight adjustment of condenser $C_{59}$ will bring it back into oscillation.

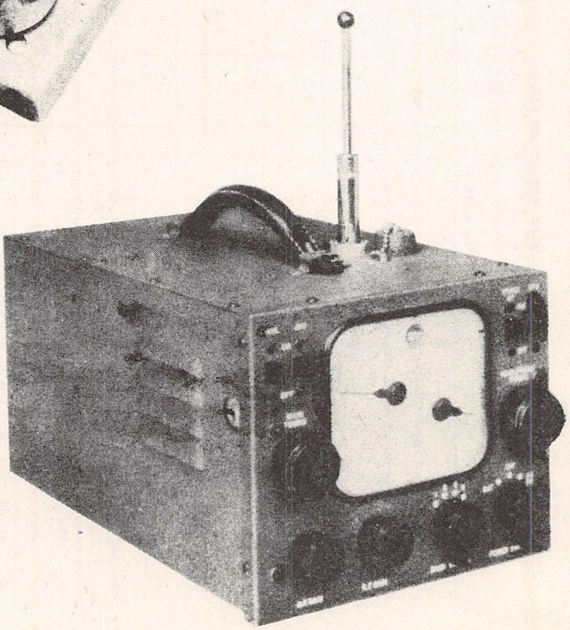
Note: Only one section of the telescoping antenna shall extend above the top cover of the receiver. (This procedure is necessary to obtain an accurate calibration for the receiver when aligning with the dummy antenna of 6.5 mmfd.) The receiver's top cover must be fastened down for the following adjustments.

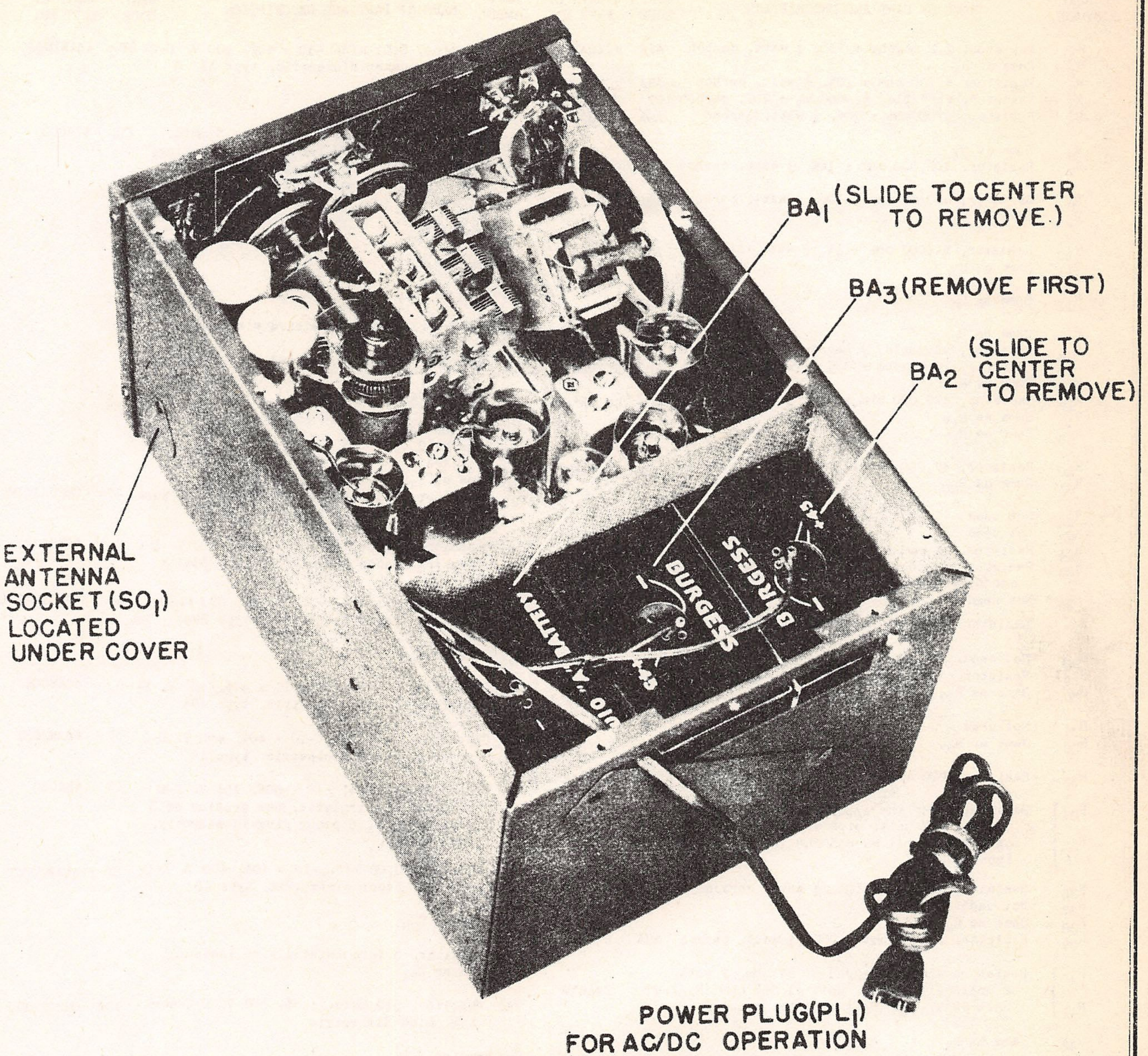
### ALIGNMENT CHART

| BAND | SIGNAL GENERATOR FREQUENCY AND "MAIN TUNING" DIAL SETTING | ADJUST FOR MAXIMUM OUTPUT | | OSCILLATOR FREQUENCY RELATIVE TO SIGNAL FREQUENCY |
|---|---|---|---|---|
| | | OSCILLATOR SECTION | ANTENNA AND CONVERTER SECTIONS | |
| 1 | 1.4 MC | $C_{55}$ | $C_{47}$ and $C_{51}$ | 455 KC Above |
| | .6 MC | $S_{12}$ | $S_8$ and $S_{16}$ | |
| 2 | 4.0 MC | $C_{56}$ | $C_{48}$ and $C_{52}$ | 455 KC Above |
| | 2.0 MC | $S_{13}$ | $S_9$ and $S_{17}$ | |
| 3 | 10.0 MC | $C_{57}$ | $C_{49}$ and $C_{53}$ | 455 KC Above |
| | 5.0 MC | $S_{14}$ | $S_{10}$ and $S_{18}$ | |
| 4 | 28.0 MC | $C_{58}$ | $C_{50}$ and $C_{54}$ | 455 KC Below |
| | 14.0 MC | $S_{15}$ $C_{59}$ | $S_{11}$ and $S_{19}$ | |


SW3
SW1
C2
C1
SW5
SW2
C27 C35 C36
V1
TELESCOPING ANTENNA
C37 C38
V2
S1
S2
T1
V3
S4
T2
S3
L2
LINE CORD
HEADSET JACK J1
LS1
T4
V8
V9
V4
V7
S5
S6
V5
T3
V6

TOP VIEW.




$BA_1$ (SLIDE TO CENTER TO REMOVE.)
$BA_3$ (REMOVE FIRST)
$BA_2$ (SLIDE TO CENTER TO REMOVE)
EXTERNAL ANTENNA SOCKET ($SO_1$) LOCATED UNDER COVER
POWER PLUG ($PL_1$) FOR AC/DC OPERATION

MODEL S-39 RECEIVER, REAR VIEW, COVER REMOVED, SHOWING POWER CORD COMPARTMENT AND BATTERY COMPARTMENT.

A-3. POWER SUPPLIES - Two separate and independent power supplies are incorporated in the receiver, namely an internal battery supply and a rectifier-filter type of supply for use with an external a-c/d-c source.

The battery supply consists of two 45-volt "B" batteries ($BA_2$ and $BA_3$) connected in series, and one 6-volt "A" battery ($BA_1$) all of which are located in the back section of the carrying-case cabinet. See figure 6.

The a-c/d-c supply consists of two type 35Z5GT rectifier tubes ($V_7$ and $V_9$) and the associated filter ($L_2$, $C_{35}$ and $C_{27}$) and filament voltage dropping resistors ($R_{32}$, $R_{33}$, $R_{34}$ and $R_{35}$). This supply may be used whenever commercial power lines, delivering 110-to 117-volts A-C or D-C are accessible. Refer to Section D for operating instructions.

The supply to be used is selected from the front panel by POWER SWITCH, $SW_7$. Refer to figure 2 for circuit details.

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| REF. SYMBOL | NAME OF PART AND DESCRIPTION | MFR. CODE | CONTR S. PART NO. |
|---|---|---|---|
| $R_1$ | Resistor, 2.2 megohm ± 10%, $\frac{1}{4}$ watt, carbon | ASA | RC10AE225K |
| $R_2$ | Same as $R_1$ | | |
| $R_3$ | Resistor, 8,200 ohm ± 10%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE822K |
| $R_4$ | Resistor, variable, $\frac{1}{2}$ megohm ± 20%, carbon | CT | 25C071 |
| $R_5$ | Resistor, 4700 ohm ± 10%, $\frac{1}{4}$ watt, carbon | ASA | RC10AE472K |
| $R_6$ | Same as $R_1$ | | |
| $R_7$ | Resistor, 100,000 ohm ± 10%, $\frac{1}{4}$ watt, carbon | ASA | RC10AE104K |
| $R_8$ | Resistor, 1.0 megohm ± 10%, $\frac{1}{4}$ watt, carbon | ASA | RC10AE105K |
| $R_9$ | Same as $R_1$ | | |
| $R_{10}$ | Resistor, 51,000 ohm ± 5%, $\frac{1}{2}$ watt, carbon | ASA | RC21AE513J |
| $R_{11}$ | Same as $R_1$ | | |
| $R_{12}$ | Same as $R_8$ | | |
| $R_{13}$ | Same as $R_7$ | | |
| $R_{14}$ | Resistor, variable, $\frac{1}{2}$ megohm ± 20%, carbon | CT | 25C070 |
| $R_{15}$ | Resistor, 10 megohm ± 20%, $\frac{1}{4}$ watt, carbon | ASA | RC10AE106M |
| $R_{16}$ | Same as $R_7$ | | |
| $R_{17}$ | Resistor, 470,000 ohm ± 20%, $\frac{1}{4}$ watt, carbon | ASA | RC10AE474M |
| $R_{18}$ | Same as $R_{17}$ | | |
| $R_{19}$ | Same as $R_{17}$ | | |
| $R_{20}$ | Resistor, 47,000 ohm ± 20%, $\frac{1}{4}$ watt, carbon | ASA | RC10AE473M |
| $R_{21}$ | Same as $R_{20}$ | | |
| $R_{22}$ | Not used | | |
| $R_{23}$ | Not used | | |
| $R_{24}$ | Resistor, 24 ohm ± 5%, 1 watt, carbon | ASA | RC31AE240J |
| $R_{25}$ | Resistor, 330 ohm ± 5%, 9 watt, wire wound, candohm, type FH | MT | 24A829 |
| $R_{26}$ | Not used | | |
| $R_{27}$ | Resistor, 1000 ohm ± 10%, $\frac{1}{4}$ watt, carbon | ASA | RC10AE102K |
| $R_{28}$ | Not used. | | |
| $R_{29}$ | Resistor, 560 ohm ± 10%, $\frac{1}{4}$ watt, carbon | ASA | RC10AE561K |
| $R_{30}$ | Same as $R_{29}$ | | |
| $R_{31}$ | Not used | | |
| $R_{32}$ | Same as $R_{27}$ | | |
| $R_{33}$ | Resistor, 820 ohm ± 10%, 1 watt, carbon | ASA | RC31AE821K |
| $R_{34}$<br>$R_{35}$ | Resistor, 1645 ohm ± 10%, tapped at 800 ohm, 7.4 watt, 2 unit, wire wound, unit #1 800 ohm ($R_{34}$), unit #2 845 ohm ($R_{35}$), candohm, type MW-2 | IRC | 24A044 |
| $R_{36}$ | Resistor, 820 ohm ± 10%, $\frac{1}{4}$ watt, carbon | ASA | RC10AE821K |
| $R_{37}$ | Not used. | | |
| $R_{38}$ | Same as $R_{24}$ | | |
| $R_{39}$ | Resistor, 1.5 meghom ± 20%, $\frac{1}{4}$ watt, carbon | ASA | RC10AE155M |
| $R_{40}$<br>$R_{41}$ | Resistor, 450 ohm tapped at 87 ohm, 7 watt, 2 unit, wire wound, unit #1 363 ohm ($R_{40}$), unit #2 87 ohm ($R_{41}$) candohm, special | MT | 24A819 |
| $R_{42}$ | Same as $R_7$ | | |
| $C_1$<br>$C_2$ | Capacitor, variable, 3 section, 2 unit, unit #1-($C_1$), max. cap. per section 352 mmfd., air dielectric, unit #2-($C_2$) max. cap. per section 22 mmfd. air dielectric, each unit has separate drive shaft to which pulleys are fixed, type 945-3-20 | OM | 48B055 |
| $C_3$ | Capacitor, 51 mmfd. ± 5%, 500 V. D-C working, low loss mica dielectric | ASA | CM20C510J |
| $C_4$ | Capacitor, 0.1 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type 464 | A | 46AV104J |
| $C_5$ | Capacitor, 15 mmfd. ± 20%, 500 V. D-C working, temp. coeff., -.00075 mmfd./ mmfd./ degree Cent., ceramic dielectric, type 809-047 | CRL | 47A027 |
| $C_6$ | Capacitor, 10 mmfd. ± 20%, 500 V. D-C working, temp. coeff., -.00075 mmfd./ mmfd./ degree Cent., ceramic dielectric, type 811-013. | CRL | 47A028 |
| $C_7$ | Capacitor, 0.05 mfd. -10 + 40%, 200 V. D-C working, paper dielectric, type AB | SP | 46AU503J |

| REF. SYMBOL | NAME OF PART AND DESCRIPTION | MFR. CODE | CONTR'S. PART NO. |
|---|---|---|---|
| $C_8$ | Capacitor, 0.01 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type AB | SP | 46AW103J |
| $C_9$ | Same as $C_8$ | | |
| $C_{10}$ | Capacitor, adjustable, min. cap. 5 mmfd., max. cap. 6.5 mmfd., 500 V. D-C working, temp. coeff. -.00075 mmfd./ mmfd./ degree Cent., ceramic dielectric, type 807-004 | CRL | 47A005 |
| $C_{11}$ | Same as $C_{10}$ | | |
| $C_{12}$ | Same as $C_7$ | | |
| $C_{13}$ | Same as $C_7$ | | |
| $C_{14}$ | Capacitor, 3 mmfd., twisted wire leads | | |
| $C_{15}$ | Capacitor, 2 mmfd., twisted wire leads | | |
| $C_{16}$ | Same as $C_3$ | | |
| $C_{17}$ | Same as $C_7$ | | |
| $C_{18}$ | Same as $C_8$ | | |
| $C_{19}$ | Not used | | |
| $C_{20}$ | Same as $C_7$ | | |
| $C_{21}$ | Capacitor, 100 mmfd. ± 20%, 500 V. D-C working, mica dielectric | ASA | CM20A101M |
| $C_{22}$ | Capacitor, 0.004 mfd. -10 + 40%, 600 V. D-C working, paper dielectric, type 684 | A | 46AZ402J |
| $C_{23}$ | Capacitor, 0.1 mfd. - 10 + 40%, 200 V. D-C working, paper dielectric, type 284 | A | 46AU104J |
| $C_{24}$ | Same as $C_8$ | | |
| $C_{25}$ | Capacitor, 0.005 mfd. - 10 + 40%, 400 V. D-C working, paper dielectric, type 484 | A | 46AW502J |
| $C_{26}$ | Capacitor, 0.02 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type AB | SP | 46AW203J |
| $C_{27}$ | Capacitor, 60 mfd. -10 + 50%, 150 V. D-C working, electrolytic, one section of 3 section unit, 6 prong plug-in assembly, type 10B336 | IC | 45A065 |
| $C_{28}$ | Capacitor, 0.02 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type AB | SP | 46AW203J |
| $C_{29}$ | Same as $C_{28}$ | | |
| $C_{30}$ | Capacitor, 3 turn twisted wire leads | | |
| $C_{31}$ | Same as $C_{21}$ | | |
| $C_{32}$ | Capacitor, 510 mmfd. ± 5%, 500 V. D-C working, mica dielectric | ASA | CM20A511J |
| $C_{33}$ | Same as $C_7$ | | |
| $C_{34}$ | Capacitor, 0.05 mfd. -10 + 40%, 400 V. D-C working, paper dielectric, type 484 | A | 46AW503J |
| $C_{35}$ | Capacitor, 30 mfd. -10 + 50%, 150 V. D-C working, electrolytic, one part of triple unit - refer to $C_{27}$ | | |
| $C_{36}$ | Capacitor, 100 mfd. -10 + 65%, 5 V. D-C working, electrolytic, one part of triple unit - refer to $C_{27}$ | | |
| $C_{37}$<br>$C_{38}$ | Capacitor, dual, 120 mfd. -10 + 50%, 150 V. D-C working ($C_{38}$), 60 mfd. -10 ± 65%, 5 V. D-C working ($C_{37}$), unit hermetically seale 4 prong plug-in assembly, type 10B335 | IC | 45A066 |
| $C_{39}$ | Capacitor, 4300 mmfd. ± 5%, 500 V. D-C working, mica dielectric | ASA | CM35A432J |
| $C_{40}$ | Capacitor, 240 mmfd. ± 5%, 500 V. D-C working, mica dielectric | ASA | CM20A241J |

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| REF. SYMBOL | NAME OF PART AND DESCRIPTION | MFR. CODE | CONTR'S. PART NO. |
|---|---|---|---|
| $C_{41}$ | Capacitor, 2000 mmfd. ± 5%, 500 V. D-C working, mica dielectric | ASA | CM30A202J |
| $C_{42}$ | Capacitor, 910 mmfd. ± 5%, 500 V. D-C working, mica dielectric | ASA | CM30A911J |
| $C_{43}$ | Capacitor, 390 mmfd. ± 5%, 500 V. D-C working, mica dielectric | ASA | CM20A391J |
| $C_{44}$ | Same as $C_8$ | | |
| $C_{45}$ | Same as $C_7$ | | |
| $C_{46}$ | Capacitor, 0.5 mfd. -10 + 40%, 200 V. D-C working, paper dielectric | | 46AT504J |
| $C_{47}$<br>$C_{48}$<br>$C_{49}$<br>$C_{50}$ | Capacitor, 4 unit assembly, mica dielectric, compression type adjustment, trimmers mounted on a single metal strip, 3 units with min. cap. 2.7 mmfd., max. cap. 35 mmfd. ($C_{47}$. $C_{49}$, $C_{50}$.) 1 unit with min. cap. 1.5 mfd., max. cap. 10 mmfd. ($C_{48}$ special | UE | 44A064 |
| $C_{51}$<br>$C_{52}$<br>$C_{53}$<br>$C_{54}$ | Same as $C_{47}$, $C_{48}$, $C_{49}$, $C_{50}$, assembly. $C_{51}$, $C_{53}$, $C_{54}$, same as $C_{47}$, $C_{48}$, $C_{50}$; and $C_{52}$ same as $C_{48}$) | | |
| $C_{55}$<br>$C_{56}$<br>$C_{57}$<br>$C_{58}$<br>$C_{59}$ | Capacitor, 5 unit assembly, mica dielectric, compression type adjustment, trimmers mounted on a single metal strip, 2 units with min. cap. 1.5 mmfd., max. cap. 10 mfd. ($C_{57}$ and $C_{58}$), 2 units with min. cap. 2.7 mmfd., max. cap. 35 mmfd. ($C_{55}$ and $C_{56}$), 1 unit with min. cap. 25 mmfd., MAX. 140 mmfd. ($C_{59}$), special | UE | 44A092 |
| $C_{60}$ | Not used | | |
| $C_{61}$ | Same as $C_{40}$ | | |
| $C_{62}$ | Same as $C_{21}$ | | |
| $T_1$ | Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 80 mmfd., primary and secondary are tuned by adjustable iron cores, special | SI | 50A086 |
| $T_2$ | Same as $T_1$ except for length of leads | SI | 50B157 |
| $T_3$ | Same as $T_1$, except for length of leads | SI | 50B158 |
| $T_4$ | Transformer, A-F, primary to match the output of the type 3Q5GT tube, part of speaker assembly $LS_1$. Shown for reference only | | |
| $T_5$<br>$T_6$<br>$T_7$<br>$T_8$ | Transformer, R-F, 4 unit assembly, tunes from .55 MC. to 30 MC. in 4 bands with condenser $C_1$ and $C_2$, inductance adjusted by movable iron cores. | SWI | 51B301 |
| $T_9$<br>$T_{10}$<br>$T_{11}$<br>$T_{12}$ | Transformer, R-F, 4 unit assembly, tunes from .55 MC. to 30 MC. in 4 bands with condensers $C_1$ and $C_2$, inductance adjusted by movable iron cores | SWI | 51B303 |
| $SW_2$ | Switch, DPST, slide action, bakelite insulation, steel mtg. plate with 2 holes having 1-1/8" mtg. centers, type 71 | OM | 60A061 |
| $SW_3$ | Same as $SW_2$ | | |
| $SW_4$ | Switch, SPST, toggle action, refer to $SW_7$ | | |
| $SW_5$ | Switch, SPDT, slide, bakelite insulation, brass solder lugs, steel mtg. plate with 2 holes having 1-1/8" mtg. centers, type 77 | OM | 60A130 |
| $SW_6$ | Switch, rotary selector, 4 position, 3 section, shorting type contacts, bushing $\frac{1}{4}$" long, type RM | MA | 60B160 |

| REF. SYMBOL | NAME OF PART AND DESCRIPTION | MFR. CODE | CONTR'S. PART NO. |
|---|---|---|---|
| $SW_7$ | Switch, rotary selector, 3 position, single section, non-shorting type contacts, has a type 8030-K4 toggle action, SPST A-C switch ganged on rear of assembly "ON" position full clockwise, type H | OM | 60A162 |
| $SO_1$ | Socket, female, 4 contacts, bakelite insulation, wafer type, brass contacts, 2 mtg. holes with $1\frac{1}{4}$" mtg. centers, type 2642 | CN | 10A080 |
| $PL_1$ | Plug with line cord, 2 conductor, rubber insulation, #18 ga.. stranded copper wire, length 6 feet, 2 prong spring type molded on plug, special | E | 87A078 |
| $BA_1$ | Battery, 6 V. D-C, 2 hole socket, 3-7/8" x 2-15/16" x $5\frac{1}{2}$", type P698A | ROV | 27A010 |
| $BA_2$ | Battery, 45 V. D-C, combination "B" socket, 4-1/8" x 2-9/16" x 5-5/16", type P5303 | ROV | 27A009 |
| $BA_3$ | Same as $BA_2$ | | |
| $J_1$ | Jack, single circuit, normally closed, brass mechanism, bakelite insulation, type 1J102 | U | 36A002 |
| $LS_1$ | Loudspeaker; 4 inch O.D. permanent magnet dynamic, includes transformer $T_4$ in the assembly, type 4-OM-11A | OT | 85B009 |
| $LM_1$ | Lamp, indicator, 1-1/8" leads, clear glass bulb type $4\frac{1}{2}$, type NE-7 | GE | 39A007 |
| $V_1$ | Tube, pentode, type 1T4 | RCA | 90X1T4 |
| $V_2$ | Tube, pentagrid converter, type 1R5 | RCA | 90X1R5 |
| $V_3$ | Tube, type, 1P5GT | RCA | 90X1P5GT |
| $V_4$ | Same as $V_3$ | | |
| $V_5$ | Tube, diode triode, type 1H5GT | RCA | 90X1H5GT |
| $V_6$ | Tube, beam power amplifier, type 3Q5GT | RCA | 90X3Q5GT |
| $V_7$ | Tube, half-wave high-vacuum rectifier, type 35Z5GT | RCA | 90X35Z5GT |
| $V_8$ | Same as $V_5$ | | |
| $V_9$ | Same as $V_7$ | | |
| | FOR TROPICAL RECEIVERS USE THE ABOVE PARTS | | |
| $T_1$ | Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 85 mmfd., primary and secondary are tuned by adjustable iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hollowax #2012, special (Note: $T_1$ differs from $T_2$ and $T_3$ in the length of the wire leads) | SI | 50A150 |
| $T_2$ | Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 85 mmfd., primary and secondary are tuned by adjustable iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hollowax #2012, special (Note: $T_2$ differs from $T_1$ and $T_3$ in the length of the wire leads) | SI | 50A159 |
| $L_1$ | Reactor, R-F, inductance 170 microhenries, air core, vacuum impregnated with zophar #1340 and flash dipped in Hallowax #2012, type 3485 | SWI | 53A057 |
| $L_2$ | Reactor, filter, d-c resistance 250 ohms ± 20%, max. load current 30 milliamperes, inductance 3.6 henrys at 30 milliamperes, vacuum wax impregnated and flash dipped in Hallowax #2012, type 1A1251 modified | GT | 56B051 |
| $SW_6$ | Switch, rotary selector, 4 position, 3 section, shorting type contacts, bushing $\frac{1}{4}$" long, terminal 6 of section 2 front and rear are electrically connected, type RM | MA | 60B179 |

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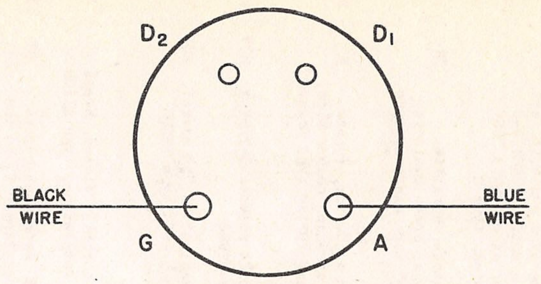
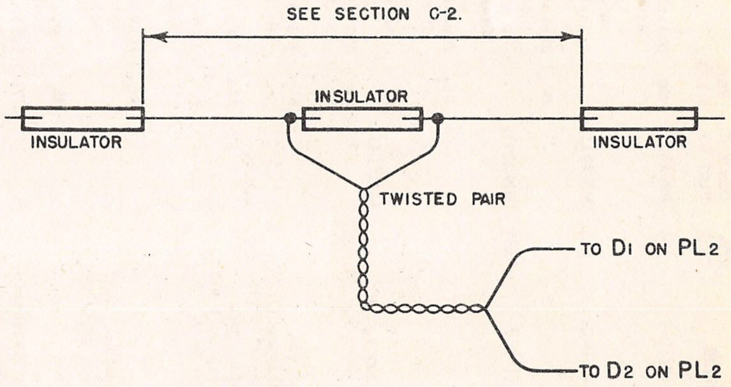
| REF. SYMBOL | NAME OF PART AND DESCRIPTION | MFR. CODE | CONTR'S. PART NO. |
|---|---|---|---|
| $T_3$ | Transformer, I-F, 455 KC., fixed primary trimmer 155 mmfd., fixed secondary trimmer 85 mmfd., primary and secondary are tuned by adjustable iron cores, vacuum impregnated with zophar #1340 and flash dipped in Hollowax #2012, special, (Note $T_3$ differs from $T_1$ and $T_2$ in the length of the wire leads) | SI | 50A151 |
| $T_5$<br>$T_6$<br>$T_7$<br>$T_8$ | Transformer, R-F, 4 unit assembly, tunes from 0.55 MC. to 30 MC. in 4 bands with condenser $C_1$ and $C_2$, inductance adjusted by movable iron cores, wax impregnated with Hallowax #2012 | SWI | 51B648 |
| $T_9$<br>$T_{10}$<br>$T_{11}$<br>$T_{12}$ | Transformer, R-F, 4 unit assembly, tunes from 0.55 MC. to 30 MC. in 4 bands with condenser $C_1$ and $C_2$, inductance adjusted by movable iron cores, wax impregnated with Hallowax #2012 | SWI | 51B650 |
| $T_{13}$<br>$T_{14}$<br>$T_{15}$<br>$T_{16}$ | Transformer, R-F, 4 unit assembly, tunes from 0.55 MC. to 30 MC. in 4 bands with condenser $C_1$ and $C_2$, inductance adjusted oy movable iron cores. wax impregnated with Hallowax #2012 | SWI | 51B649 |

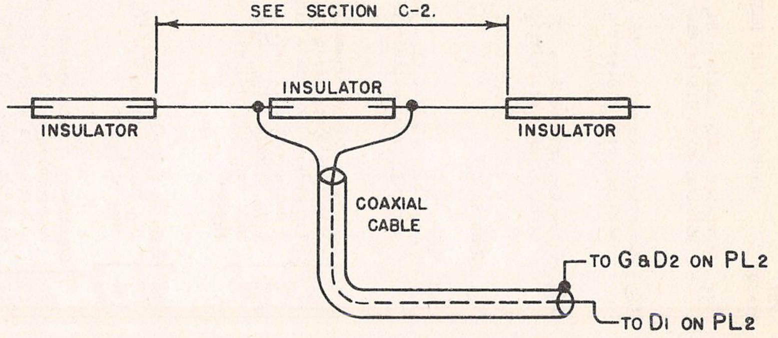
## RECOMMENDED ANTENNA INSTALLATIONS

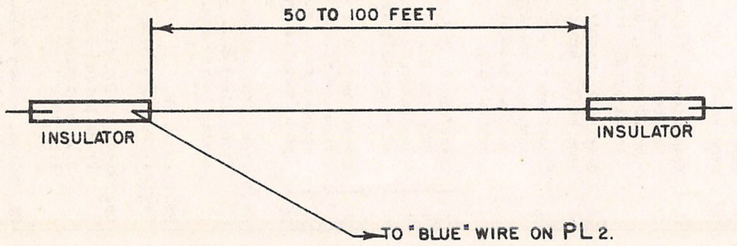

D2
D1
BLACK WIRE
BLUE WIRE
G
A

PL2
PIN VIEW

NOTE: PL2 IS SUPPLIED WIRED AS ABOVE

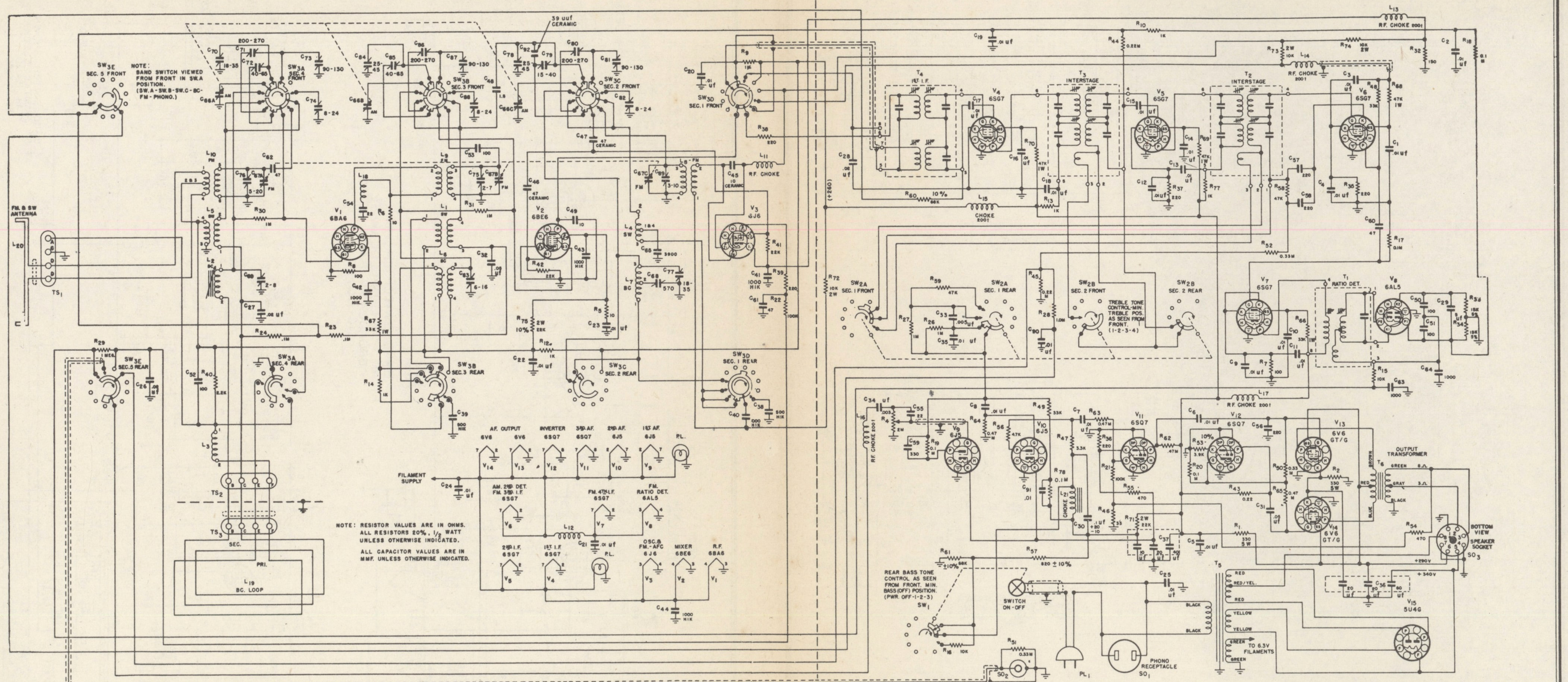

SEE SECTION C-2.
INSULATOR
INSULATOR
INSULATOR
TWISTED PAIR
TO D1 ON PL2
TO D2 ON PL2


SEE SECTION C-2.
INSULATOR
INSULATOR
INSULATOR
COAXIAL CABLE
TO G & D2 ON PL2
TO D1 ON PL2


50 TO 100 FEET
INSULATOR
INSULATOR
TO 'BLUE' WIRE ON PL 2.

THE HALLICRAFTERS CO.

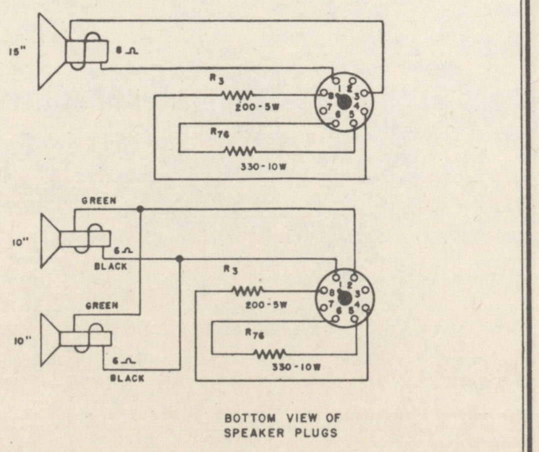
**MODELS EC-403,EC-404,**
**Echophone**


SW3E SEC. 5 FRONT
SW3A SEC. 4 FRONT
SW3B SEC. 3 FRONT
SW3C SEC. 2 FRONT
SW3D SEC. 1 FRONT
39 uuf CERAMIC
FM. & SW ANTENNA
TS1
V1 6BA6
V2 6BE6
V3 6J6
T4 1ST I.F.
T3 INTERSTAGE
T2 INTERSTAGE
V4 6SG7
V5 6SG7
V6 6SG7
V7 6SG7
V8 6AL5
T1 RATIO DET.
L13 R.F. CHOKE 2001
L14 R.F. CHOKE 2001
L15 CHOKE 2001
L11 R.F. CHOKE
L17 R.F. CHOKE 2001
L16 R.F. CHOKE 2001
SW2A SEC. 1 FRONT
SW2A SEC. 1 REAR
SW2B SEC. 2 FRONT
SW2B SEC. 2 REAR
TREBLE TONE CONTROL-MIN TREBLE POS. AS SEEN FROM FRONT. (1-2-3-4)
SW3E SEC. 5 REAR
SW3A SEC. 4 REAR
SW3B SEC. 3 REAR
SW3C SEC. 2 REAR
SW3D SEC. 1 REAR
AF. OUTPUT 6V6
6V6
INVERTER 6SQ7
3RD AF. 6SQ7
2ND AF. 6J5
1ST AF. 6J5
PL.
FILAMENT SUPPLY
AM. 2ND DET. FM. 3RD I.F. 6SG7
FM. 4TH I.F. 6SG7
FM. RATIO DET. 6AL5
2ND I.F. 6SG7
1ST I.F. 6SG7
OSC. & FM.-AFC 6J6
MIXER 6BE6
R.F. 6BA6
TS2
TS3
SEC.
PRI.
L19 BC. LOOP
V9 6J5
V10 6J5
V11 6SQ7
V12 6SQ7
V13 6V6 GT/G
V14 6V6 GT/G
OUTPUT TRANSFORMER
GREEN
GRAY
BLACK
RED
BROWN
BOTTOM VIEW SPEAKER SOCKET SO3
+290V
+340V
V15 5U4G
T5
RED
RED/YEL.
RED
YELLOW
YELLOW
GREEN
GREEN
TO 6.3V FILAMENTS
BLACK
BLACK
SWITCH ON-OFF
SW1
PL1
PHONO RECEPTACLE SO1
SO2
PHONO JACK
TUNER
MAIN CHASSIS

NOTE: BAND SWITCH VIEWED FROM FRONT IN SW.A POSITION. (SW.A-SW.B-SW.C-BC-FM-PHONO.)

NOTE: RESISTOR VALUES ARE IN OHMS. ALL RESISTORS 20%, 1/2 WATT UNLESS OTHERWISE INDICATED. ALL CAPACITOR VALUES ARE IN MMF. UNLESS OTHERWISE INDICATED.

REAR BASS TONE CONTROL AS SEEN FROM FRONT. MIN. BASS(OFF) POSITION. (PWR. OFF-1-2-3)


15"
6 Ω
R3
200-5W
R76
330-10W
GREEN
10"
6 Ω
BLACK
GREEN
10"
6 Ω
BLACK
R3
200-5W
R76
330-10W

BOTTOM VIEW OF SPEAKER PLUGS

## BUTTON SETTING:

1. Select any one pushbutton.
2. Pull translucent insert straight out.
3. Insert screw driver blade through large hole of pushbutton into slot of locking screw. (See Fig. 1).
4. Loosen locking screw about one-half turn. (Not more than one full turn.)
5. With pushbutton depressed, carefully tune in desired station with the manual control.
6. With the manual control held firm, tighten the locking screw.

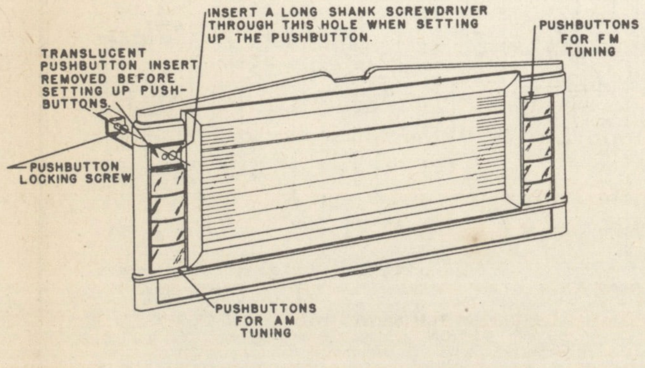
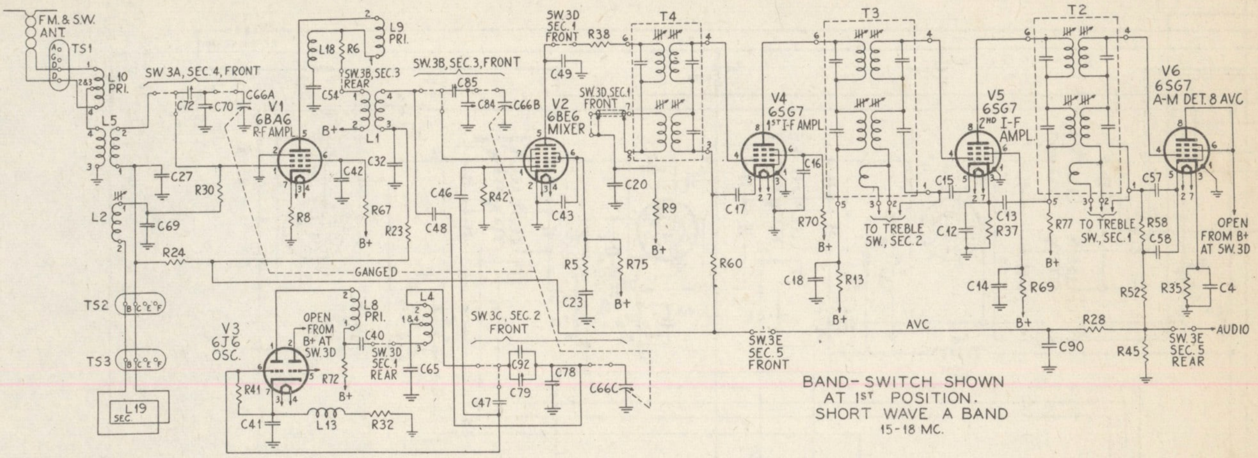

INSERT A LONG SHANK SCREWDRIVER THROUGH THIS HOLE WHEN SETTING UP THE PUSHBUTTON.
PUSHBUTTONS FOR FM TUNING
TRANSLUCENT PUSHBUTTON INSERT REMOVED BEFORE SETTING UP PUSH-BUTTONS.
PUSHBUTTON LOCKING SCREW
PUSHBUTTONS FOR AM TUNING

*Fig. 1. View showing pushbutton setup.*

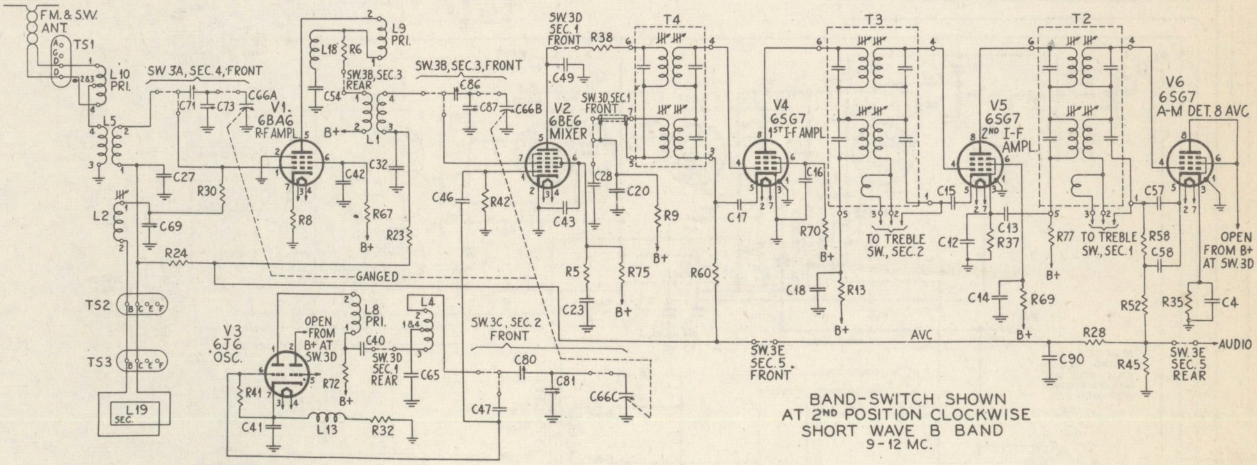
| | |
|---|---|
| Tuning Range.............. | (BC) 540 kc —1700 kc |
| | (A) 15 mc— 18 mc |
| | (B) 9 mc— 12 mc |
| | (C) 5.8 mc— 18 mc |
| | (FM) 88 mc— 108 mc |
| Intermediate Frequency..... | 455 kc |
| Intermediate Frequency..... | 10.7 mc |
| Power Supply.............. | 105–125 V. 60 cycle AC |
| Power Consumption........ | 180 watts |

# THE HALLICRAFTERS CO.

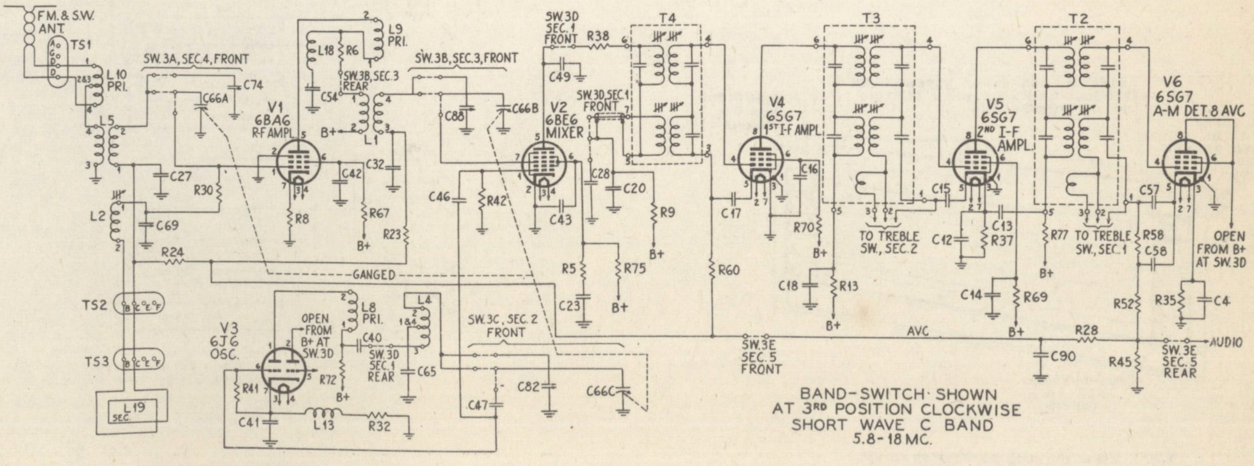
**MODELS EC-403, EC-404,**
**Echophone**


F.M. & S.W. ANT
TS1
L10 PRI.
L5
L2
TS2
TS3
L19 SEC.
SW.3A, SEC.4, FRONT
C72
C70
C66A
V1 6BA6 R-F AMPL
L18
R6
L9 PRI.
SW.3B, SEC.3 REAR
C54
L1
B+
C27
R30
C42
C32
R8
R67
R23
C69
R24
GANGED
SW.3B, SEC.3, FRONT
C85
C84
C66B
V2 6BE6 MIXER
SW.3D SEC.1 FRONT
R38
C49
SW.3D, SEC.1 FRONT
T4
C46
R42
C48
C43
C20
R9
R5
R75
C23
V3 6J6 OSC.
OPEN FROM B+ AT SW.3D
L8 PRI.
L4
C40
SW.3D SEC.1 REAR
C65
R72
R41
C41
L13
R32
SW.3C, SEC.2 FRONT
C92
C78
C79
C47
C66C
R60
V4 6SG7 1ST I-F AMPL.
C16
C17
T3
R70
C18
R13
TO TREBLE SW., SEC.2
V5 6SG7 2ND I-F AMPL.
C15
C12
C13
R37
C14
R69
T2
R77
TO TREBLE SW., SEC.1
V6 6SG7 A-M DET. & AVC
C57
R58
C58
R52
R35
C4
OPEN FROM B+ AT SW.3D
AVC
SW.3E SEC.5 FRONT
C90
R28
R45
SW.3E SEC.5 REAR
AUDIO

BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE A BAND
15-18 MC.


F.M. & S.W. ANT
TS1
L10 PRI.
L5
L2
TS2
TS3
L19 SEC.
SW.3A, SEC.4, FRONT
C71
C73
C66A
V1. 6BA6 R-F AMPL
L18
R6
L9 PRI.
SW.3B, SEC.3 REAR
C54
L1
B+
C27
R30
C42
C32
R8
R67
R23
C69
R24
GANGED
SW.3B, SEC.3, FRONT
C86
C87
C66B
V2 6BE6 MIXER
SW.3D SEC.1 FRONT
R38
C49
SW.3D, SEC.1 FRONT
T4
C46
R42
C28
C43
C20
R9
R5
R75
C23
V3 6J6 OSC.
OPEN FROM B+ AT SW.3D
L8 PRI.
L4
C40
SW.3D SEC.1 REAR
C65
R72
R41
C41
L13
R32
SW.3C, SEC.2 FRONT
C80
C81
C47
C66C
R60
V4 6SG7 1ST I-F AMPL.
C16
C17
T3
R70
C18
R13
TO TREBLE SW., SEC.2
V5 6SG7 2ND I-F AMPL.
C15
C12
C13
R37
C14
R69
T2
R77
TO TREBLE SW., SEC.1
V6 6SG7 A-M DET. & AVC
C57
R58
C58
R52
R35
C4
OPEN FROM B+ AT SW.3D
AVC
SW.3E SEC.5. FRONT
C90
R28
R45
SW.3E SEC.5 REAR
AUDIO

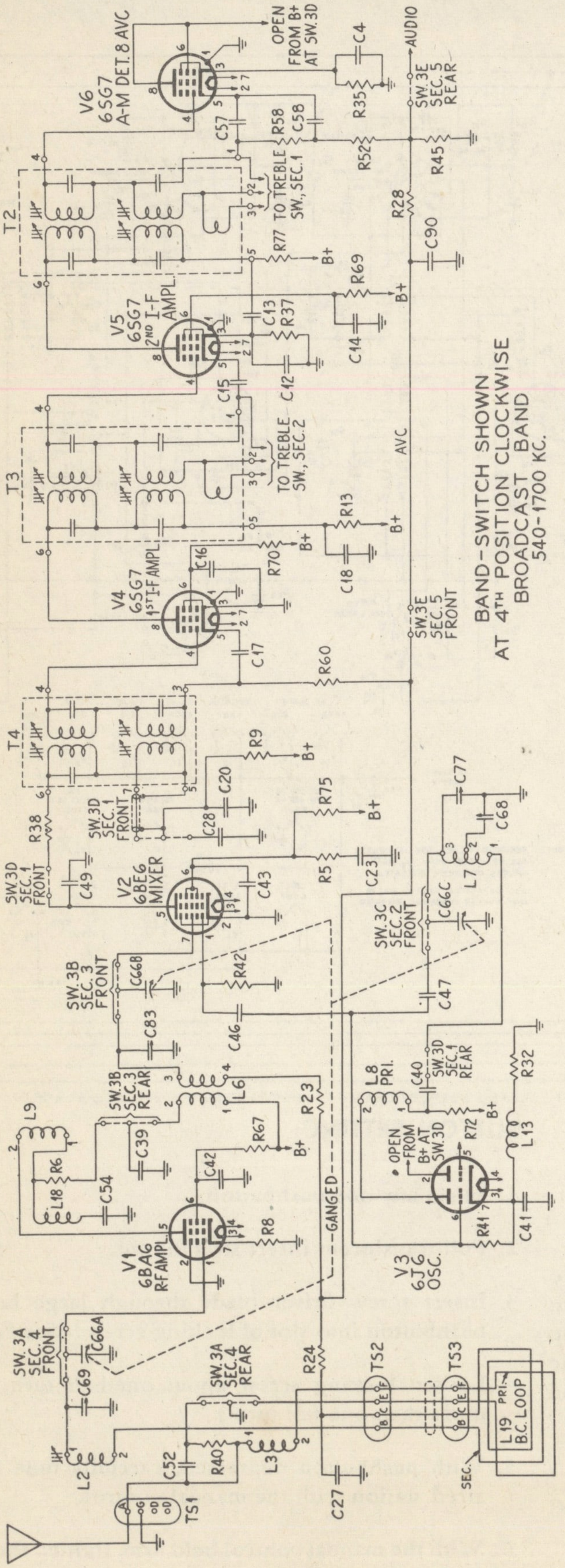
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE B BAND
9-12 MC.

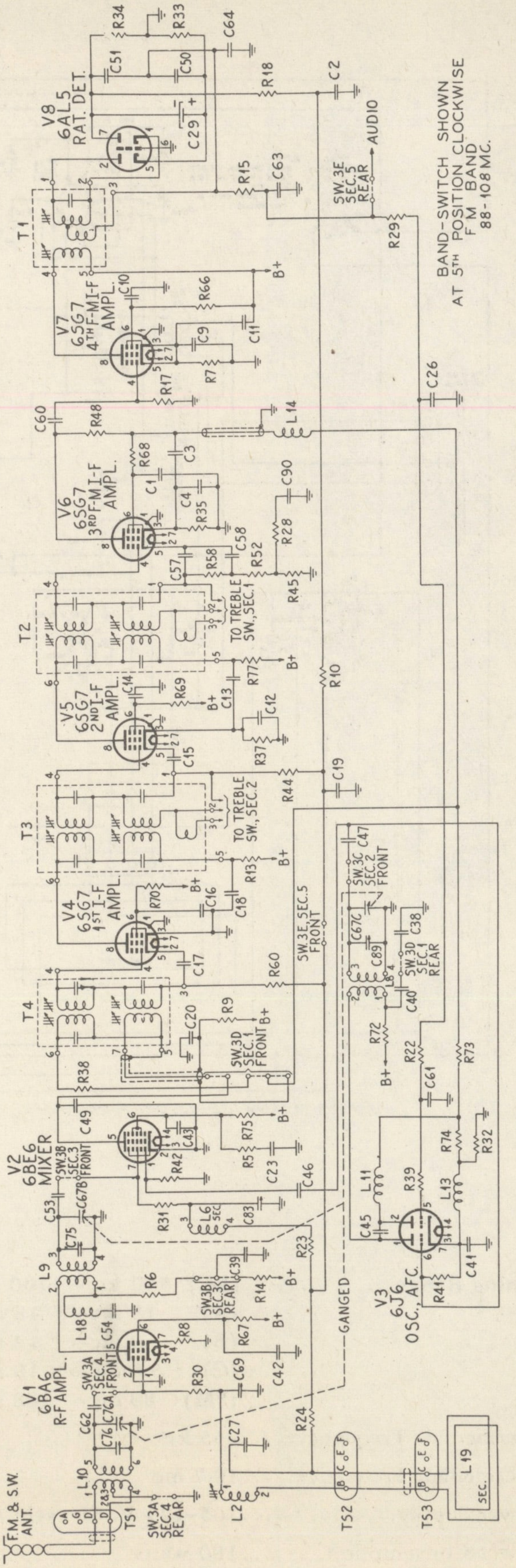

F.M. & S.W. ANT
TS1
L10 PRI.
L5
L2
TS2
TS3
L19 SEC.
SW.3A, SEC.4, FRONT
C74
C66A
V1 6BA6 R-F AMPL
L18
R6
L9 PRI.
SW.3B, SEC.3 REAR
C54
L1
B+
C27
R30
C42
C32
R8
R67
R23
C69
R24
GANGED
SW.3B, SEC.3, FRONT
C88
C66B
V2 6BE6 MIXER
SW.3D SEC.1 FRONT
R38
C49
SW.3D, SEC.1 FRONT
T4
C46
R42
C28
C43
C20
R9
R5
R75
C23
V3 6J6 OSC.
OPEN FROM B+ AT SW.3D
L8 PRI.
L4
C40
SW.3D SEC.1 REAR
C65
R72
R41
C41
L13
R32
SW.3C, SEC.2 FRONT
C82
C47
C66C
R60
V4 6SG7 1ST I-F AMPL.
C16
C17
T3
R70
C18
R13
TO TREBLE SW., SEC.2
V5 6SG7 2ND I-F AMPL.
C15
C12
C13
R37
C14
R69
T2
R77
TO TREBLE SW., SEC.1
V6 6SG7 A-M DET. & AVC
C57
R58
C58
R52
R35
C4
OPEN FROM B+ AT SW.3D
AVC
SW.3E SEC.5 FRONT
C90
R28
R45
SW.3E SEC.5 REAR
AUDIO

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
SHORT WAVE C BAND
5.8-18 MC.

**MODELS EC-403, EC-404, Echophone**

## THE HALLICRAFTERS CO.


BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE BROADCAST BAND 540-1700 KC.
V6
6SG7
A-M DET. & AVC
OPEN FROM B+ AT SW.3D
AUDIO
SW.3E SEC.5 REAR
C4
R35
C57
R58
C58
R52
R45
R28
C90
AVC
T2
TO TREBLE SW., SEC.1
R77
B+
R69
V5
6SG7
2ND I-F AMPL.
C13
R37
C14
C42
C15
T3
TO TREBLE SW., SEC.2
R13
V4
6SG7
1ST I-F AMPL.
C16
R70
C18
C17
SW.3E SEC.5 FRONT
R60
T4
R9
SW.3D SEC.1 FRONT
C20
C28
R75
R38
C49
V2
6BE6
MIXER
C43
R5
C23
C77
C68
L7
SW.3C SEC.2 FRONT
C66C
C47
SW.3B SEC.3 FRONT
C66B
R42
C83
C46
L6
SW.3B SEC.3 REAR
C39
L9
R6
L18
C54
R67
C42
R23
R8
V1
6BA6
RF AMPL.
L8 PRI.
C40
SW.3D SEC.4 REAR
R72
OPEN FROM B+ AT SW.3D
R32
L13
V3
6J6
OSC.
R41
C41
GANGED
SW.3A SEC.4 FRONT
C66A
C69
SW.3A SEC.4 REAR
R24
TS2
TS3
L19 B.C. LOOP
PRI.
SEC.
L2
C52
R40
L3
C27
TS1


BAND-SWITCH SHOWN AT 5TH POSITION CLOCKWISE F M BAND 88-108 MC.
R34
R33
C64
C51
C50
V8
6AL5
RAT. DET.
C29
R18
C2
AUDIO
SW.3E SEC.5 REAR
R15
C63
T1
R29
V7
6SG7
4TH F-M I-F AMPL.
C10
R66
C9
C11
R17
R7
R48
C60
L14
C26
V6
6SG7
3RD F-M I-F AMPL.
R68
C3
C1
C4
R35
C90
R28
C57
R58
C58
R52
R45
T2
TO TREBLE SW., SEC.1
R77
R10
V5
6SG7
2ND I-F AMPL.
C14
R69
C13
C12
R37
C15
R44
C19
T3
TO TREBLE SW., SEC.2
R13
V4
6SG7
1ST I-F AMPL.
R70
C16
C18
C17
R60
SW.3E, SEC.5 FRONT
SW.3C SEC.2 FRONT
C47
C67C
C89
C38
SW.3D SEC.4 REAR
C40
T4
R9
C20
SW.3D SEC.1 FRONT
R38
R72
R22
R73
C61
C49
R75
R5
C23
C46
V2
6BE6
MIXER
SW.3B SEC.3 FRONT
C67B
C53
C75
R42
R31
L6
C83
L9
R6
SW.3B SEC.3 REAR
C39
R14
L18
C54
R8
R67
V1
6BA6
R-F AMPL.
SW.3A SEC.4 FRONT
C76A
R30
C69
C42
R23
GANGED
L11
R39
L13
R74
R32
C45
V3
6J6
OSC. AFC.
R41
C41
C62
C76
L10
R24
C27
L2
TS2
TS3
L19
SEC.
TS1
SW.3A SEC.4 REAR
F.M. & S.W. ANT.

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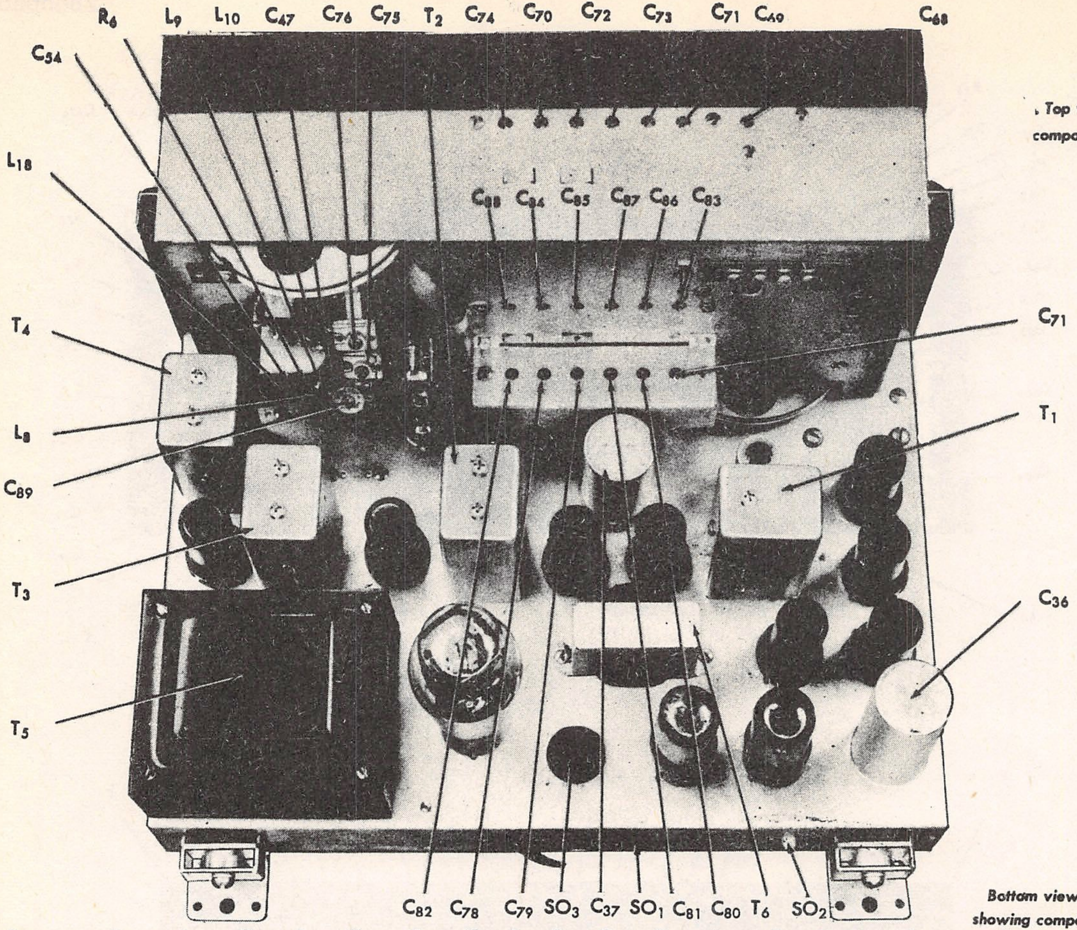
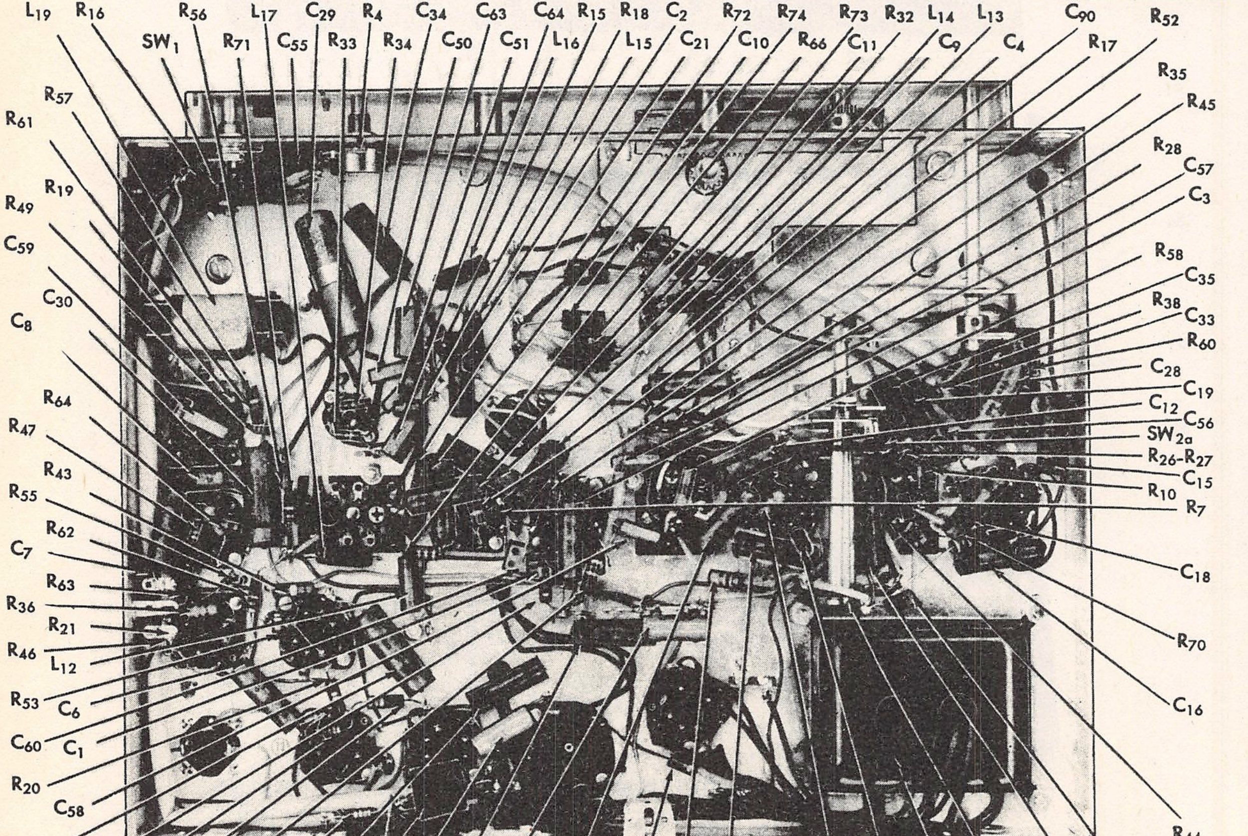
# THE HALLICRAFTERS CO.


R6
L9
L10
C47
C76
C75
T2
C74
C70
C72
C73
C71
C69
C68
C54
L18
C88
C84
C85
C87
C86
C83
C71
T4
L8
C89
T1
T3
C36
T5
C82
C78
C79
SO3
C37
SO1
C81
C80
T6
SO2

*Top view showing component location.*

*Bottom view of receiver showing component location.*


L19
R16
R56
L17
C29
R4
C34
C63
C64
R15
R18
C2
R72
R74
R73
R32
L14
L13
C90
R52
SW1
R71
C55
R33
R34
C50
C51
L16
L15
C21
C10
R66
C11
C9
C4
R17
R35
R45
R28
C57
C3
R58
C35
R38
C33
R60
C28
C19
C12
C56
SW2a
R26-R27
C15
R10
R7
C18
R70
C16
R44
R57
R61
R19
R49
C59
C30
C8
R64
R47
R43
R55
R62
C7
R63
R36
R21
R46
L12
R53
C6
C60
C1
R20
C58
C31
R48
R50
R65
R68
R51
C24
C25
R2
C5
R1
C13
R54
R1
C14
R37
R69
T5
SW2b
C15
R13

## ALIGNMENT PROCEDURE

Removal of the receiver chassis from the cabinet requires the use of other calibration means than the dial glass. Calibration strips mounted on the pointer rails are provided for alignment purposes.

In order to see these calibration strips, it is necessary that the dial plate (brown metal cover) be removed in the following order:

1. Pull out dial pointers.
2. Remove seven self-tapping screws holding dial plate to chassis.
3. Remove the Right hand and Left hand Dial lamp assemblies fastened by one self-tapping screw each.
4. Remove dial plate.

With the variable condensers fully "meshed," the right hand side of the pointer carriage will be indexed to "0" on the calibration strips (see fig. 3).

Proceed with alignment of the receiver as indicated on the alignment chart.

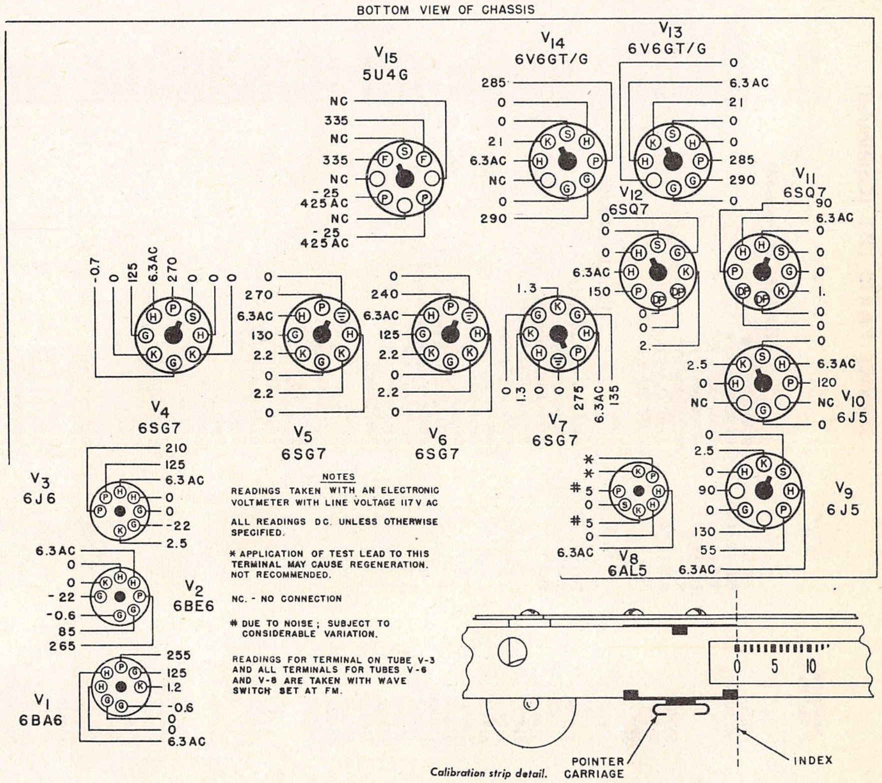
NOTE: This receiver has AUTOMATIC FREQUENCY CONTROL employed on the "FM" band in order to compensate for mechanical variations in the push-button mechanism. Correction factor is approximately 5 times; "take hold" characteristics are: "Before" 100 kc and "Release" before 450 kc at .1 volt input signal.

Standard RMA dummy consisting of a 200 mmf condenser in series with a 20 uh r-f choke which is shunted by a 400 mmf condenser in series with a 400 ohm carbon resistor.

### ALIGNMENT PROCEDURE

| *Steps* | *Signal Generator Thru .01 Mfd to:* | *Sig. Gen. Tuned to:* | *Receiver Tuned to:* | *Cal. No.* | *Adjust the Following Slugs/Trimmers for:* |
|---|---|---|---|---|---|
| "AM" i.f. | 1. 2nd i.f. control grid | 455 kc | "BC" Band 1000 kc | 55 | S3 and S6, Max. output |
| | 2. 1st i.f. control grid | 455 kc | 1000 kc | 55 | S2 and S5, Max. output |
| | 3. 1st Det. control grid | 455 kc | 1000 kc | 55 | S1 and S4, Max. output |
| *NOTE:* Set "Bass" control at No. 1, and "Treble" control at No. 4, read output for maximum AVC voltage, using a VTVM or 20,000 ohms/volt meter connected to pin No. 7 of the 6AL5 radio detector tube to ground. | | | | | |
| "FM" i.f. | 4. 2nd i.f. control grid | 10.7 mc | "FM" Band Mid-scale | 55 | S9, S12, S13 Max. output |
| | 5. 1st i.f. control grid | 10.7 mc | Mid-scale | 55 | S8 & S11 Max. output |
| | 6. 1st Det. control grid | 10.7 mc | Mid-scale | 55 | S7, S10 Max. output |
| NOTE: For ratio detector alignment, clip output meter to C-34 leading to audio control potentiometer and ground. | | | | | |
| | 7. 1st Det. control grid | 10.7 mc | Mid-scale | 55 | S14 for "0" audio voltage |
| | 8. Standard RMA dummy ant. to: | 1500 kc | "BC" Band 1500 kc | 82 | "F," Calibration |
| | 9. "A" "G" | 1500 kc | 1500 kc | 82 | "H," Max. output |
| | 10. "A" "G" | 1500 kc | 1500 kc | 82 | "I," Max. output |
| | 11. "A" "G" | 600 kc | 600 kc | 15.5 | "G," Calibration |
| | 12. "A" "G" | 600 kc | 600 kc | 15.5 | S15, Max. output |
| | 13. "A" "G" | 12 mc | "B" Band 12 mc | 91.5 | "C," Calibration |
| | 14. "A" "G" | 12 mc | 12 mc | 91.5 | "J," Max. output |
| | 15. "A" "G" | 12 mc | 12 mc | 91.5 | "K," Max. output |
| | 16. "A" "G" | 9 mc | 9 mc | 6.5 | "D," Calibration |
| | 17. "A" "G" | 9 mc | 9 mc | 6.5 | "L," Max. output |
| | 18. "A" "G" | 9 mc | 9 mc | 6.5 | "M," Max. output |
| | 19. "A" "G" | 18 mc | "A" Band 18 mc | 94.5 | "A," Calibration |
| | 20. "A" "G" | 18 mc | 18 mc | 94.5 | "N," Max. output |
| | 21. "A" "G" | 18 mc | 18 mc | 94.5 | "O," Max. output |
| | 22. "A" "G" | 15 mc | 15 mc | 7.5 | "B," Calibration |
| | 23. "A" "G" | 15 mc | 15 mc | 7.5 | "P," Max. output |
| | 24. "A" "G" | 15 mc | 15 mc | 7.5 | "Q," Max. output |
| | 25. "A" "G" | 16 mc | "C" Band 16 mc | 84 | "E," Calibration |
| | 26. "A" "G" | 16 mc | 16 mc | 84 | "R," Max. output |
| | 27. "A" "G" | 16 mc | 16 mc | 84 | "S," Max. output |
| | 28. Two 150 ohm resistors to: "D" "D" | 108 mc | "FM" Band 108 mc | 83.5 | "T," Calibration |
| | 29. "D" "D" | 108 mc | 108 mc | 83.5 | "U," Max. output |
| | 30. "D" "D" | 108 mc | 108 mc | 83.5 | "V," Max. output |

BOTTOM VIEW OF CHASSIS


V15 5U4G
NC
335
NC
335
NC
-25 425AC
NC
-25 425AC
V14 6V6GT/G
285
0
0
21
6.3AC
NC
0
290
V13 6V6GT/G
0
6.3AC
21
0
0
285
290
0
V12 6SQ7
V11 6SQ7
90
6.3AC
V10 6J5
6.3AC
120
NC
V9 6J5
V8 6AL5
6.3AC
V7 6SG7
1.3
275
6.3AC
135
V6 6SG7
240
6.3AC
125
2.2
V5 6SG7
270
6.3AC
130
2.2
V4 6SG7
210
125
6.3AC
-22
2.5
V3 6J6
-0.7
6.3AC
V2 6BE6
-22
-0.6
85
265
V1 6BA6
255
125
1.2
-0.6
6.3AC
0 5 10
POINTER CARRIAGE
INDEX

NOTES

READINGS TAKEN WITH AN ELECTRONIC VOLTMETER WITH LINE VOLTAGE 117 V AC

ALL READINGS D.C. UNLESS OTHERWISE SPECIFIED.

* APPLICATION OF TEST LEAD TO THIS TERMINAL MAY CAUSE REGENERATION. NOT RECOMMENDED.

NC. - NO CONNECTION

# DUE TO NOISE; SUBJECT TO CONSIDERABLE VARIATION.

READINGS FOR TERMINAL ON TUBE V-3 AND ALL TERMINALS FOR TUBES V-6 AND V-8 ARE TAKEN WITH WAVE SWITCH SET AT FM.

*Calibration strip detail.*

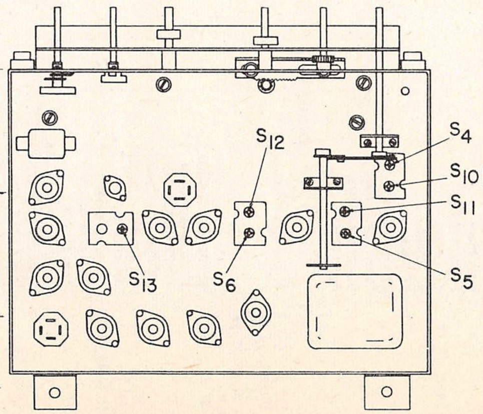
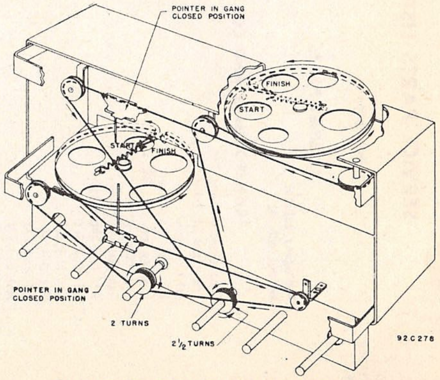

S4
S10
S11
S5
S12
S6
S13

*Fig. 5. Bottom view showing alignment points.*


POINTER IN GANG CLOSED POSITION
FINISH
START
START
FINISH
POINTER IN GANG CLOSED POSITION
2 TURNS
2½ TURNS
92C276

**DIAL CORD STRINGING INSTRUCTIONS**

For restringing the "FM" gang and dial, cut a 5 ft. piece of 9 lb. test dial cord and proceed as indicated in Fig. 9.

For restringing the "AM" gang and dial, cut a 4½ ft. piece of dial cord and proceed as indicated in Fig. 9.

MODELS EC-403, EC-404,
Echophone

# THE HALLICRAFTERS CO.

## SERVICE PARTS LIST

### CABINET PARTS

| Illustration No. | Description | Hallicrafters Part No. |
|---|---|---|
| | Mahogany, cabinet | 66F341 |
| | Walnut, cabinet | 66F342 |

### TRANSFORMERS AND COILS

| Illustration No. | Description | Hallicrafters Part No. |
|---|---|---|
| T1 | Freq. detector trans. FM | 50C208 |
| T2, 3 | Interstage I.F. trans. | 50C209 |
| T4 | 1st I.F. trans. | 50C210 |
| L1 | R.F. Coil, short wave | 51B905 |
| L2 | Loading coil, ant., BC | 51B906 |
| L3 | Loop loading coil | 51B907 |
| L4 | Osc. coil, short wave | 51B908 |
| L5 | Ant. coil, short wave | 51B909 |
| L6 | R.F. Coil, B.C. | 51B910 |
| L7 | Osc. coil, B.C. | 51B911 |
| L8 | Osc. coil, FM | 51B914 |
| L9 | R.F. coil, FM | 51B915 |
| L10 | Ant. coil, FM | 51B916 |
| L11 | Plate choke | 53B008 |
| L12 | Filament choke | 53B009 |
| L13, 14, 15, 16, 17 | R.F. choke | 53A106 |
| L18 | R.F. choke | 53A115 |
| L19 | BC-SW loop ant. | 57D106 |
| L20 | FM dipole ant. | 57C108 |
| T5 | Power transformer | 52C132 |
| T6 | Output transformer | 55B086 |
| L21 | Audio choke | 56B082 |

### CONDENSERS

| Illustration No. | Description | Hallicrafters Part No. |
|---|---|---|
| C1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 90, 91. | .01 mfd. 600 v. tubular | 46AZ103F |
| C26, 27, 28 | .02 mfd 600 v. tubular | 46AV203F |
| C30 | .1 mfd 200 v. tubular | 46AU104H |
| C31, 32 | .05 mfd 600 v. tubular | 46AY503F |
| C33 | .002 mfd 600 v. tubular | 46AZ202J |
| C34, 35 | .003 mfd 600 v. tubular | 46AZ302J |
| C38, 39 | 500 uuf ceramic | 47A147 |
| C40, 41, 42, 43, 44, 16 | 1000 uuf ceramic | 47A148 |
| C45 | 10 uuf ceramic | 47A149 |
| C46, 47 | 47 uuf ceramic | 47A150 |
| C48 | 1.5 uuf "Gimmick," wire | Not Supplied |
| C49 | 10 uuf 500 v. mica, 10% | CM20A100K |
| C50, 51, 52, 53 | 100 uuf 500 v. mica | CM20A101M |
| C54 | 22 uuf 500 v. mica, 10% | CM20A220K |
| C55 | 22 uuf 500 v. mica | CM20A220M |
| C56, 57, 58 | 220 uuf 500 v. mica | CM20A221M |
| C59 | 330 uuf 500 v. mica | CM20A331M |
| C60, 61, 62 | 47 uuf 500 v. mica | CM20A470M |
| C63 64 | 1000 uuf 500 v. mica | CM30A102M |
| C65 | 3900 uuf 500 v. mica | CM35A392J |
| C36 | 60–20 mfd 450 v. electrolytic<br>20 mfd 30 v. electrolytic | 45B099 |
| C37 | 40–10 mfd 450 v. electrolytic<br>20 mfd 30 v. electrolytic | 45B100 |
| C29 | 5 mfd. 50 v. electrolytic | 45A108 |
| C68 | 570 uuf, trimmer | 44A189 |
| C75 | Trimmer, FM, RF | 44A192 |
| C89 | Trimmer, FM, Osc. | 44A193 |
| C76 | Trimmer, FM, Ant. | 44A194 |
| C69, 70, 71, 72, 73, 74 | Trimmer assembly, ant. | 44B190 |
| C77, 78, 79, 80, 81, 82 | Trimmer assembly, Osc. | 44B195 |
| C83, 84, 85, 86, 87, 88 | Trimmer assembly, RF | 44B196 |
| C67a-b-c | Variable condenser, "FM" | 48C175 |
| C66a-b-c | Variable Condenser, "AM" | 48C176 |
| C92 | 39 uuf, Ceramic | CC30SH390M |

### RESISTORS

| Illustration No. | Description | Hallicrafters Part No. |
|---|---|---|
| R1, 2 | 330 ohm, 5W WW | 24A864 |
| R76 | 330 ohm 10 W WW | 24BG331E |
| R3 | 200 ohm 5W WW | 24A865 |
| R4 | 2 meg. volume control | 25A571 |
| R5, 6 | 10 ohm, ½ W | RC20AE100M |
| R7, 8 | 100 ohm, ½ W | RC20AE101M |
| R9, 10, 11, 12, 13, 14, 77 | 1000 ohm, ½ W | RC20AE102M |
| R15, 16 | 10,000 ohm ½ W | RC20AE103M |
| R17, 18, 19, 20, 21, 22, 23, 24, 25, 78 | 100,000 ohm ½ W | RC20AE104M |
| R26, 27, 28, 29, 30, 31 | 1 meg. ½ W | RC20AR105M |
| R32 | 150 ohm ½ W | RC20AE151M |
| R33, 34 | 15,000 ohm ½ W | RC20AE153J |
| R35, 36, 37, 38, 39 | 220 ohm, ½ W | RC20AE221M |
| R40 | 2200 ohm, ½ W | RC20AE222M |
| R41, 42 | 22,000 ohm, ½ W | RC20AE223M |
| R43, 44, 45 | 220,000 ohm, ½ W | RC20AE224M |
| R46 | 33 ohm, ½ W | RC20AE330M |
| R47, 48 | 3300 ohm, ½ W | RC20AE332M |
| R49 | 33,000 ohm, ½ W | RC20AE333M |
| R50, 51, 52 | 330,000 ohm, ½ W | RC20AE334M |
| R53 | 3900 ohm, ½ W (10%) | RC20AE392K |
| R54, 55 | 470 ohm, ½ W | RC20AE471M |
| R56 | 4700 ohm, ½ W | RC20AE472M |
| R57 | 820 ohm, ½ W | RC20AE821K |
| R58, 59 | 47,000 ohm, ½ W | RC20AE473M |

## SERVICE PARTS LIST (Continued)

### RESISTORS (Continued)

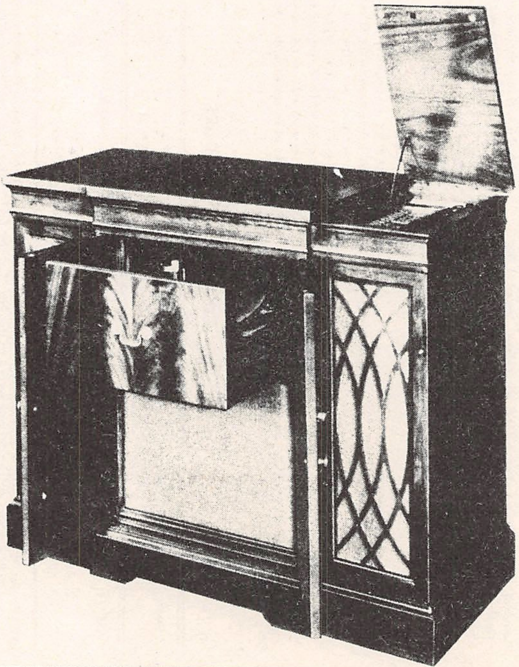
| Illustration No. | Description | Hallicrafters Part No. |
|---|---|---|
| R60, 61 | 68,000 ohm, ½ W | RC20AE683K |
| R62, 63, 64, 65 | 470,000 ohm, ½ W | RC20AE474M |
| R66, 67 | 33,000 ohm, 1 W | RC30AE333M |
| R68, 69, 70 | 47,000 ohm, 1 W | RC30AE473M |
| R71 | 68,000 ohm, 1 W | RC30AE683M |
| R72, 73, 74 | 10,000 ohm, 2 W | RC40AE103M |
| R75 | 22,000 ohm, 2 W | RC40AE223K |

### MISCELLANEOUS

| Illustration No. | Description | Hallicrafters Part No. |
|---|---|---|
| SW1 | Bass, on and off, complete | 60B265 |
| SW2 | Treble, complete | 60B264 |
| SW3 | Band switch, 5 sec. 6 pos. | 60C266 |
| | Phono motor receptacle | 10A015 |
| | Phono pick-up jack | 36A034 |
| | Speaker socket | 6A190 |
| | Octal socket, (tube) | 6A190 |
| | Miniature socket | 6A276 |
| | Pilot light socket and bracket, L.H. | 86A046 |
| | Pilot light socket and bracket, R. H. | 86A047 |
| | Pointer carriage | 67B645 |
| | Tube shield spring retainer | 69A104 |
| | Shield base | 69A169 |
| | Dial cord | 38A014 |
| | Line cord and plug | 87A1570 |
| | Pilot lamp | 39A004 |
| | Pointer, FM | 82A120 |
| | Pointer, AM | 82A121 |
| | Insert, pointer, FM | 17A022 |
| | Insert, pointer, AM | 17A023 |
| | Push-button | 17B028 |
| | Speaker, PM, 15" | 85C045 |
| | Speaker, PM, 10" | 85C043 No. 1<br>85C047 No. 2. |
| | Knob, with index | 15B093 |
| | Knob | 15B096 |
| | Push-button insert | 17A027 |
| | Call letters | 17A025 |
| | Record changer | 115C002-2 |
| | Dial glass, lower | 22B179 |
| | Dial glass, upper | 22B178 |
| | Escutcheon | 7D039 |

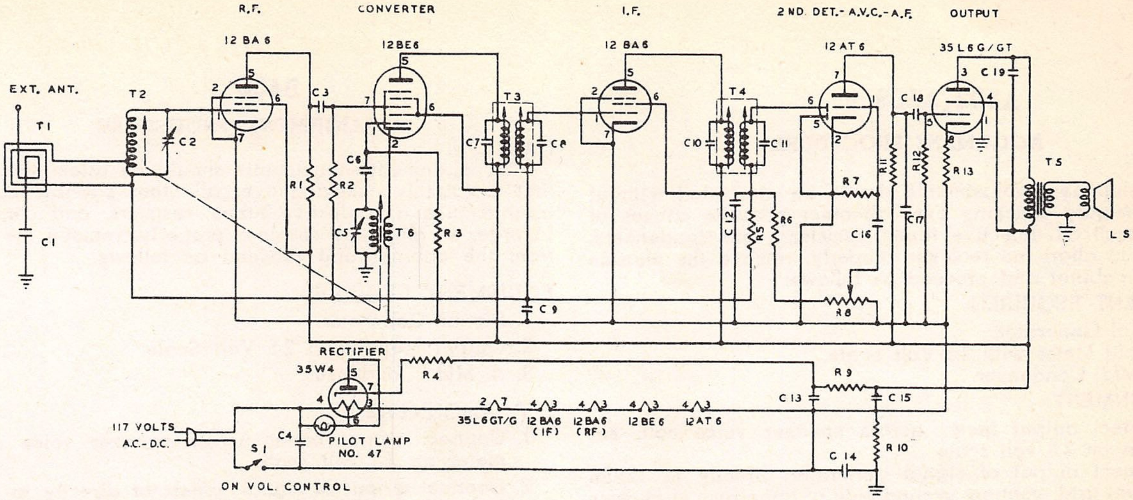
### TUBES

| Illustration No. | Description | Hallicrafters Part No. |
|---|---|---|
| V15 | 5U4G Rectifier | 90X5U4G |
| V8 | 6AL5 FM Freq. detector | 90X6AL5 |
| V1 | 6BA6 RF amplifier | 90X6BA6 |
| V2 | 6BE6 1st detector | 90X6BE6 |
| V9, 10 | 6J5 1st and 2nd audio amp. | 90X6J5 |
| V3 | 6J6 H.F. osc. and FM AFC | 90X6J6 |
| V4, 5, 6, 7 | 6SG7 1st and 2nd I.F., AM 2nd det., FM 3rd and 4th I.F. | 90X6SG7 |
| V13, 14 | 6V6GT/G push pull audio amp. | 90X6V6GT |
| V12, 11 | 6SO7 Inverter and 3rd audio amp. | 90X6SQ7 |



# HOFFMAN RADIO CORP.

MODELS A202,A309,
Chassis 119


R.F.
CONVERTER
I.F.
2ND DET.-A.V.C.-A.F.
OUTPUT
12 BA 6
12BE6
12 BA6
12 AT 6
35 L6 G/GT
EXT. ANT.
T1
T2
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
T3
T4
T5
T6
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
LS
RECTIFIER
35W4
35L6GT/G
12 BA6 (IF)
12 BA6 (RF)
12 BE 6
12AT 6
117 VOLTS A.C.-D.C.
S1
PILOT LAMP NO. 47
ON VOL. CONTROL

| SYMBOL | DESCRIPTION | HOFFMAN No. |
|---|---|---|
| C1 | .005 Mfd. 600 Volt Tubular Paper | 4102 |
| C2, C5 | Dual Padder 280 Mmf. Per Section | 4307 |
| C3, C6 | 100 Mmf. ± 20% Mica | 4000 |
| C4 | .05 Mfd. 400 Volt Tubular Paper | 4101 |
| C7, C8 | 100 Mmf. ± 10% Ceramic | 4012 |
| C9 | .05 Mfd. 200 Volt Tubular Paper | 4100 |
| C10, C11 | 100 Mmf. ± 10% Ceramic | 4012 |
| C12 | 270 Mmf. ± 20% Mica | 4001 |
| C13, C15 | Dry Electrolytic (30-50 Mfd./150 V) | 4201 |
| C14 | .2 Mfd. 200 Volt Paper Tubular | 4108 |
| C16 | .005 Mfd. 600 Volt Paper Tubular | 4102 |
| C17 | 270 Mmf. ± 20% Mica | 4001 |
| C18 | .005 Mfd. 600 Volt Tubular Paper | 4102 |
| C19 | .02 Mfd. 400 Volt Tubular Paper | 4106 |
| LS | 5" PM Loudspeaker | 9003 |
| R1 | 2200 Ohm ± 20% ½ Watt | 4512 |
| R2, R6 | 47,000 Ohm ± 20% ½ Watt | 4504 |
| R3 | 22,000 Ohm ± 20% ½ Watt | 4501 |
| R4 | 47 Ohm ± 20% ½ Watt | 4508 |
| R5 | 2.2 Megohm ± 20% ½ Watt | 4502 |
| R7 | 10 Megohm ± 20% ½ Watt | 4505 |
| R8 | .5 Megohm Pot. with Switch (Volume) | 4802 |
| R9 | 500 Ohm ± 10% 5 Watt | 4700 |
| R10, R12 | .47 Megohm ± 20% ½ Watt | 4506 |
| R11 | .22 Megohm ± 20% ½ Watt | 4500 |
| R13 | 150 Ohm ± 20% ½ Watt | 4510 |
| S1 | On-Off Switch (on Volume Control) | |
| T1 | Antenna Loop | 5238 |
| T2 | R.F. Coil | 55203 |
| T3 | Input I.F. Transformer (455 Kc.) | 55201 |
| T4 | Output I.F. Transform (455 Kc.) | 55202 |
| T5 | Audio Output Transformer | 5101 |
| T6 | Oscillator Coil | 55204 |

## MODELS A202 & A309

### DESCRIPTION

Hoffman Models A202 and A309 are electrically identical and differ in cabinet design only. The receiver consists of a 6-tube broadcast band AC-DC Superheterodyne incorporating a built-in loop antenna.

### SPECIFICATIONS

| | |
|---|---|
| Tuning Range | 540 Kc to 1650 Kc |
| Intermediate Frequency | 455 Kc. |
| Power Supply | 115 V. D.C. or 115 V. A.C. 50-60 C.P.S. |
| Power Consumption | 28 Watts |
| Undistorted Audio Output | .6 Watt |
| Maximum Audio Output | .9 Watt |
| Loudspeaker | 5-inch round P.M. |

### NORMAL OPERATING CURRENTS

| | | |
|---|---|---|
| 35W4 | Cathode Current | 60 Ma. |
| 35L6 | Cathode Current | 30 Ma. |

Meter inserted in circuit at cathode.

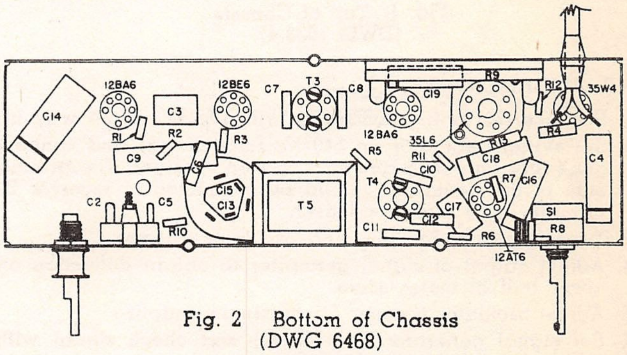

12BA6
12BE6
T3
C7
C8
C19
R9
R12
35W4
C14
C3
R1
R2
R3
12BA6
35L6
R4
C9
C6
R5
R11
C18
C10
C4
T4
R7
C16
C15
C13
T5
C2
C5
C17
S1
C11
C12
R6
R8
R10
12AT6

Fig. 2 Bottom of Chassis
(DWG 6468)

### NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

| PIN NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 12BA6(R.F.) | — .45 | 0. | 25. A.C. | 37.5 A.C. | +65. | +80. | 0. | |
| 12BE6 | 4.6* | 0. | 12.5 A.C. | 25. A.C. | +80. | +80. | 0. | |
| 12BA6 (I.F.) | — .45 | 0. | 37.5 A.C. | 50. A.C. | +80. | +80. | 0. | |
| 12AT6 | —1.5* | 0. | 0. | 12.5 A.C. | 0. | —15. | +37.5 | |
| 35L6 | 0. | 85 A.C. | +75 D.C. | +80. D.C. | 0. | 0. | 50. A.C. | +4.6 |
| 35W4 | 115 A.C. | 0. | 85. A.C. | 115. A.C. | 110. A.C. | 110. A.C. | +110. D.C. | |

D.C. voltages measured with 1000 ohm/volt meter
A.C. voltages measures with 1000 ohm/volt meter
All voltages measured with reference to B-
Line voltage 115.

* These readings taken with V. T.V .M.

NOTE: The above readings are obtained with no signal input to receiver.

**MODELS A202,A309**
**MODEL B400**

# HOFFMAN RADIO CORP.

## A202,A309

### ALIGNMENT PROCEDURE

CAUTION:

No alignment adjustments should be attempted without first thoroughly checking over all other possible causes of trouble such as defective tubes, resistors, and condensers. In order to align the receiver properly, remove the chassis from the cabinet and proceed as follows:

EQUIPMENT REQUIRED:

1. Signal Generator.
2. Output Meter with 2.5 Volt Scale.
3. .25 Mfd. Condenser.

I.F. ALIGNMENT:

1. Connect output meter across speaker voice coil; set meter on 2.5 volt scale.
2. Connect output of signal generator directly to 12BE6 control grid; connect ground side of generator to chassis of receiver through .25 Mfd. condenser. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. slugs (first T4 and then T3) for maximum reading on output meter.
   Note: Keep signal level low, just enough to keep maximum reading on lower half of meter scale. Tuning condenser plates should be all the way out; volume control should be on full. After adjustment, put a drop of wax on each I.F. tuning slug to hold it in place.

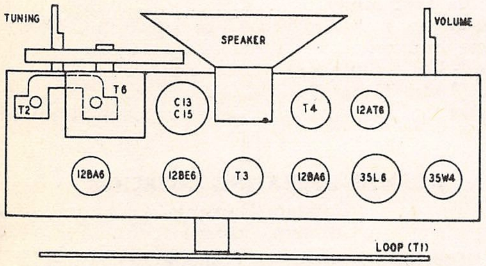


Fig. 1 Top of Chassis
(DWG 1023-4)

R.F. ALIGNMENT:

1. Set receiver tuning ~~condenser~~ control with ~~plates~~ slugs all the way in.
2. Set signal generator on 540 Kc (modulated) and connect generator output to antenna post on receiver. The ground side of the generator should be connected to receiver B- through a .25 Mfd. condenser.
3. Tune in signal by adjusting oscillator trimmer C5.
4. Adjust output of signal generator to obtain deflection on lower half of meter scale.
5. Adjust oscillator trimmer for maximum output.
6. Set signal generator on 1650 Kc and check signal with tuning condenser plates all the way out.
7. Set signal generator on 1470 Kc.
8. Tune in signal on receiver and adjust rf trimmer C2 for maximum reading on output meter. Feed only enough signal from the generator to keep maximum reading on lower half of meter scale.
9. Recheck at 600 Kc, 1000 Kc and 1410 Kc for tracking and readjust as required.

DIAL ADJUSTMENT:

To set the dial on calibration, pick up a station of known frequency near the center of the dial and move the pointer by hand as required.

## B400

### ALIGNMENT PROCEDURE

CAUTION:

No alignment adjustments should be attempted without first thoroughly checking over all other possible causes of trouble such as defective tubes, resistors, and condensers. In order to align the receiver properly, remove the chassis from the cabinet and proceed as follows:

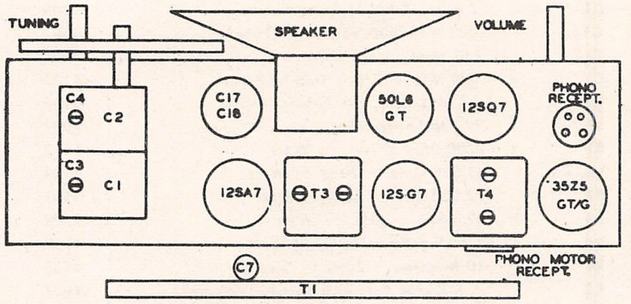
EQUIPMENT REQUIRED:

1. Signal Generator.
2. Output Meter with 2.5 Volt Scale.
3. .1 Mfd. Condenser.

I. F. ALIGNMENT:

1. Connect output meter across speaker voice coil; set meter on 2.5 volt scale.
2. Connect output of signal generator directly to antenna post on loop; connect ground side of generator to chassis of receiver through .1 Mfd. condenser. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. trimmers (first T4 and then T3) for maximum reading on output meter.

NOTE: Keep signal level low, just enough to keep maximum reading on lower half of meter scale. Tuning condenser plates should be all the way out, volume control should be on full.



R.F. ALIGNMENT:

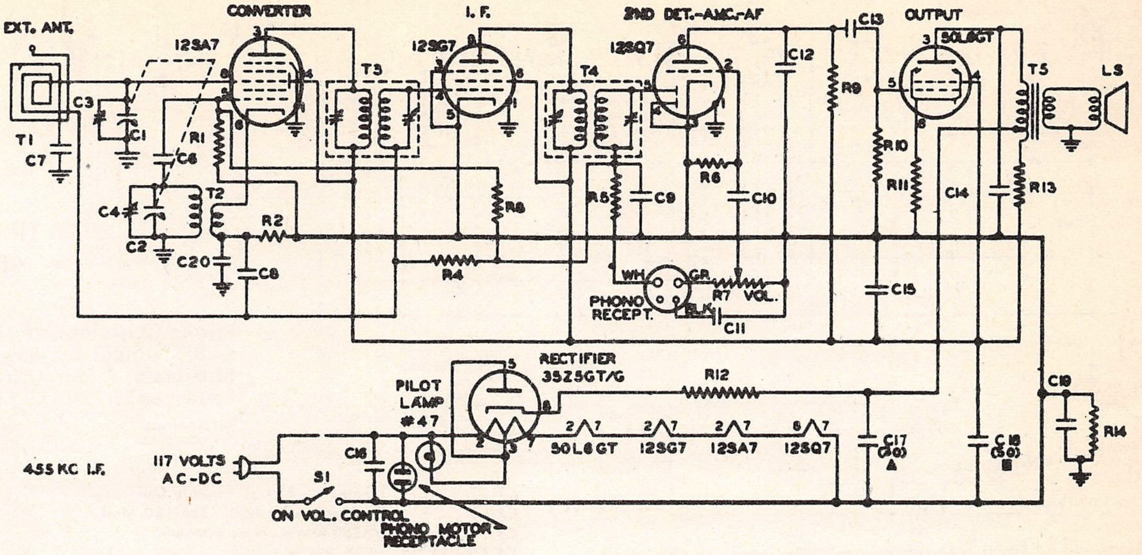
1. Set tuning condenser with plates completely out.
2. Set signal generator at 1650 Kc (modulated) and feed its output into a loop of wire about 6" in diameter. Place this loop about one foot away from and parallel to the receiver loop antenna.
3. Tune in signal by adjusting oscillator trimmer (C4).
4. Adjust output of signal generator to obtain deflection on lower half of meter scale.
5. Adjust oscillator trimmer (C4) for maximum output.
6. Set signal generator at 1400 Kc and tune in signal with tuning condenser.
7. Adjust antenna trimmer (C3) while rocking gang condenser for maximum reading on output meter. Feed only enough signal from generator to keep maximum reading on lower half of meter scale.

DIAL ADJUSTMENT:

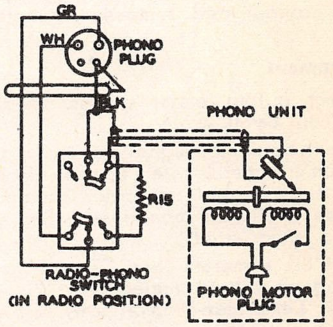
To set the dial on calibration, tune in a station of known frequency near the center of the dial and move the pointer by hand as required.

**MODEL B400, Chassis 118**

# HOFFMAN RADIO CORP.


EXT. ANT.
CONVERTER
12SA7
I. F.
12SG7
2ND DET.-AMC.-AF
12SQ7
C13
OUTPUT
50L6GT
T1
C7
C3
C1
C6
R1
C4
T2
C2
C20
C8
R2
T3
R8
R4
T4
R5
C9
R6
C10
C12
R9
R10
R11
C14
R13
T5
LS
WH
GR
PHONO RECEPT.
BLK
R7 VOL.
C11
C15
RECTIFIER
35Z5GT/G
R12
PILOT LAMP #47
C19
R14
455 KC I.F.
117 VOLTS AC-DC
C16
S1
ON VOL. CONTROL
PHONO MOTOR RECEPTACLE
50L6GT
12SG7
12SA7
12SQ7
C17 (30)
C18 (50)

| SYMBOL | DESCRIPTION | HOFFMAN No. |
|---|---|---|
| C1, C2 | Two Section Variable (388-180 Mmf.) | 4401 |
| C3, C4 | Trimmer: Part of Variable Cond. | |
| C6 | 100 Mmf. ±20% Mica | 4000 |
| C7, C10, C13 | .005 Mfd. 600 Volt Tubular Paper | 4102 |
| C8, C11, C15 | .05 Mfd. 200 Volt Tubular Paper | 4100 |
| C9, C12 | 270 Mmf. ±20% Mica | 4001 |
| C14 | .02 Mfd. 400 Volt Tubular Paper | 4106 |
| C16 | .05 Mfd. 400 Volt Tubular Paper | 4101 |
| C17, C18 | Dry Electrolytic (50/30 Mfd./150 V.) | 4201 |
| C19 | .2 Mfd. 200 Volt Tubular Paper | 4108 |
| C20 | .001 Mfd. 600 Volt Tubular Paper | 4104 |
| R1 | 22,000 Ohm ±20% ½Watt | 4501 |
| R4 | 2.2 Megohm ±20% ½Watt | 4502 |
| R5 | 47,000 Ohm ±20% ½Watt | 4504 |
| R6, R8 | 10 Megohm ±20% ½Watt | 4505 |
| R7 | .5 Megohm Pot. with Switch (Vol.) | 4802 |
| R9 | .22 Megohm ±20% ½Watt | 4500 |
| R10, R14, R15 | .47 Megohm ±20% ½Watt | 4506 |
| R11 | 150 Ohm ±20% ½Watt | 4510 |
| R12 | 47 Ohm ±20% ½Watt | 4508 |
| R13 | 1500 Ohm ±20% 1 Watt | 4552 |
| S2 | Phono-Radio-Tone Switch | 6021 |
| LS | PM Loudspeaker | 9023 |
| S1 | On-Off Switch (on Vol. Control) | |
| T1 | Antenna Loop | 5255 |
| T2 | Oscillator | 5208 |
| T3 | Input I.F. Transformer (455Kc.) | 5205 |
| T4 | Output I.F. Transformer (455Kc.) | 5206 |
| T5 | Audio Output Transformer | 5117 |


GR
WH
PHONO PLUG
BLK
PHONO UNIT
R15
RADIO-PHONO SWITCH (IN RADIO POSITION)
PHONO MOTOR PLUG

## DESCRIPTION

Hoffman model B400 is a table model radio-phonograph combination. The radio section consists of a 5-tube AC-DC superheterodyne receiver with a built-in loop antenna. The phonograph section consists of an automatic record changer which plays either fourteen 10-inch records or twelve 12-inch records at one loading. The record changer may also be operated manually.

## SPECIFICATIONS

| | |
|---|---|
| Tuning Range | 540 Kc to 1650 Kc |
| Intermediate Frequency | 455 Kc |
| Power Supply | 115 V. D.C. or A.C. 50-60 C.P.S. |
| Power Consumption | 48 Watts |
| Audio Output | 1.25 Watts |

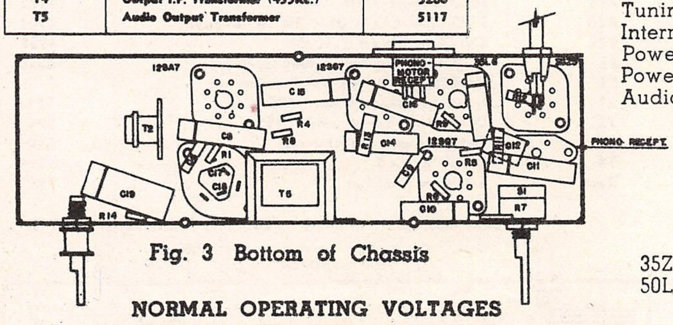

12SA7
12SG7
PHONO-MOTOR RECEPT.
50L6
35Z5
C15
T2
C8
R4
R8
C16
R12
C14
12SQ7
R9
C12
C11
R1
C17
C18
T5
C19
R14
R5
C10
S1
R7
PHONO RECEPT.

Fig. 3 Bottom of Chassis

## NORMAL OPERATING CURRENTS

| | | |
|---|---|---|
| 35Z5 | Cathode Current | 57 Ma |
| 50L6 | Cathode Current | 33 Ma |

## NORMAL OPERATING VOLTAGES

The following table lists the normal operating voltages to be expected at the various tube socket terminals.

| PIN NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 12SA7 | 0 | 24 A.C. | +85 | +92 | −5.5 | 0 | 11.5 A.C. | −.4 |
| 12SG7 | 0 | 22 A.C. | 0 | −.4 | 0 | +92 | 36 A.C. | +86 |
| 12SQ7 | 0 | −.8 | 0 | 0 | −1.0 | +60 | 0 | 9 A.C. |
| 50L6 | 0 | 36 A.C. | +101 | +93 | +.2 | 0 | 87 A.C. | +7.5 |
| 35Z5 | 0 | 117 A.C. | 114 A.C. | +112 | 114 A.C. | 0 | 87 A.C. | +116 |

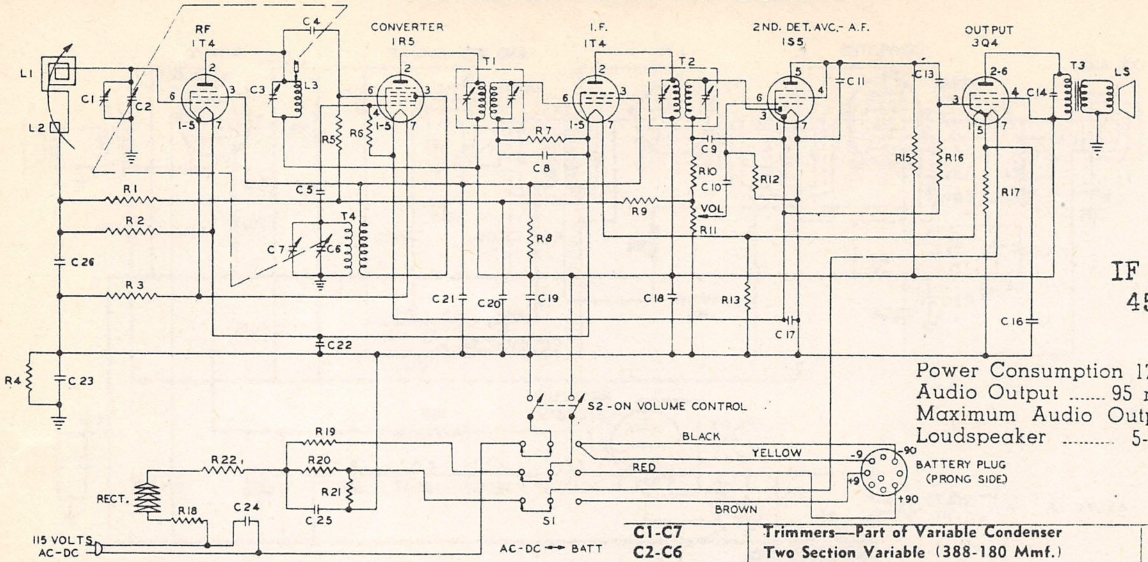
D.C. voltages measured with 20,000 ohm/volt meter.
A.C. voltages measured with 1,000 ohm/volt meter.
All voltages measured with reference to B−.
Line voltage 117.

**NOTE:** The above readings are obtained with no signal input to the receiver, radio-phono switch in the RADIO position, and volume control full on.

RECORD CHANGER: Aero 46A, RCD. CH. P.16-1
For alignment, see P.16-2

MODEL A700, Chassis 110S

## HOFFMAN RADIO CORP.


RF 1T4
CONVERTER 1R5
I.F. 1T4
2ND. DET. AVC.- A.F. 1S5
OUTPUT 3Q4
L1
L2
C1
C2
C3
C4
L3
T1
T2
T3
T4
LS
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R15
R16
R17
R18
R19
R20
R21
R22
C5
C6
C7
C8
C9
C10
C11
C13
C14
C16
C17
C18
C19
C20
C21
C22
C23
C24
C25
C26
VOL
S2 - ON VOLUME CONTROL
BLACK
YELLOW
RED
BROWN
-9
-90
+9
+90
BATTERY PLUG (PRONG SIDE)
RECT.
115 VOLTS AC-DC
S1
AC-DC ⟷ BATT

IF PEAK
455KC

Power Consumption 17 watts at 117 V.
Audio Output ....... 95 mw. at 10% dist.
Maximum Audio Output ... 225 mw.
Loudspeaker .......... 5-inch round P.M.

In order to align the receiver properly, remove the chassis from the cabinet and remove the bottom plate from the chassis.

**I. F. Alignment**

1. Connect output meter across speaker voice coil; set meter on 1-volt scale.
2. Connect output of signal generator to trimmer C3 (blue wire on trimmer located at rear of chassis). The ground side of the signal generator should be connected to B- through a .1 Mfd. condenser. Set signal generator on 455 Kc (modulated).
3. Adjust I.F. trimmers (first T2 and then T1) for maximum reading on output meter.
   NOTE: Keep signal level low, just enough to keep the maximum reading on the output meter at 0.4 volt or less. tuning gang should be set with plates all the way out; volume control full on.
4. Replace bottom cover plate.

**R. F. Alignment**

1. Leave tuning gang with plates all the way out.
2. Set signal generator on 1650 Kc (modulated) and feed generator output into a loop of wire approximately 6" in diameter. Place the loop about one foot away and parallel to the receiver loop antenna.
3. Tune in signal by adjusting oscillator trimmer C7.
4. Adjust output of signal generator to obtain deflection of .4 volt or less on output meter.
5. Adjust oscillator trimmer for maximum output.
6. Set Signal generator to 1400 Kc and tune in signal with tuning condenser.
7. Adjust loop antenna trimmer C1 and R. F. Coil assembly for maximum output. The R. F. coil adjustment is made by loosening the coil mounting clamp and sliding the coil up or down as required.
8. Set signal generator and tuning gang to 600 Kc and adjust R. F. trimmer C3 for maximum output.
9. Go back to 1400 Kc to check tracking and readjust at 1400 Kc and 600 Kc as required.

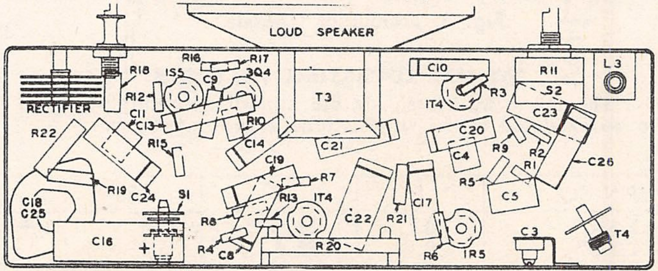
| PIN NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1T4 (RF) | 2.6 | 84 | 65 |  | 2.6 |  | 3.9 |  |
| 1R5 | 1.3 | 84 | 64 | —5.0* | 1.3 | 3* | 2.6 |  |
| 1T4 (RF) | 3.9 | 84 | 65 | 1.2* | 3.9 | 1.5* | 5.2 |  |
| 1S5 | 1.3 | 0 | .5* | 20* | 1 | --.5* | 0 |  |
| 3Q4 | 5.2 | 84 | ---1.3* | 84 | 6.5 | 84 | 7.8 |  |

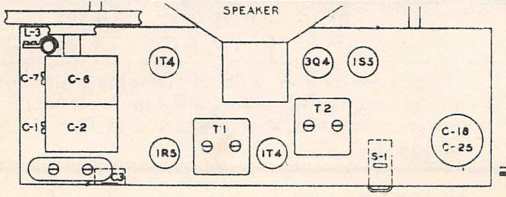
NOTE: All voltages are measured with reference to B- (black wires on volume control switch) and no signal input to receiver.

* These readings must be taken with a V. T. V. M.

| | | |
|---|---|---|
| C1-C7 | Trimmers—Part of Variable Condenser | |
| C2-C6 | Two Section Variable (388-180 Mmf.) | 4401 |
| C3 | 60-260 Mmfd. Mica Trimmer | 4306 |
| C4-C9-C11 | .0001 Mfd. Mica | 4000 |
| C5 | 47 Mfd. Mica | 4009 |
| C8-C26 | .01 Mfd. 400 Volt Tubular Paper | 4112 |
| C10-C12-C13-C14 | .005 Mfd. 600 Volt Tubular Paper | 4102 |
| C15-C16 | 100 Mfd. 25 Volt Dry Electrolytic | 4204 |
| C17-C19-C20-C21 | .05 Mfd. 200 Volt Tubular Paper | 4100 |
| C18-C25 | Dry Electrolytic Condenser (30-50 Mfd. 150-150 Volt) | 4201 |
| C22-C23 | .2 Mfd. 200 Volt Tubular Paper | 4108 |
| C24 | .05 Mfd. 400 Volt Tubular Paper | 4101 |
| L1 | Antenna Loop | 55208 |
| L2 | Antenna Loop Compensator | 5250 |
| L3 | R.F. Coil Permeability Tuned | 5245 |
| L.S. | 5¼" P.M. Speaker | 9019 |
| R1-R14 | 3.3 Megohm, ½ Watt | 4535 |
| R2-R7-R9-R16 | 2.2 Megohm, ½ Watt | 4502 |
| R3 | 680 Ohms, ½ Watt | 4514 |
| R4 | .47 Megohm, ½ Watt | 4506 |
| R5-R15 | 1 Megohm, ½ Watt | 4513 |
| R6-R10 | .1 Megohm, ½ Watt | 4511 |
| R8 | 3900 Ohms ± 10%, ½ Watt | 4527 |
| R11 | 1 Megohm Potentiometer with D.P.S.T. Switch (Volume) | 4808 |
| R12 | 10 Megohm, ½ Watt | 4505 |
| R13* | 820 Ohm ± 10%, ½ Watt | 4533 |
| R17 | 1500 Ohm, ½ Watt | 4534 |
| R18-R22 | 47 Ohm, 2 Watt | 4532 |
| R19 | 1000 Ohm, 1 Watt | 4522 |
| R20 | 1500 Ohm, 6½ Watt ± 5% Wirewound | 4701 |
| R21 | 470 Ohm, 1 Watt ± 10% | 4531 |
| S1 | AC/DC Battery Switch Plug Operated | 6010 |
| S2 | On-Off Switch (on Volume Control) | |
| T1 | Input I.F. Transformer (455 K.C.) | 5242 |
| T2 | Output I.F. Transformer (455 K.C.) | 5243 |
| T3 | Output Audio Transformer | 5104 |
| T4 | Oscillator Coil | 5244 |
| Rect. | Selenium Rectifier | 9517 |

* Some sets use 1000 ohms ± 20%, ½ Watt, Part No. 4542.


LOUD SPEAKER
RECTIFIER
R18
R12
1S5
R16
R17
3Q4
C9
C11
C13
R15
R10
C14
T3
C10
R11
S2
L3
1T4
R3
C23
C20
C4
R9
R2
R1
C26
C21
C19
R7
R5
C5
R22
R19
C24
S1
C18 C25
C16
R8
R13
1T4
C22
R21
C17
R4
C8
R20
R6
1R5
C3
T4

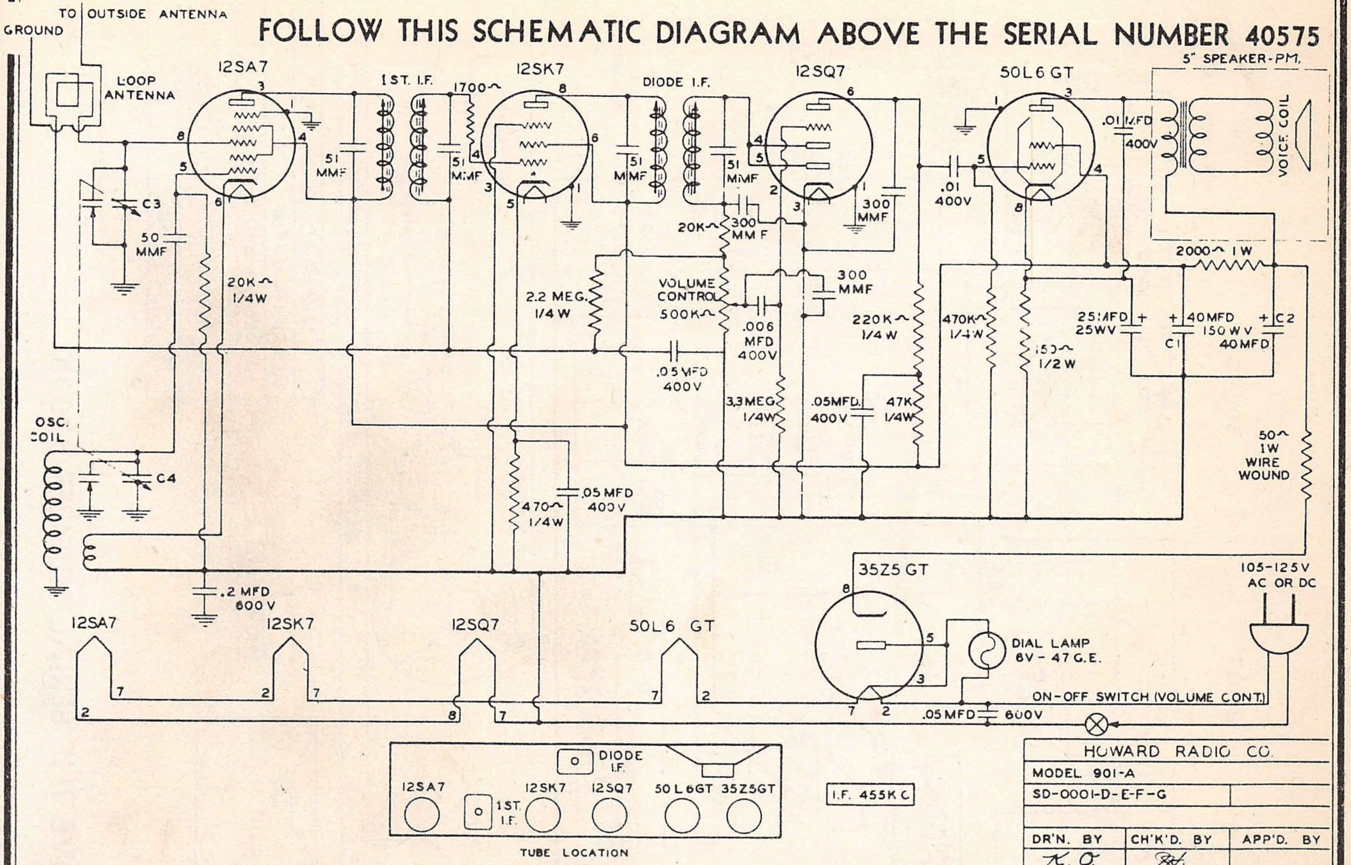

SPEAKER
L-3
C-7
C-6
C-1
C-2
1T4
3Q4
1S5
T2
T1
1R5
1T4
S-1
C-18 C-25
C3

©John F. Rider

MODEL 901-A
MODEL M901-A

# HOWARD RADIO CO.

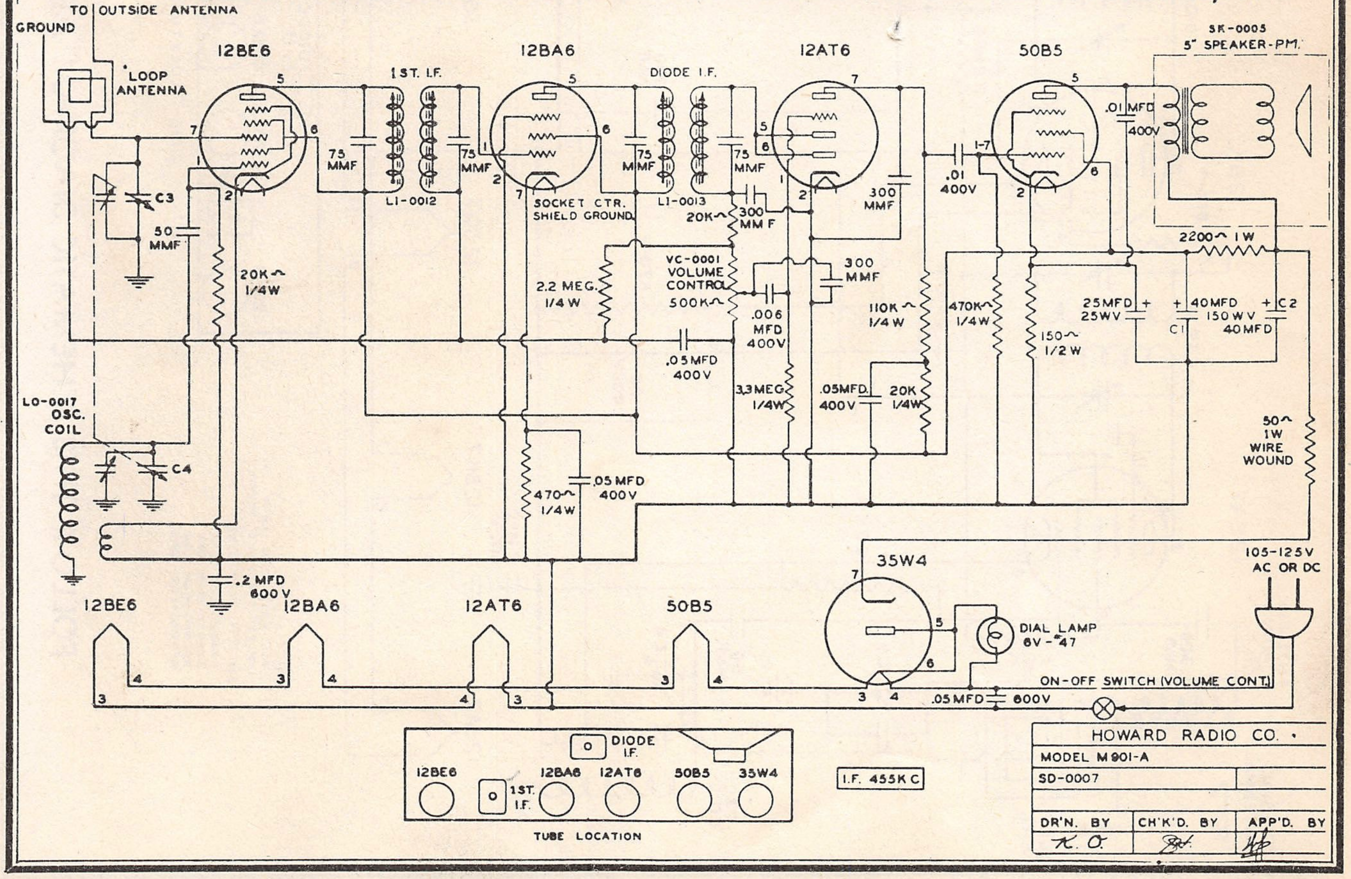
## FOLLOW THIS SCHEMATIC DIAGRAM ABOVE THE SERIAL NUMBER 40575



GROUND
TO OUTSIDE ANTENNA
LOOP ANTENNA
12SA7
1ST. I.F.
1700~
12SK7
DIODE I.F.
12SQ7
50L6 GT
5" SPEAKER-PM.
VOICE COIL
C3
50 MMF
51 MMF
20K~ 1/4W
2.2 MEG. 1/4 W
20K~
300 MMF
VOLUME CONTROL 500K~
.006 MFD 400V
.05 MFD 400V
300 MMF
.01 400V
.01 MFD 400V
220K~ 1/4 W
470K~ 1/4W
150~ 1/2 W
2000~ 1W
25MFD 25WV
40MFD 150 WV
C1
C2 40MFD
3.3 MEG. 1/4W
.05MFD. 400V
47K 1/4W
50~ 1W WIRE WOUND
OSC. COIL
C4
470~ 1/4W
.05 MFD 400V
.2 MFD 600 V
35Z5 GT
105-125V AC OR DC
DIAL LAMP 6V - 47 G.E.
ON-OFF SWITCH (VOLUME CONT.)
.05 MFD 600V
12SA7
12SK7
12SQ7
50L6 GT
DIODE I.F.
1ST. I.F.
35Z5GT
TUBE LOCATION
I.F. 455KC

| HOWARD RADIO CO. | | |
|---|---|---|
| MODEL 901-A | | |
| SD-0001-D-E-F-G | | |
| DR'N. BY | CH'K'D. BY | APP'D. BY |
| K. O. | | |

## FOLLOW THIS SCHEMATIC DIAGRAM ABOVE THE SERIAL NUMBER 45,771

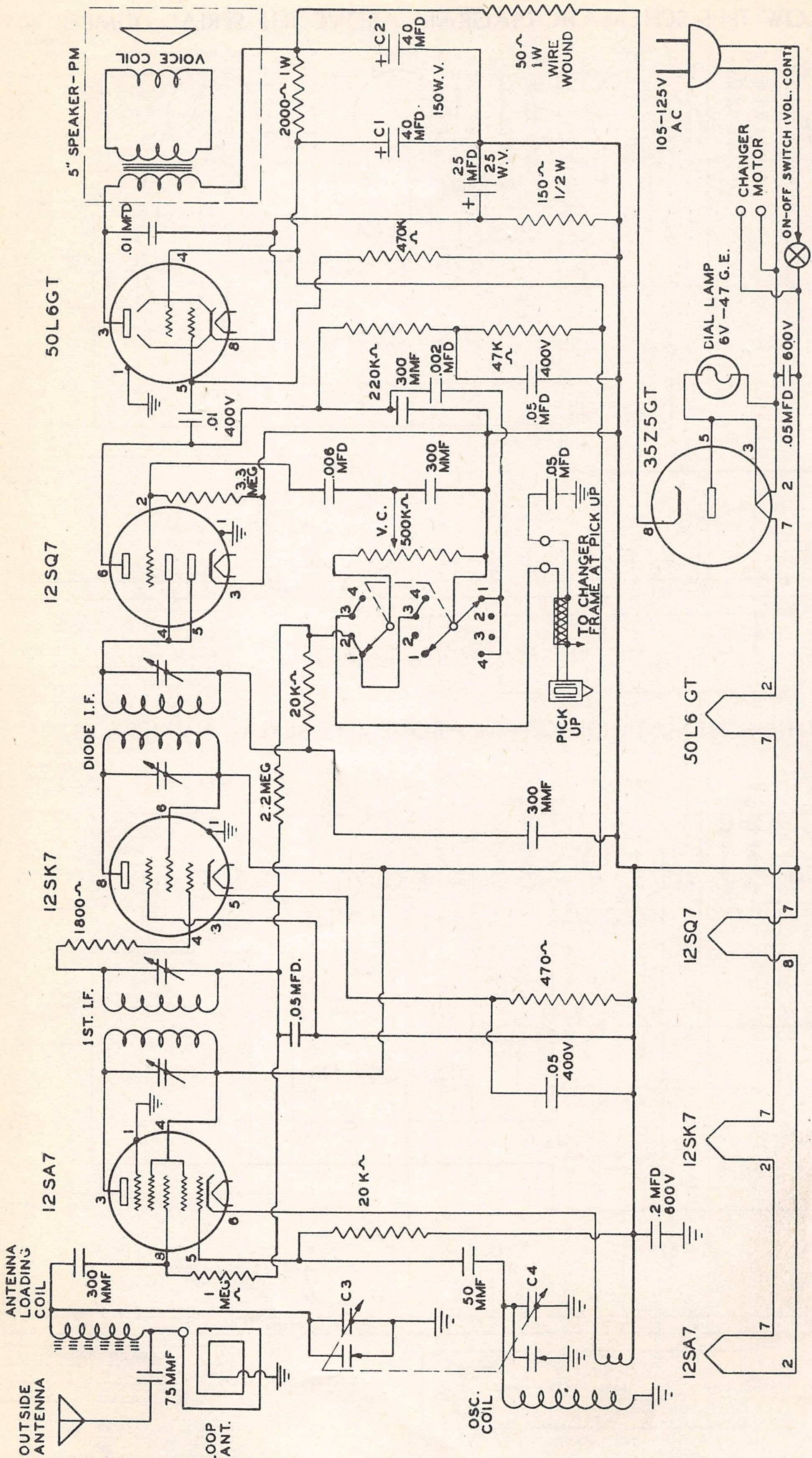


GROUND
TO OUTSIDE ANTENNA
LOOP ANTENNA
12BE6
1ST. I.F.
12BA6
DIODE I.F.
12AT6
50B5
SK-0005
5" SPEAKER-PM.
C3
50 MMF
75 MMF
L1-0012
L1-0013
SOCKET CTR. SHIELD GROUND
20K~ 1/4W
2.2 MEG. 1/4 W
20K~
300 MMF
VC-0001 VOLUME CONTROL 500K~
.006 MFD 400V
.05 MFD 400V
300 MMF
.01 400V
.01 MFD 400V
110K~ 1/4 W
470K~ 1/4W
150~ 1/2 W
2200~ 1W
25MFD 25WV
40MFD 150 WV
C1
C2 40MFD
3.3 MEG. 1/4W
.05MFD. 400V
20K 1/4W
50~ 1W WIRE WOUND
L0-0017 OSC. COIL
C4
470~ 1/4W
.05 MFD 400V
.2 MFD 600 V
35W4
105-125V AC OR DC
DIAL LAMP 6V-47
ON-OFF SWITCH (VOLUME CONT.)
.05 MFD 600V
12BE6
12BA6
12AT6
50B5
DIODE I.F.
1ST. I.F.
35W4
TUBE LOCATION
I.F. 455KC

| HOWARD RADIO CO. | | |
|---|---|---|
| MODEL M901-A | | |
| SD-0007 | | |
| DR'N. BY | CH'K'D. BY | APP'D. BY |
| K. O. | | |

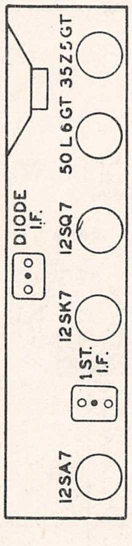
MODEL 901-AP-A

# HOWARD RADIO CO.


5" SPEAKER-PM
VOICE COIL
2000~ 1W
+C2 40 MFD
+C1 40 MFD 150W.V.
50~ 1W WIRE WOUND
25 MFD 25 W.V.
150~ 1/2W
105-125V AC
CHANGER MOTOR
ON-OFF SWITCH (VOL. CONT.)
DIAL LAMP 6V-47 G.E.
.05 MFD 600V
.01 MFD
470K~
50L6GT
220K~
300 MMF
.002 MFD
47K~
.05 MFD 400V
.01 400V
35Z5GT
3.3 MEG
.006 MFD
300 MMF
.05 MFD
12SQ7
V.C. 500K~
TO CHANGER FRAME AT PICK UP
PICK UP
20K~
DIODE I.F.
2.2MEG
300 MMF
12SK7
1800~
1ST. I.F.
.05 MFD.
470~
.05 400V
12SA7
20 K~
.2 MFD 600V
ANTENNA LOADING COIL
300 MMF
1 MEG~
C3
50 MMF
C4
75 MMF
OUTSIDE ANTENNA
LOOP ANT.
OSC. COIL
50L6 GT
12SQ7
12SK7
12SA7

| HOWARD RADIO CO. | | |
|---|---|---|
| MODEL 901-AP-A | | |
| SD-0004-A-B-C-D-E-F | | |
| DR'N. BY | CH'K'D. BY | APP'D. BY |
| K. O. | | |

I.F. 455 KC


35Z5GT
50L6GT
12SQ7
DIODE I.F.
12SK7
1ST. I.F.
12SA7

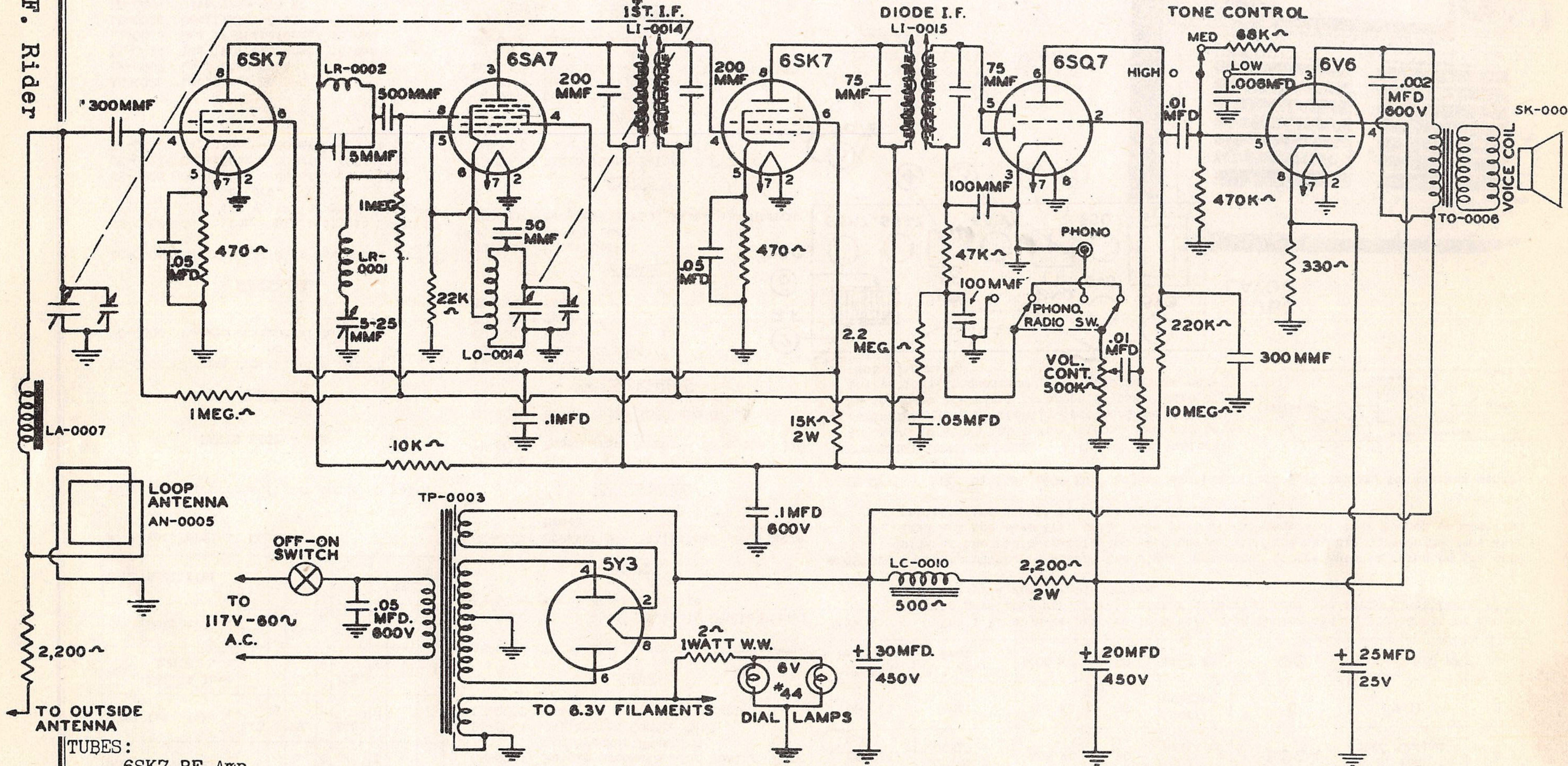
TUBE LOCATION

NOTE:- ALL RESISTORS 1/4 W UNLESS OTHERWISE SHOWN

SWITCH POSITIONS:-
1. RADIO-LOW TONE
2. RADIO-HIGH TONE
3. PHONO-HIGH TONE
4. PHONO-LOW TONE

FOLLOW THIS SCHEMATIC DIAGRAM ABOVE THE SERIAL NUMBER 13000

# HOWARD RADIO CO.


6SK7
6SA7
6SK7
6SQ7
6V6
5Y3
1ST. I.F.
LI-0014
DIODE I.F.
LI-0015
TONE CONTROL
MED
68K^
LOW
.008MFD
HIGH
.01 MFD
470K^
.002 MFD 600V
SK-0004
VOICE COIL
TO-0006
330^
220K^
300 MMF
10MEG^
VOL. CONT. 500K^
.01 MFD
PHONO
PHONO. RADIO SW.
100MMF
47K^
100 MMF
75 MMF
75 MMF
2.2 MEG^
.05MFD
15K^ 2W
200 MMF
200 MMF
470^
.05 MFD
LR-0002
500MMF
5MMF
IMEG
LR-0001
5-25 MMF
22K^
50 MMF
LO-0014
.IMFD
10K^
IMEG.^
*300MMF
470^
.05 MFD
LA-0007
LOOP ANTENNA AN-0005
2,200^
TO OUTSIDE ANTENNA
OFF-ON SWITCH
TO 117V-60~ A.C.
.05 MFD. 600V
TP-0003
.1MFD 600V
TO 6.3V FILAMENTS
2^ 1WATT W.W.
6V #44
DIAL LAMPS
LC-0010
500^
2,200^ 2W
30MFD. 450V
20MFD 450V
25MFD 25V

TUBES:
- 6SK7 RF Amp.
- 6SA7 Mixer & Oscillator
- 6SK7 IF Amp.
- 6SQ7 Diode Det. & 1st AF.
- 6U6 Output
- 5Y3 Rectifier

I.F. 455KC

PHONO.-RADIO SWITCH
SHOWN IN RADIO POSITION.

| HOWARD RADIO CO. | | |
|---|---|---|
| MODEL 906 | | |
| SD-0005 | | |
| DR'N. BY | CH'K'D. BY | APP'D. BY |
| K. O. | | |

BEAM POWER OUTPUT:
Undistorted output over 3 watts. Maximum output 4-1/2 watts.

SPEAKER:
Rubber floated 6x9 inch HOWARD P.M., using large Alnico No. 5 core.

## MODEL 906
## MODEL 906C

# HOWARD RADIO CO.

### SOCKET VOLTAGE READINGS - 906 AND 906C

Voltage reading taken from ground with voltage at line set at 110 volts A.C. These readings were taken with a vacuum tube voltmeter of the VoltOhmyst type.

| TUBE | FUNCTION | CATH. | | SC. | | PLATE | | B+ | |
|---|---|---|---|---|---|---|---|---|---|
| 6SK7 | R.F . . . . | 1.8 | * 5 | 79. | * 6 | 210. | * 8 | | * |
| 6SA7 | Converter . | | | 79. | 4 | 230. | 3 | | |
| 6SK7 | 1st. I.F. . | 2.3 | 5 | 79. | 6 | 240. | 8 | | |
| 6SQ7 | Det. & 1st. Audio. . . | | | | | 115. | 6 | | |
| 6V6 | Output. . . | 11. | 8 | 235. | 4 | 225. | 3 | | |
| 5Y3 | Rectifier . | | | | | | | 285 | 8 |

* Socket Terminal Number.

Voltage drop across filter choke 10 volts.

### PARTS LIST - 906

#### CONTROLS

| | |
|---|---|
| VC-0005 | Volume Control with Switch |
| | or |
| VC-0006 | Volume Control with Switch |

#### CONDENSERS

| | |
|---|---|
| AC-0004 | Tuning Gang with Gears and Drive Hub. |
| CE-0009 | Capacitor - Electrolytic 30-20-20 mfd. 450 volts or the following 3 capacitors. |
| CE-0005 | Capacitor - 25 mfd. 25 volts. |
| CE-0011 | Capacitor - 30 mfd. 450 volts. |
| CE-0012 | Capacitor - 20 mfd. 450 volts. |

#### COILS

| | |
|---|---|
| AN-0005 | Loop Antenna |
| LA-0007 | Loop Load Coil |
| LI-0014 | 1st IF Transformer in can |
| LI-0015 | 2nd IF Transformer in can |
| LO-0014 | Oscillator Coil |
| LR-0001 | Wave Trap 455 KC |
| LR-0002 | Untuned RF Coil |

#### DIAL AND CONTROL ACCESSORIES

| | |
|---|---|
| AS-0213 | Tuning Shaft Assembly |
| AS-0217 | Dial Pointer Assembly |
| AR-0019 | Dial Light Bracket Assembly - Right Side |
| AR-0024 | Dial Light Bracket Assembly - Left Side |
| ES-0001 | Dial covering - Plastic escutcheon for cabinet |
| SP-0010 | Dial Drive Spring |
| DC-0001 | Dial Drive Cord 52" long |
| PR-0062 | Dial Glass Snaps |
| GR-0001 | Rubber Grommets for Tuning Gang and Speaker Mounting |
| DG-0004 | Calibrated Lucite Dial |
| LS-0002 | #44 Blue Bead Pilot Lamp |

#### KNOBS

| | |
|---|---|
| AR-0025 | Thumb Wheel Assembly (Tone Control) |
| AR-0026 | Thumb Wheel Assembly (Radio Phono) |
| KB-0015-1 | Knobs Brown Bakelite |

#### SPEAKER

| | |
|---|---|
| SK-0004 | Speaker 9" Elliptical PM Table Model |

#### TRANSFORMERS

| | |
|---|---|
| TO-0006 | Speaker Output Transformer |
| TP-0003 | Power Transformer - 60 cycle 110 volt |
| LC-0010 | Power Choke (500 ohm D.C.) |

#### TUBE COMPLEMENT

| | |
|---|---|
| TU-5Y3 | Tube |
| TU-6SK7 | Tubes (2 used) |
| TU-6SA7 | Tube |
| TU-6SQ7 | Tube |
| TU-6V6 | Tube |

#### SOCKETS

| | |
|---|---|
| SO-0010 | Phono Socket |
| SO-0017 | Tube Socket |
| TB-0007 | Terminal Strip, External Antenna |

#### SWITCHES

| | |
|---|---|
| SW-0009 | Radio Phono Switch D.P.D.T. |
| SW-0010 | Tone Switch - 3 position |

#### CABINET

| | |
|---|---|
| CW-0008 | Cabinet complete |
| AS-0240 | Metal Grill Assembly (1 used) |
| BC-0003 | Wood Baffle used with above item |
| | or |
| MO-0026 | Plastic Grill (2 used) |

#### LINE CORD

| | |
|---|---|
| CA-0038 | Line Cord - 6 ft and Moulded Plug |

### ALIGNMENT CHART-MODELS 906 AND 906C

Set controls at indicated positions before following alignment chart.

Tone switch high
Volume control on full
Set dial between stations
Radio phono control at radio

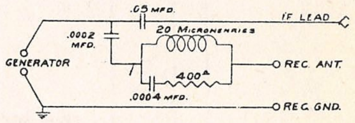
| DUMMY ANTENNA | SIG. GEN. CONNECTION TO | GEN. FREQ. | BAND POSITION | DIAL SETTING | ORDER OF TRIMMER ADJUSTMENTS | TRIMMER FUNCTION | SEE NOTE |
|---|---|---|---|---|---|---|---|
| .05 Mfd. | Grid of 6SA7 | 455 KC | BC | Off Station | ①②③④ | I.F. Peak to Max. Output | A |
| .05 Mfd. | Ant. | 455 KC | BC | Off Station | ⑤ | Null | B |
| 400 Ohn. Resistor | "A" Ant. Post | 1400 KC | BC | 1400 KC | ⑥⑦ | BC Osc. and RF | C |

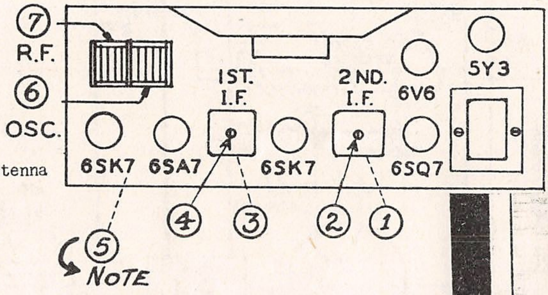
NOTE A. The I.F. adjustments are iron core slug tuning and it should not be necessary to move them very far in either direction from the factory setting, since they are of a very stable nature.

NOTE B. Important. Connect the signal generator to the antenna screw on the outside of the radio chassis and keep the metal of the chassis between the generator lead and the wave trap coil. Use your signal generator in a turned up powerful position and adjust the wave trap trimmer to null.

NOTE C. Set dial at 1400 KC. Adjust oscillator and R.F. trimmer for maximum sensitivity.

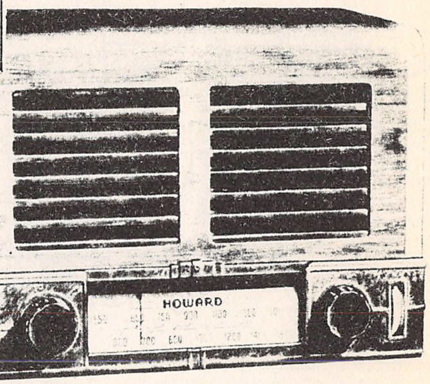
RECOMMENDED DUMMY ANTENNA. Although the values as shown in above table for antenna load may be satisfactory, we urgently recommend the circuit as shown at the right to properly take care of the various frequencies to accomplish the correct alignment.





TUBE LAYOUT

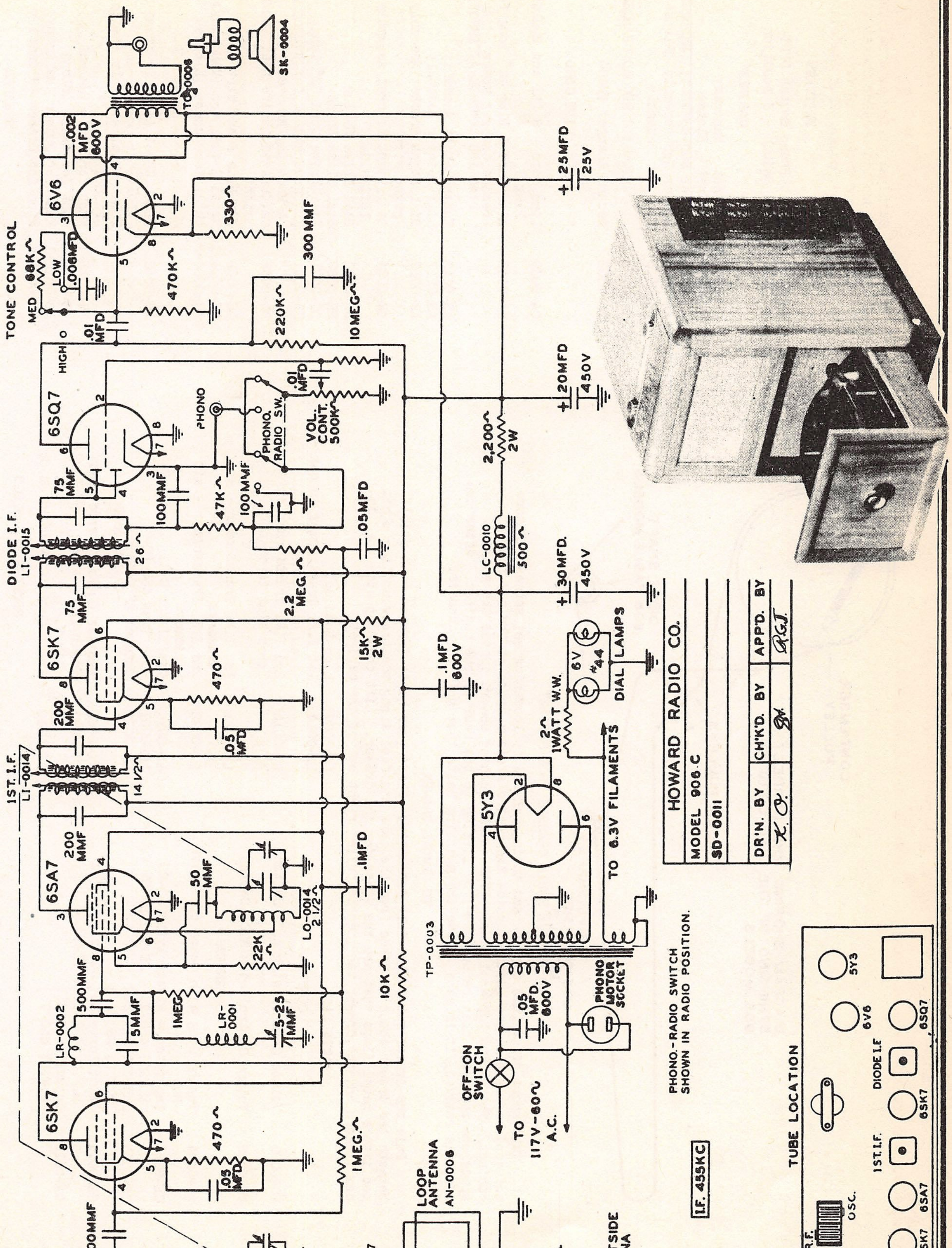
Wave Trap adjustment is located beneath chassis at this point. Adjustments 1 & 3 also beneath chassis.



MODEL 906

MODEL 906C

## HOWARD RADIO CO.


6SK7
6SA7
6SK7
6SQ7
6V6
5Y3
300MMF
470Ω
.05 MFD
1MEG.Ω
LR-0002
500MMF
5MMF
1MEG
LR-0001
5-25 MMF
22K Ω
50 MMF
LO-0014 2 1/2Ω
.1MFD
10KΩ
200 MMF
1ST. I.F. LI-0014
14 1/2Ω
15KΩ 2W
2.2 MEG Ω
.1MFD 600V
DIODE I.F. LI-0015
26Ω
75 MMF
100MMF
47KΩ
100MMF
.05MFD
PHONO
PHONO RADIO SW.
VOL. CONT. 500KΩ
.01 MFD
TONE CONTROL
MED
LOW
HIGH
68KΩ
.006MFD
.01 MFD
470KΩ
220KΩ
300 MMF
10MEG.Ω
330Ω
.002 MFD 600V
TO-0006
SK-0004
25MFD 25V
20MFD 450V
2,200Ω 2W
LC-0010 500Ω
30MFD. 450V
6V #44
DIAL LAMPS
2Ω 1WATT W.W.
TO 6.3V FILAMENTS
TP-0003
.05 MFD. 600V
PHONO MOTOR SOCKET
OFF-ON SWITCH
TO 117V-60~ A.C.
LOOP ANTENNA AN-0006
LA-0007 2.2Ω
2,200Ω
TO OUTSIDE ANTENNA
PHONO-RADIO SWITCH SHOWN IN RADIO POSITION.
I.F. 455KC
HOWARD RADIO CO.
MODEL 906.C
SD-0011
DR'N. BY
CH'K'D. BY
APP'D. BY
K.O.
RGT
TUBE LOCATION
R.F.
OSC.
1ST.I.F.
DIODE I.F
6SK7
6SA7
6SK7
6V6
6SQ7
5Y3

MODEL 906C

# HOWARD RADIO CO.

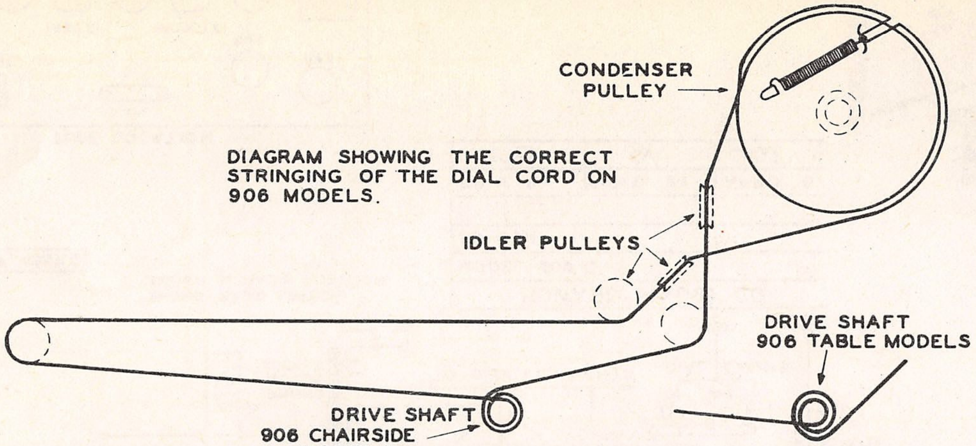

CONDENSER PULLEY
IDLER PULLEYS
DRIVE SHAFT 906 TABLE MODELS
DRIVE SHAFT 906 CHAIRSIDE MODELS

DIAGRAM SHOWING THE CORRECT STRINGING OF THE DIAL CORD ON 906 MODELS.

### TO REMOVE RADIO CHASSIS FROM CABINET

Take knobs off volume control and tuning control by loosening set screws. Remove the wood screws that are located inside the record storage space at the top rear of cabinet. The entire top wood panel lifts out by pushing upward inside the storage space one inch, and then remove panel by lifting to the rear of the cabinet. After the panel is removed, it is easy to see the mounting bolts that hold the chassis.

### TO REMOVE DRAWER

Pull the drawer out to its full extremity. Place your hands (one on each side) beneath the drawer about 3 inches from the back and feel along the track until you hit two little metal flaps that are the stops for the drawer. Lift these up with your index fingers and the drawer can then be pulled right out of the cabinet.

## PARTS LIST

### CONTROLS

| | |
|---|---|
| VC-0005 | Volume Control with A.C. Switch |
| | or |
| VC-0006 | Volume Control with A.C. Switch |

### CONDENSERS

| | | |
|---|---|---|
| AC-0004 | Tuning Gang with Gears and Drive Hub | |
| CE-0009 | Capacitor - Electrolytic 30-20 M.F.D. 450 V. - 25 M.F.D. 25 V. | |
| CE-0005 | Capacitor - 25 M.F.D. 25 V. | Substitute for CE-0009 |
| CE-0011 | Capacitor - 30 M.F.D. 450 V. | |
| CE-0012 | Capacitor - 20 M.F.D. 450 V. | |

### COILS

| | |
|---|---|
| AN-0006 | Loop Antenna (low impedance) |
| LA-0007 | Loop Load Coil |
| LI-0014 | 1st I.F. Transformer in can - iron slug tuned |
| LI-0015 | 2nd I.F. Transformer in can - iron slug tuned |
| | or |
| LI-0021 | 1st I.F. Transformer - air trimmers |
| LI-0022 | 2nd I.F. Transformer - air trimmers |
| LO-0014 | Oscillator Coil |
| LR-0001 | Wave Trap 455 KC |
| LR-0002 | Untuned RF Coil |

### TRANSFORMERS

| | |
|---|---|
| TO-0006 | Speaker Output Transformer |
| TP-0003 | Power Transformer - 60 cycle 110 V. |
| LC-0010 | Power Choke - 500 Ohm. D.C. |

### SOCKETS AND PLUGS

| | |
|---|---|
| SO-0017 | Tube Socket |
| TB-0007 | Terminal Strip, external antenna |
| SO-0010 | Phono and Speaker Socket (female) |
| SO-0012 | Power Socket 110 V. |
| TL-0005 | Phono Speaker Plug (male) |

### SWITCHES

| | |
|---|---|
| SW-0009 | Radio Phono Switch DPDT |
| SW-0010 | Tone Switch - 3 position |

### CABINET

| | |
|---|---|
| CW-0009-1 | Cabinet - Mahogany |
| CW-0009-2 | Cabinet - Blonde |
| AA-0008-1 | Drawer Sub-assembly (Mahogany) |
| AA-0008-2 | Drawer Sub-assembly (Blonde) |
| AW-0015 | Carriage Assembly |

### AUTOMATIC RECORD CHANGER

| | |
|---|---|
| PH-0003 | Record Changer VM400 |

### LINE CORD

| | |
|---|---|
| CA-0039 | Line Cord - 8 ft. and Moulded Plug |
| CA-0043 | Line Cord & Plug 42" long for record changer motor |

### DIAL AND CONTROL ACCESSORIES

| | |
|---|---|
| AS-0213 | Tuning Shaft Assembly |
| AS-0217 | Dial Pointer Assembly |
| AR-0019 | Dial Light Bracket Assembly - right side |
| AR-0024 | Dial Light Bracket Assembly - left side |
| SP-0010 | Dial Drive Spring |
| PR-0062 | Dial Glass Snaps |
| DC-0001 | Dial Drive Cord 52" long |
| GR-0001 | Rubber Grommets for tuning gang & Mounting Bracket |
| DG-0008 | Calibrated Lucite Dial 550 KC at right |
| LS-0002 | #44 Blue Bead Pilot Lamp |
| ES-0004-1 | Metal Escutcheon (Mahogany) |
| ES-0004-2 | Metal Escutcheon (Blonde) |

### KNOBS

| | |
|---|---|
| AR-0042 | Thumb Wheel Assembly (Tone Control) |
| AR-0043 | Thumb Wheel Assembly (Radio Phono) |
| KB-0015-1 | Knob for Radio (Walnut) |
| KB-0015-3 | Knob for Radio (Blonde) |
| KB-0014-1 | Knob for Drawer (Mahogany) |
| KB-0014-2 | Knob for Drawer (Blonde) |

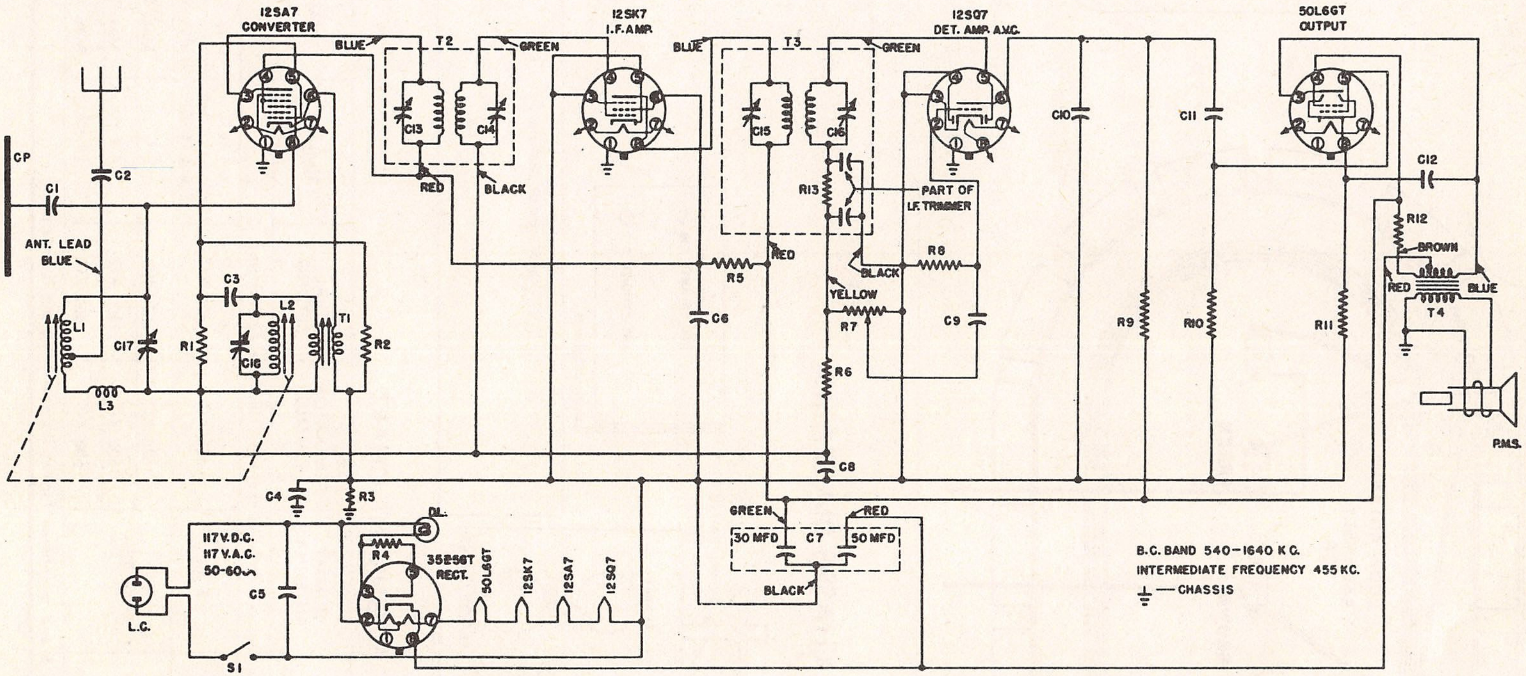
### SPEAKER

| | |
|---|---|
| SK-0004 | Speaker 9" Elliptical P.M. |

MODELS 565,565BL,566,
567,568

# LEAR, INC.

JULY 1, 1946


12SA7
CONVERTER
12SK7
I.F. AMP.
12SQ7
DET. AMP. A.V.C.
50L6GT
OUTPUT
CP
C1
C2
ANT. LEAD
BLUE
L1
L3
C17
C3
R1
L2
C16
T1
R2
BLUE
T2
GREEN
C13
C14
RED
BLACK
BLUE
T3
GREEN
C15
C16
R13
PART OF
I.F. TRIMMER
R5
RED
C6
BLACK
YELLOW
R7
R8
C9
R6
C8
C10
C11
R9
R10
R11
C12
R12
BROWN
RED
BLUE
T4
P.M.S.
C4
R3
D.L.
117 V.D.C.
117 V.A.C.
50-60∿
L.C.
C5
S1
R4
35Z5GT
RECT.
50L6GT
12SK7
12SA7
12SQ7
GREEN
RED
30 MFD
C7
50 MFD
BLACK

B.C. BAND 540-1640 K.C.
INTERMEDIATE FREQUENCY 455 KC.
⏚ — CHASSIS

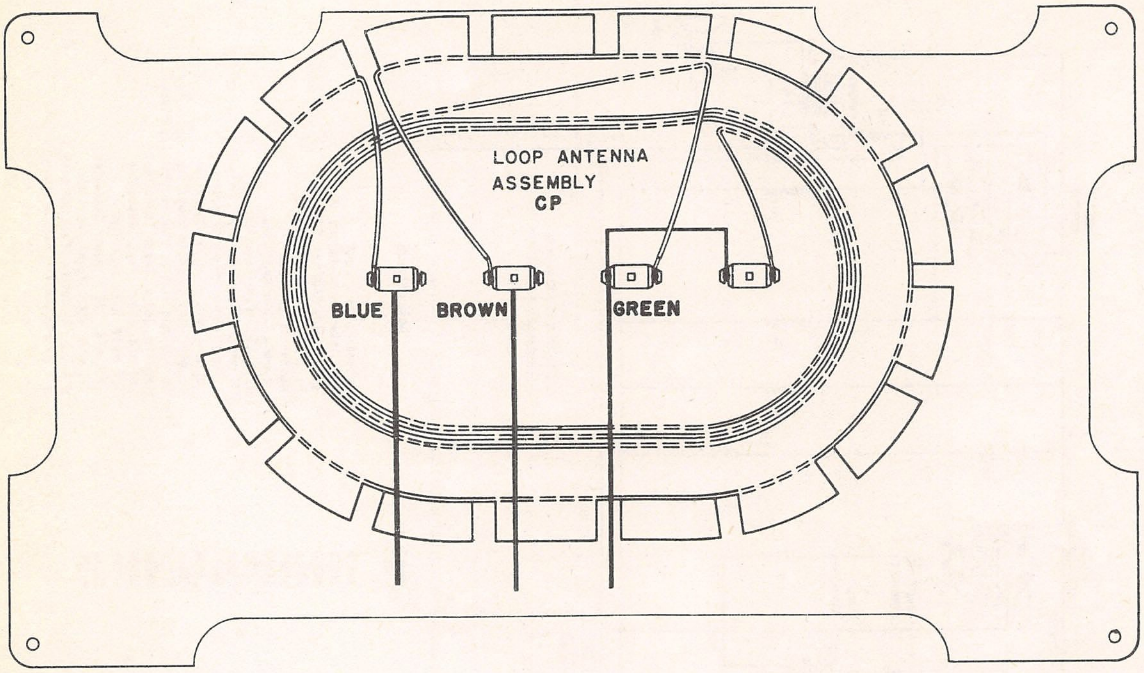
| DWG. SYM. | PART NO. | DESCRIPTION |
|---|---|---|
| R1 | 55496 | 15 meg. ½ w. carbon resistor |
| R2 | 55479 | 22,000 ohm ½ w. carbon resistor |
| R3 | 55485 | 220,000 ohm ½ w. carbon resistor |
| R4 | 55460 | 15 ohm ½ w. carbon resistor |
| R5 | 55475 | 4,700 ohm ½ w, carbon resistor |
| R6 | 55491 | 2.2 meg. ½ w. carbon resistor |
| R7,S1 | 56340 | 500,000 ohm vol. control & line sw. |
| R8 | 55491 | 2.2 meg. ½ w. carbon resistor |
| R9 | 55487 | 470,000 ohm ½ w. carbon resistor |
| R10 | 55487 | 470,000 ohm ½ w. carbon resistor |
| R11 | 55466 | 150 ohm ½ w. carbon resistor |
| R12 | 55674 | 1,200 ohm 1 w. carbon resistor |
| R13 | 55481 | 47,000 ohm ½ w. carbon resistor |
| L1,L2 | | |
| C17,C18 | 54284 | Slug tuner & pully assy. |
| L3 | 53385 | Antenna loading coil |
| L.C. | 53091 | Line cord |
| D.L. | 70535 | Dial light, type 47 |
| P.M.S. | 53450 | 5" Permanent magnet speaker |

| DWG. SYM. | PART NO. | DESCRIPTION |
|---|---|---|
| CP | 52570 | Antenna Assy. LOOP |
| T1 | 54282 | Oscillator Transformer Assy. |
| T2 | 53350 | #1 I.F. Transformer Assy. |
| T3 | 53361 | #2 I.F. Transformer Assy. |
| T4 | 52531 | Output Transformer |
| C1 | 56053 | 22 mmfd. Mica Capacitor |
| C2 | 56053 | 22 mmfd. Mica Capacitor |
| C3 | 56055 | 47 mmfd. Mica Capacitor |
| C4 | 56631 | .1 mfd. 400 v. Paper Capacitor |
| C5 | 56656 | .05 mfd. 600 v. Paper Capacitor |
| C6 | 56631 | .1 mfd.. 400 v. Paper Capacitor |
| C7 | 52326 | 50 - 30 mfd. 150 v. Electrolytic Capacitor |
| C8 | 56600 | .05 mfd 200 v. Paper Capacitor |
| C9 | 56596 | .02 mfd. 200 v. Paper Capacitor |
| C10 | 56059 | 220 mmfd. Mica Capacitor |
| C11 | 56589 | .004 mfd. 200 v. Paper Capacitor |
| C12 | 56628 | .05 mfd. 400v. Paper Capacitor |
| C13,C14 | | # 1 I.F. Trimmers (Part of assy.) |
| C15,C16 | | # 2 I.F. Trimmers (Part of assy.) |

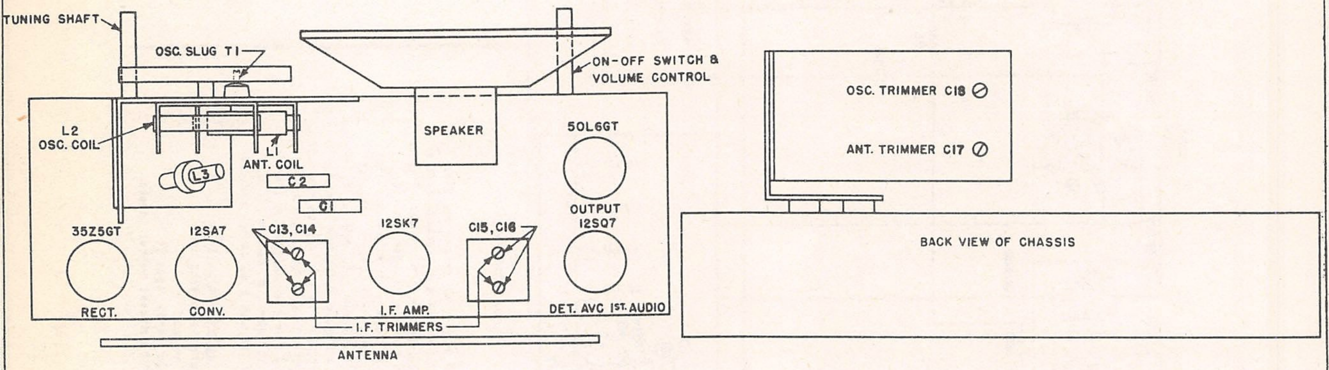
MODELS 565,565BL,566,
567,568

LEAR, INC.

## LOOP WIRING DIAGRAM


LOOP ANTENNA
ASSEMBLY
CP
BLUE
BROWN
GREEN

## CHASSIS DIAGRAMS


TUNING SHAFT
OSC. SLUG T1
ON-OFF SWITCH & VOLUME CONTROL
L2 OSC. COIL
L1 ANT. COIL
L3
SPEAKER
50L6GT
C2
C1
OUTPUT 12SQ7
35Z5GT
12SA7
C13, C14
12SK7
C15, C16
RECT.
CONV.
I.F. AMP.
DET. AVC 1ST AUDIO
I.F. TRIMMERS
ANTENNA
OSC. TRIMMER C18
ANT. TRIMMER C17
BACK VIEW OF CHASSIS

## ALIGNMENT CHART

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | DIAL SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | Set dial pointer at 1620 KC with tuning unit drive turned fully clockwise against stop. | | | | | | |
| 2 | 2nd IF | Pin No. 8 of 12SA7 and B– | .05 mf. | 455 KC | 1620 KC | C15.16 | Max. Output |
| 3 | 1st IF | | | | | C13.14 | Max. Output |
| 4 | Osc. Trim | Antenna lead (blue wire) and B– | 200 mmf. | 1620 KC | 1620 KC | C18 | Max. Output |
| 5 | Ant. Trim | | | 1500 KC | 1500 KC | C17 | Max. Output |
| 6 | Osc. Slug | | | 600 KC | 600 KC | T1 | Max. Output* |
| 7 | Repeat adjustments in operations 5 and 6 until no further increase in output is obtained. | | | | | | |

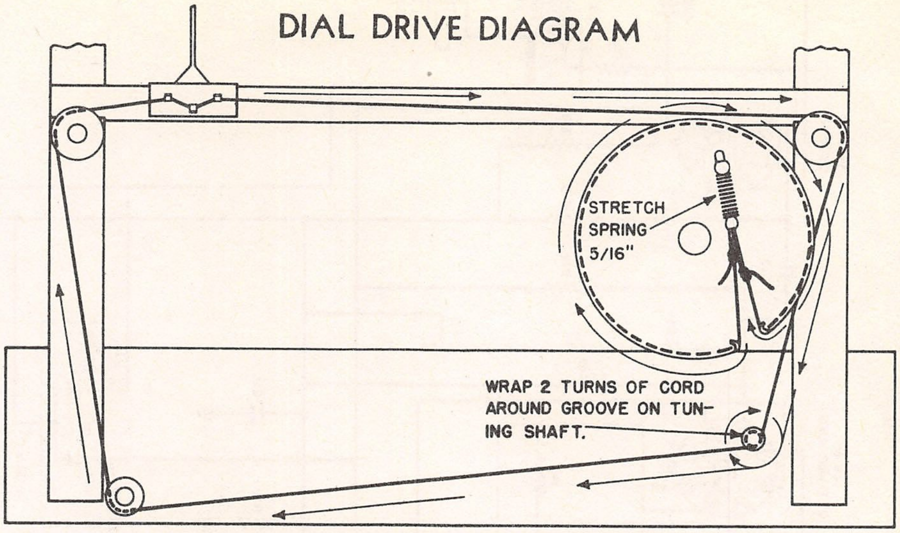
* Rock dial tuner slightly while adjusting

Notes: Connect output meter to voice coil circuit.
Volume control on full for all adjustments.
Signal generator gain control at minimum for satisfactory output meter reading.

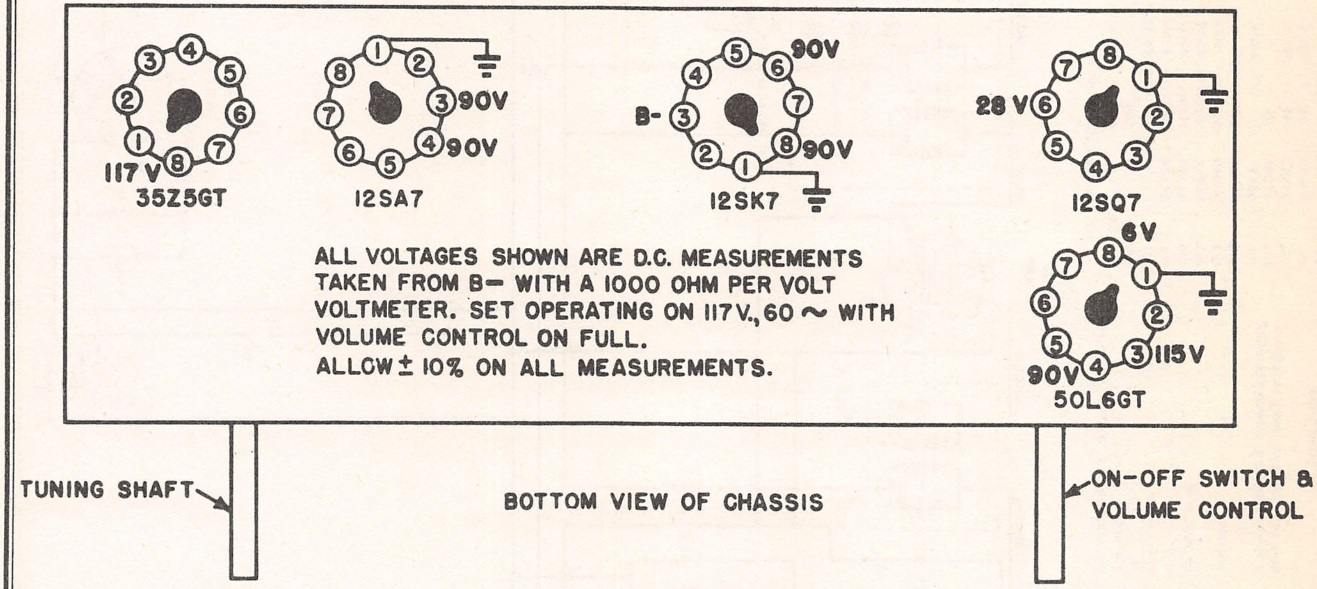
MODELS 565,565BL,566,
567,568

# LEAR, INC.

## DIAL DRIVE DIAGRAM


STRETCH
SPRING
5/16"
WRAP 2 TURNS OF CORD
AROUND GROOVE ON TUNING SHAFT.

FRONT VIEW


117 V
35Z5GT
90V
90V
12SA7
B-
90V
90V
12SK7
28 V
12SQ7
6V
115V
90V
50L6GT
TUNING SHAFT
ON-OFF SWITCH &
VOLUME CONTROL

ALL VOLTAGES SHOWN ARE D.C. MEASUREMENTS TAKEN FROM B– WITH A 1000 OHM PER VOLT VOLTMETER. SET OPERATING ON 117V., 60 ~ WITH VOLUME CONTROL ON FULL.
ALLOW ± 10% ON ALL MEASUREMENTS.

BOTTOM VIEW OF CHASSIS

## VOLTAGE CHART

Line voltage: 117 volts, 60 cycles (AC)     Position of volume control: On full (with no signal)

| TUBE | FUNCTION | Voltage of each socket prong to B– (Prong No. 3 of 12SK7) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 |
| 12SA7 | Oscillator – Converter | 0 | – | 90 | 90 | 0 | 0 | – | 0 |
| 12SK7 | I-F Amplifier | 0 | – | 0 | 0 | 0 | 90 | – | 90 |
| 12SQ7 | Detector – AVC – 1st. Audio | 0 | 0 | 0 | 0 | 0 | 28 | – | – |
| 50L6 | Beam Power Amplifier | 0 | | 115 | 90 | 0 | 0 | – | 6 |
| 35Z5 | Rectifier | – | – | – | – | 110 AC | – | – | 117 |

Notes: Voltage readings are for schematic diagram in this bulletin. Allow 10% ± on all measurements.
Always use meter scale which will give greatest deflection within scale limits.
All DC measurements made with 1000 ohms per volt voltmeter.
Voltages are DC unless otherwise specified.
All voltages measured from prong No. 3 of 12SK7 tube socket, or B–.

## MODELS 662,663,665,6618

## LEAR, INC.

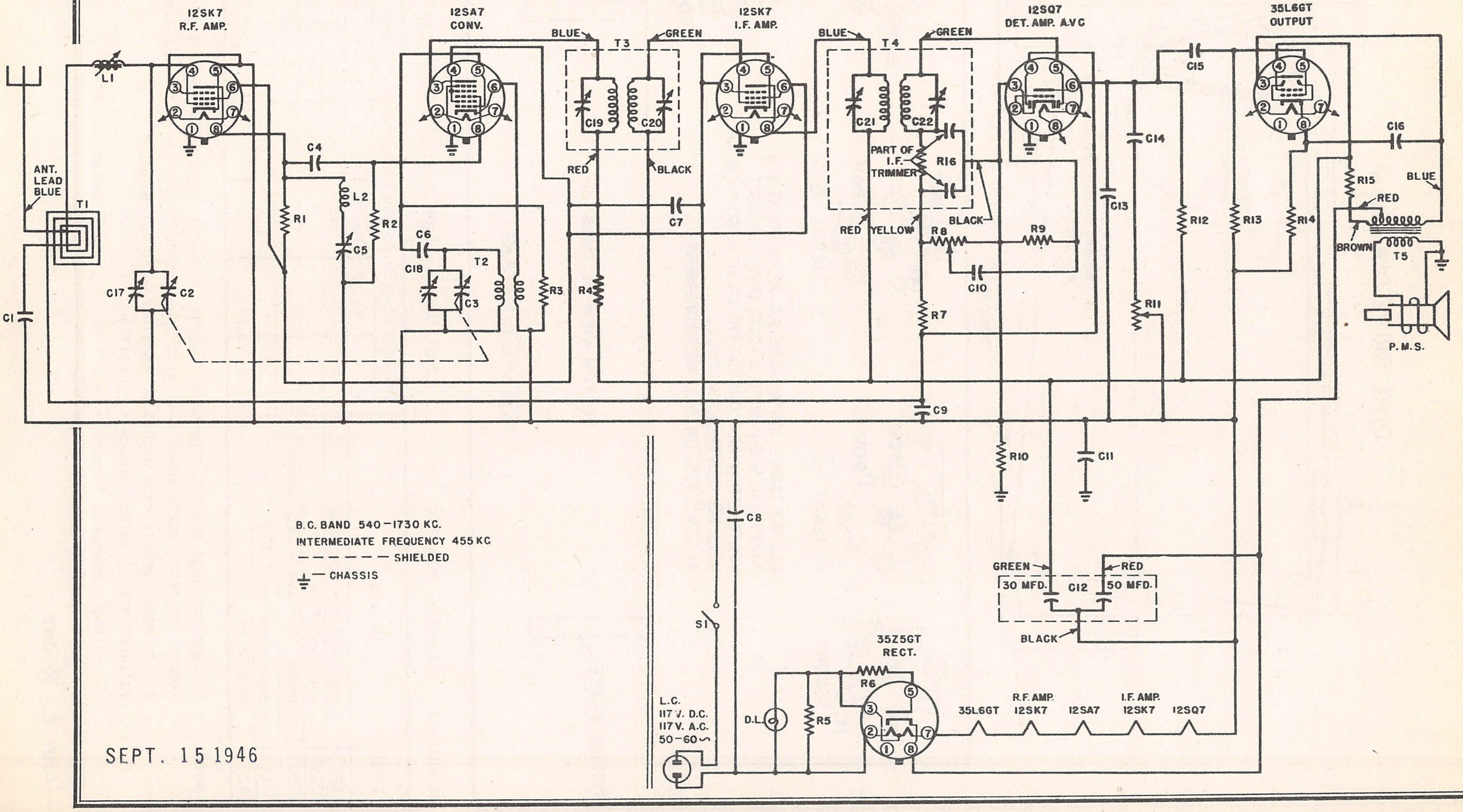
| DWG. SYM. | PART NO. | DESCRIPTION |
|---|---|---|
| T1 | 52570 | LOOP ANTENNA ASSEMBLY |
| T2 | 65015<br>ALT.-61337 | OSCILLATOR COIL " |
| T3 | 53350 | NO. 1 I.F. TRANSFORMER " |
| T4 | 53361 | " 2 " " " |
| T5 | 52531 | OUTPUT " " |
| C1 | 56585 | .001 MFD. 200V. PAPER CAPACITOR |
| C2<br>C3 | 52452<br>(ALT.)60557 | 2 GANG VARIABLE CAPACITOR & PULLEY |
| C4 | 56057 | 100 MMFD. MICA CAPACITOR |
| C5 | 52556 | WAVE TRAP TRIMMER ASSEMBLY |
| C6 | 56057 | 100 MMFD. MICA CAPACITOR |

| DWG. SYM. | PART NO. | DESCRIPTION |
|---|---|---|
| C21,C22 | | NO.2 I.F. TRIMMERS (PART OF ASS'Y.) |
| R1 | 55475 | 4,700 OHM 1/2 W. CARBON RESISTOR |
| R2 | 55485 | 220,000 " " " " |
| R3 | 55479 | 22,000 OHM " " |
| R4 | 55469 | 470 " " " " |
| R5 | 55466 | 150 " " " " |
| R6 | 55460 | 15 " " " " |
| R7 | 55491 | 2.2 MEG. " " " |
| R8, S1 | 56340 | 500,000 OHM VOL. CONTROL & LINE SW. |

| | | |
|---|---|---|
| C7 | 56605 | .2 MFD. 200V PAPER CAPACITOR |
| C8 | 56656 | .05 " 600V. " " |
| C9 | 56600 | .05 " 200V. " " |
| C10 | 56596 | .02 " " " " |
| C11 | 56631 | .1 " 400V. " " |
| C12 | 52326 | 30–50 MFD. 150V. ELECTROLYTIC |
| C13 | 56059 | 220 MMFD. MICA CAPACITOR |
| C14 | 56642 | .002 MFD. 600V. PAPER CAPACITOR |
| C15 | 56589 | .004 " 200V. " " |
| C16 | 56628 | .05 " 400V. " " |
| C17 | | ANT. TRIMMER ON VARIABLE " |
| C18 | | OSC. " " " " |
| C19,C20 | | NO. 1 I.F. TRIMMERS (PART OF ASS'Y.) |

"ALT." INDICATES ALTERNATE PART NO.

| | | |
|---|---|---|
| R9 | 55494 | 6.8 MEG. 1/2W. CARBON RESISTOR |
| R10 | 55485 | 220,000 OHM " " " |
| R11 | 56339 | 500,000 " TONE CONTROL |
| R12 | 55487 | 470,000 " 1/2W. CARBON RESISTOR |
| R13 | 55487 | 470,000 " " " " |
| R14 | 55466 | 150 " " " " |
| R15 | 55940 | 1200 " 2 W. " " |
| R16 | 55481 | 47,000 " 1/2W. " " |
| L1 | 52697 | ANT. LOAD COIL |
| L2 | 65016 | R.F. WAVE TRAP |
| L.C. | 53091 | LINE CORD |
| D.L. | 70535 | DIAL LIGHT, TYPE 47 |
| P.M.S. | 53450 | 5" PERMANENT MAGNET SPEAKER |


12SK7
R.F. AMP.
12SA7
CONV.
12SK7
I.F. AMP.
12SQ7
DET. AMP. A.V.C
35L6GT
OUTPUT
35Z5GT
RECT.
ANT. LEAD BLUE
T1
L1
C1
C17
C2
C4
L2
R1
R2
C5
C6
C18
C3
T2
R3
R4
T3
BLUE
GREEN
RED
BLACK
C19
C20
C7
T4
C21
C22
PART OF I.F. TRIMMER
R16
YELLOW
R8
R9
C10
R7
C9
C13
C14
R11
R10
C11
C15
R12
R13
R14
R15
C16
BROWN
T5
P.M.S.
C8
S1
L.C.
117V. D.C.
117V. A.C.
50–60∿
D.L.
R5
R6
30 MFD.
C12
50 MFD.
35L6GT
R.F. AMP.
12SK7
12SA7
I.F. AMP.
12SK7
12SQ7

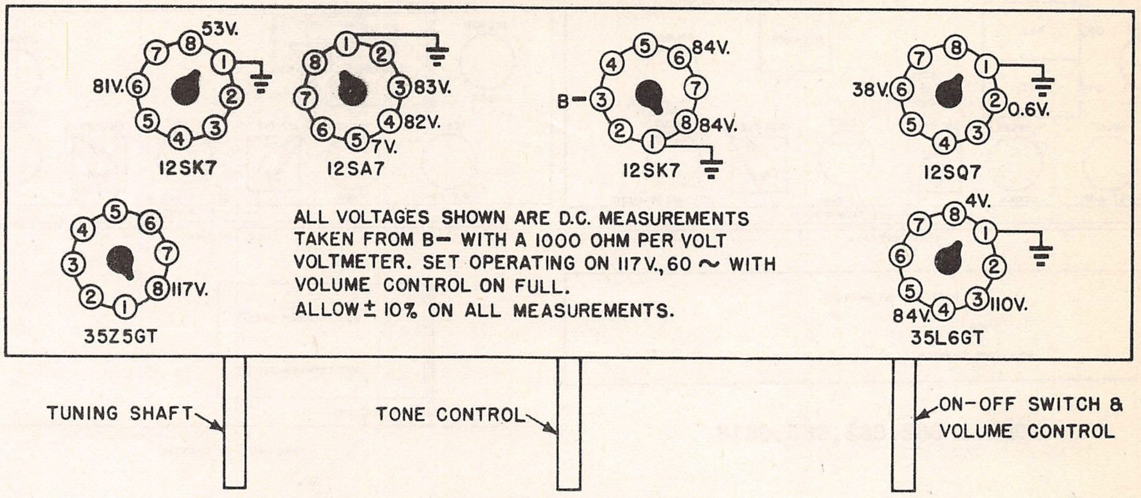
B.C. BAND 540–1730 KC.
INTERMEDIATE FREQUENCY 455 KC
– – – – – – SHIELDED
⏚ — CHASSIS

SEPT. 15 1946

# LEAR, INC.

**MODELS** 662,663,665,6618

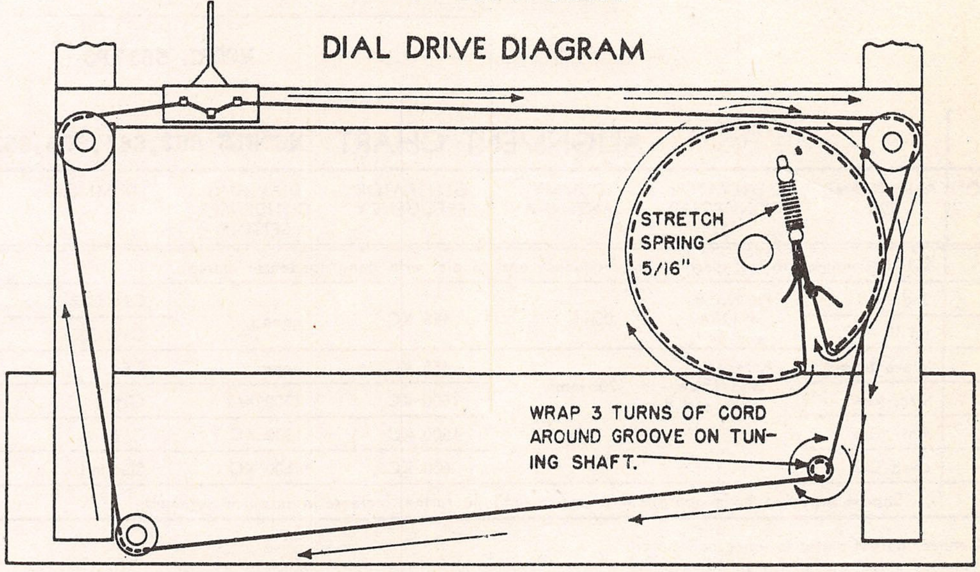
## CHASSIS VOLTAGE CHART


12SK7
53V.
81V.
12SA7
83V.
82V.
7V.
12SK7
84V.
B−
84V.
12SQ7
38V.
0.6V.
35Z5GT
117V.
35L6GT
4V.
84V.
110V.
TUNING SHAFT
TONE CONTROL
ON-OFF SWITCH & VOLUME CONTROL

ALL VOLTAGES SHOWN ARE D.C. MEASUREMENTS TAKEN FROM B− WITH A 1000 OHM PER VOLT VOLTMETER. SET OPERATING ON 117V., 60 ~ WITH VOLUME CONTROL ON FULL.
ALLOW ± 10% ON ALL MEASUREMENTS.

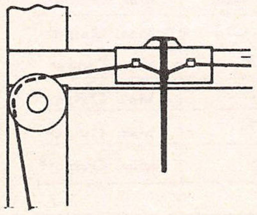
BOTTOM VIEW OF CHASSIS

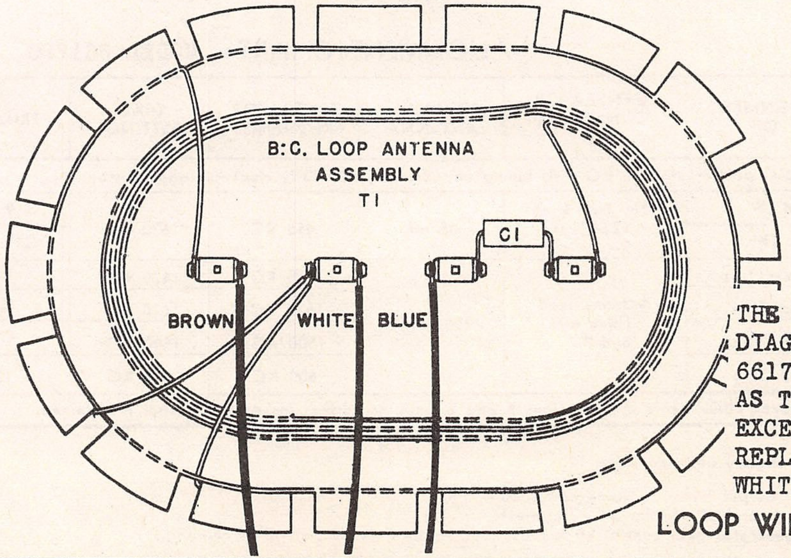
## DIAL DRIVE DIAGRAM


STRETCH SPRING 5/16"
WRAP 3 TURNS OF CORD AROUND GROOVE ON TUNING SHAFT.

FRONT VIEW

THE DIAL DRIVE DIAGRAM FOR MODEL 6617PC IS THE SAME AS THE ONE ABOVE EXCEPT FOR THIS DIFFERENCE



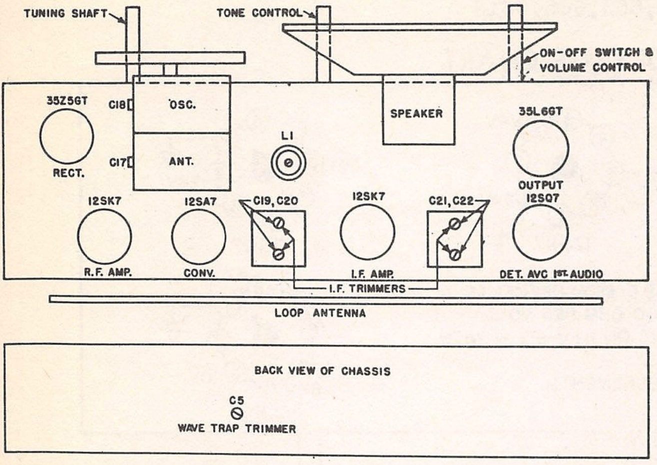

B.C. LOOP ANTENNA ASSEMBLY T1
C1
BROWN
WHITE
BLUE

THE LOOP WIRING DIAGRAM FOR MODEL 6617PC IS THE SAME AS THE ONE ON THE LEFT EXCEPT THAT BROWN IS REPLACED BY WHITE AND WHITE BY BROWN

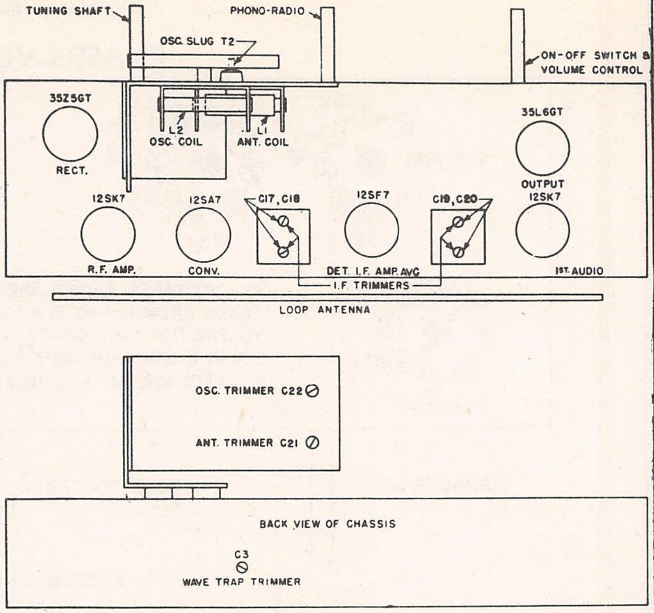
LOOP WIRING DIAGRAM

**MODELS 662,663,665,6618**
**MODEL 6617PC**

# LEAR INC.


TUNING SHAFT
TONE CONTROL
ON-OFF SWITCH & VOLUME CONTROL
35Z5GT
C18
OSC.
SPEAKER
35L6GT
L1
C17
ANT.
RECT.
OUTPUT 12SQ7
12SK7
12SA7
C19, C20
12SK7
C21, C22
R.F. AMP.
CONV.
I.F. AMP.
DET. AVC 1ST AUDIO
I.F. TRIMMERS
LOOP ANTENNA
BACK VIEW OF CHASSIS
C5
WAVE TRAP TRIMMER

**MODELS 662,663,665,6618**


TUNING SHAFT
PHONO-RADIO
OSC. SLUG T2
ON-OFF SWITCH & VOLUME CONTROL
35Z5GT
L2 OSC. COIL
L1 ANT. COIL
35L6GT
RECT.
OUTPUT 12SK7
12SK7
12SA7
C17, C18
12SF7
C19, C20
R.F. AMP.
CONV.
DET. I.F. AMP. AVC
1ST AUDIO
I.F. TRIMMERS
LOOP ANTENNA
OSC. TRIMMER C22
ANT. TRIMMER C21
BACK VIEW OF CHASSIS
C3
WAVE TRAP TRIMMER

**MODEL 6617PC**

## ALIGNMENT CHART MODELS 662,663,665,6618

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | DIAL AND CONDENSER SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | Set dial pointer to last mark at low frequency and of dial with gang condenser closed | | | | | | |
| 2 | 2nd IF | Pin No. 8 of 12SA7 and B- | .05mf. | 455 KC | open | C21, C22 | Max. Output |
| 3 | Ist IF | | | | | C19, C20 | Max. Output |
| 4 | Wave trap | Antenna lead (Blue wire) and B- | 200 mmf. | 455 KC | open | C5 | Max. Output |
| 5 | Osc. trim. | | | 1500 KC | 1500 KC | C18 | Max. Output |
| 6 | Ant. trim. | | | 1500 KC | 1500 KC | C17 | Max. Output |
| 7 | Load Coil | | | 600 KC | 600 KC | Slug in L1 | Max. Output |
| 8 | Repeat adjustments in operations 5 and 6 until no further increase in output is obtained. | | | | | | |

Notes: Connect output meter to voice coil circuit.
Volume control on full for all adjustments.
Signal generator gain control at minimum for satisfactory output meter reading.

## ALIGNMENT CHART MODEL 6617PC

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | DIAL SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | Set dial pointer at 1620 KC with tuning unit drive turned fully clockwise against stop. | | | | | | |
| 2 | 2nd IF | Pin No. 8 of 12SA7 and B– | .05 mf. | 455 KC | 1620 KC | C19, C20 | Max. Output |
| 3 | Ist IF | | | | | C17, C18 | Max. Output |
| 4 | Wave Trap | Antenna lead (blue wire) and B– | 200 mmf. | 455 KC | 1620 KC | C3 | Min. Output |
| 5 | Osc. Trim | | | 1620 KC | 1620 KC | C22 | Max. Output |
| 6 | Ant. Trim | | | 1500 KC | 1500 KC | C21 | Max. Output |
| 7 | Osc. Slug | | | 600 KC | 600 KC | T2 | Max. Output* |
| 8 | Repeat adjustments in operations 5 and 6 until no further increase in output is obtained. | | | | | | |

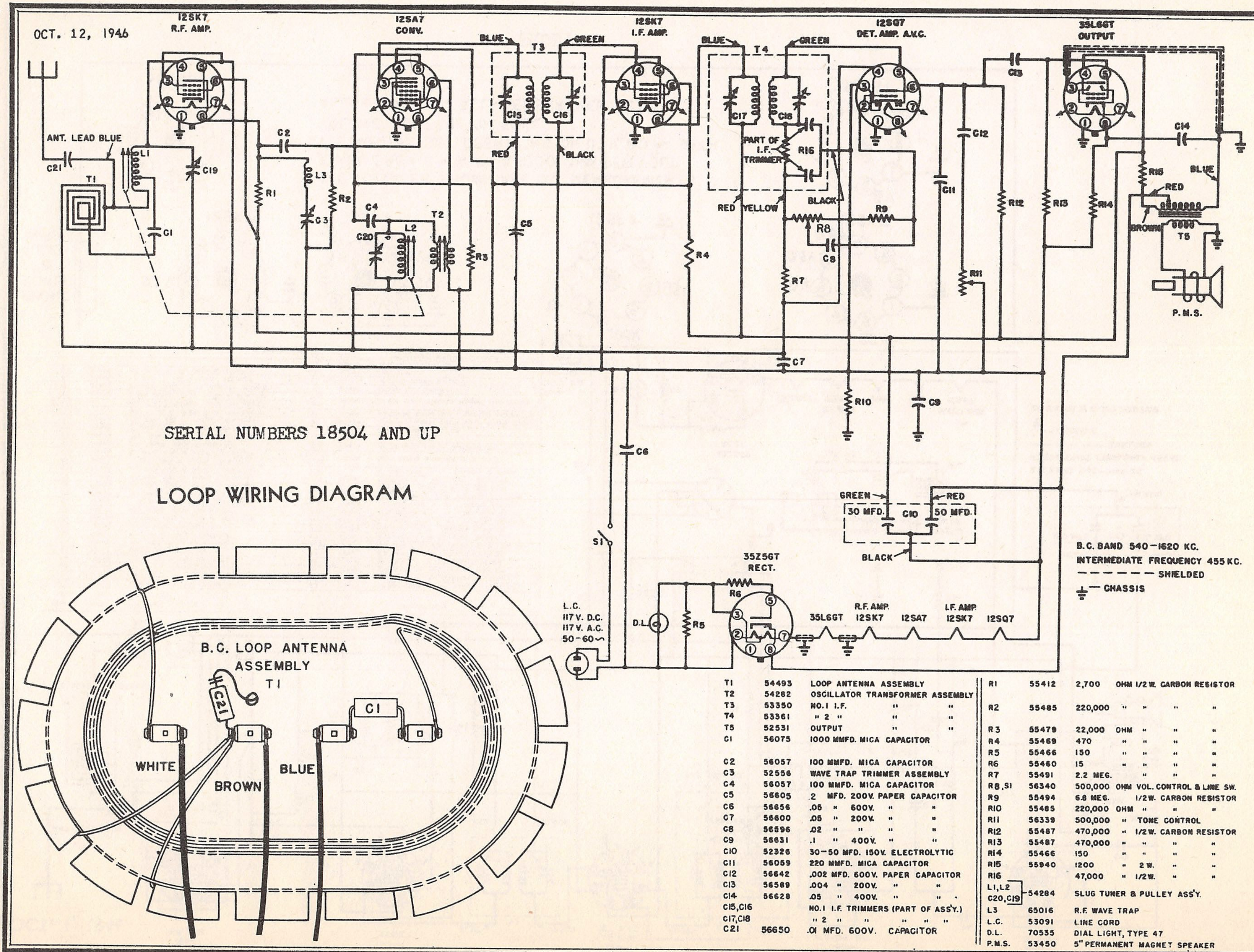
* Rock dial tuner slightly while adjusting T2.

Notes: Connect output meter to voice coil circuit.
Volume control on full for all adjustments.
Signal generator gain control at minimum for satisfactory output meter reading.

MODELS 6614,6615,6616,6619

# LEAR, INC.

OCT. 12, 1946


12SK7
R.F. AMP.
12SA7
CONV.
12SK7
I.F. AMP.
12SQ7
DET. AMP. A.V.C.
35L6GT
OUTPUT
35Z5GT
RECT.
ANT. LEAD BLUE
C21
T1
L1
C19
C1
R1
C2
L3
C3
R2
C4
C20
L2
T2
R3
C5
T3
C15
C16
BLUE
GREEN
RED
BLACK
R4
T4
C17
C18
PART OF I.F. TRIMMER
R16
YELLOW
R8
R9
C8
R7
C7
C11
C12
R11
R12
C13
R13
R14
C14
R15
T5
BROWN
P.M.S.
R10
C9
C6
S1
30 MFD.
C10
50 MFD.
L.C.
117 V. D.C.
117 V. A.C.
50-60~
D.L.
R5
R6
35L6GT
12SA7
B.C. BAND 540-1620 KC.
INTERMEDIATE FREQUENCY 455 KC.
SHIELDED
CHASSIS
B.C. LOOP ANTENNA ASSEMBLY
WHITE
BROWN
BLUE

SERIAL NUMBERS 18504 AND UP

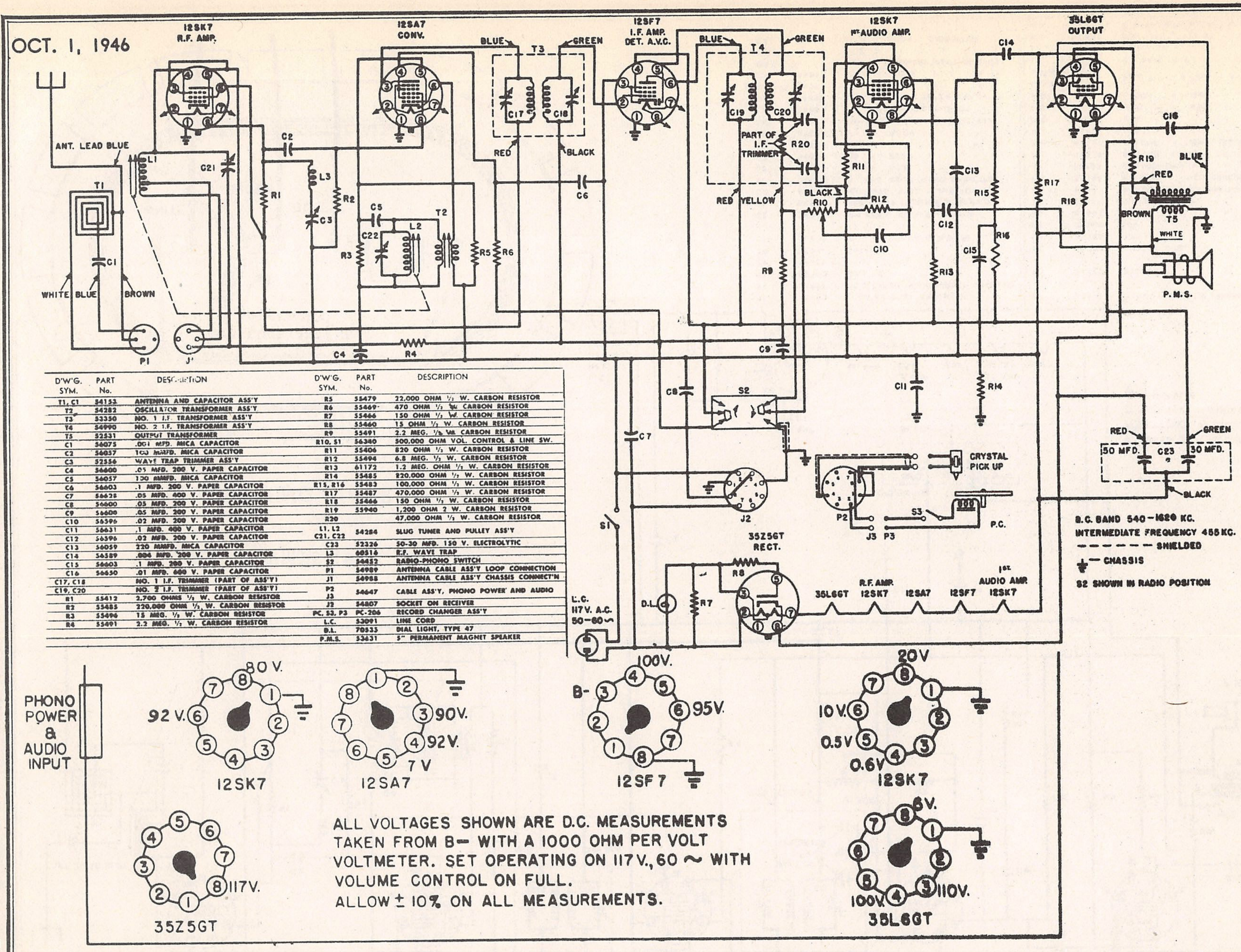
LOOP WIRING DIAGRAM

| | | |
|---|---|---|
| T1 | 54493 | LOOP ANTENNA ASSEMBLY |
| T2 | 54282 | OSCILLATOR TRANSFORMER ASSEMBLY |
| T3 | 53350 | NO.1 I.F. " " |
| T4 | 53361 | " 2 " " " |
| T5 | 52531 | OUTPUT " " |
| C1 | 56075 | 1000 MMFD. MICA CAPACITOR |
| C2 | 56057 | 100 MMFD. MICA CAPACITOR |
| C3 | 52556 | WAVE TRAP TRIMMER ASSEMBLY |
| C4 | 56057 | 100 MMFD. MICA CAPACITOR |
| C5 | 56605 | .2 MFD. 200V. PAPER CAPACITOR |
| C6 | 56656 | .05 " 600V. " " |
| C7 | 56600 | .05 " 200V. " " |
| C8 | 56596 | .02 " " " " |
| C9 | 56631 | .1 " 400V. " " |
| C10 | 52326 | 30-50 MFD. 150V. ELECTROLYTIC |
| C11 | 56059 | 220 MMFD. MICA CAPACITOR |
| C12 | 56642 | .002 MFD. 600V. PAPER CAPACITOR |
| C13 | 56589 | .004 " 200V. " " |
| C14 | 56628 | .05 " 400V. " " |
| C15,C16 | | NO.1 I.F. TRIMMERS (PART OF ASS'Y.) |
| C17,C18 | | " 2 " " " " " |
| C21 | 56650 | .01 MFD. 600V. CAPACITOR |
| R1 | 55412 | 2,700 OHM 1/2 W. CARBON RESISTOR |
| R2 | 55485 | 220,000 " " " " |
| R3 | 55479 | 22,000 OHM " " " |
| R4 | 55469 | 470 " " " " |
| R5 | 55466 | 150 " " " " |
| R6 | 55460 | 15 " " " " |
| R7 | 55491 | 2.2 MEG. " " " |
| R8,S1 | 56340 | 500,000 OHM VOL. CONTROL & LINE SW. |
| R9 | 55494 | 6.8 MEG. 1/2W. CARBON RESISTOR |
| R10 | 55485 | 220,000 OHM " " " |
| R11 | 56339 | 500,000 " TONE CONTROL |
| R12 | 55487 | 470,000 " 1/2W. CARBON RESISTOR |
| R13 | 55487 | 470,000 " " " " |
| R14 | 55466 | 150 " " " " |
| R15 | 55940 | 1200 " 2 W. " " |
| R16 | | 47,000 " 1/2W. " " |
| L1,L2<br>C20,C19 | 54284 | SLUG TUNER & PULLEY ASS'Y. |
| L3 | 65016 | R.F. WAVE TRAP |
| L.C. | 53091 | LINE CORD |
| D.L. | 70535 | DIAL LIGHT, TYPE 47 |
| P.M.S. | 53450 | 5" PERMANENT MAGNET SPEAKER |

MODEL 6617PC

# LEAR, INC.

OCT. 1, 1946


12SK7 R.F. AMP.
12SA7 CONV.
12SF7 I.F. AMP. DET. A.V.C.
12SK7 1st AUDIO AMP.
35L6GT OUTPUT
35Z5GT RECT.
ANT. LEAD BLUE
WHITE
BLUE
BROWN
GREEN
RED
BLACK
YELLOW
PART OF I.F. TRIMMER
T1
T2
T3
T4
T5
L1
L2
L3
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
P.M.S.
P1
J'
P2
J2
J3 P3
S1
S2
S3
CRYSTAL PICK UP
P.C.
50 MFD.
C23
30 MFD.
D.L.
L.C. 117V. A.C. 50-60~
35L6GT
R.F. AMP. 12SK7
12SA7
12SF7
1st AUDIO AMP. 12SK7
PHONO POWER & AUDIO INPUT
80 V.
92 V.
12SK7
90V.
92V.
7 V
12SA7
100V.
B-
95V.
12SF7
20V
10V
0.5V
0.6V
12SK7
117V.
35Z5GT
6V.
110V.
100V.
35L6GT
FRONT

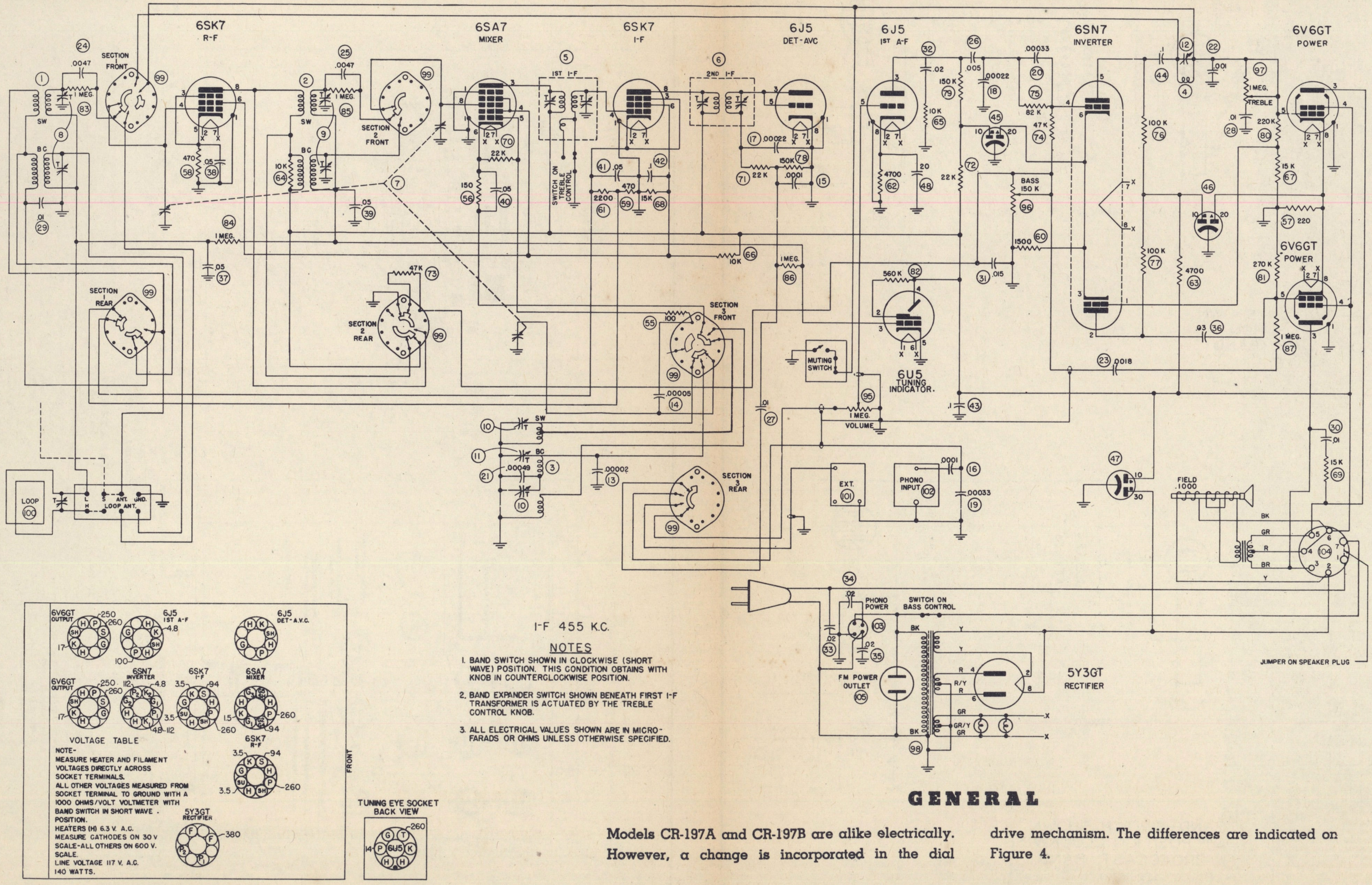
| D'W'G. SYM. | PART No. | DESCRIPTION |
|---|---|---|
| T1, C1 | 54153 | ANTENNA AND CAPACITOR ASS'Y |
| T2 | 54282 | OSCILLATOR TRANSFORMER ASS'Y |
| T3 | 53350 | NO. 1 I.F. TRANSFORMER ASS'Y |
| T4 | 54990 | NO. 2 I.F. TRANSFORMER ASS'Y |
| T5 | 52531 | OUTPUT TRANSFORMER |
| C1 | 56075 | .001 MFD. MICA CAPACITOR |
| C2 | 56057 | 100 MMFD. MICA CAPACITOR |
| C3 | 52556 | WAVE TRAP TRIMMER ASS'Y |
| C4 | 56600 | .05 MFD. 200 V. PAPER CAPACITOR |
| C5 | 56057 | 100 MMFD. MICA CAPACITOR |
| C6 | 56603 | .1 MFD. 200 V. PAPER CAPACITOR |
| C7 | 56628 | .05 MFD. 400 V. PAPER CAPACITOR |
| C8 | 56600 | .05 MFD. 200 V. PAPER CAPACITOR |
| C9 | 56600 | .05 MFD. 200 V. PAPER CAPACITOR |
| C10 | 56396 | .02 MFD. 200 V. PAPER CAPACITOR |
| C11 | 56631 | .1 MFD. 400 V. PAPER CAPACITOR |
| C12 | 56596 | .02 MFD. 200 V. PAPER CAPACITOR |
| C13 | 56059 | 220 MMFD. MICA CAPACITOR |
| C14 | 56589 | .006 MFD. 200 V. PAPER CAPACITOR |
| C15 | 56603 | .1 MFD. 200 V. PAPER CAPACITOR |
| C16 | 56650 | .01 MFD. 600 V. PAPER CAPACITOR |
| C17, C18 | | NO. 1 I.F. TRIMMER (PART OF ASS'Y) |
| C19, C20 | | NO. 2 I.F. TRIMMER (PART OF ASS'Y) |
| R1 | 55412 | 2,700 OHMS ½ W. CARBON RESISTOR |
| R2 | 55485 | 220,000 OHM ½ W. CARBON RESISTOR |
| R3 | 55496 | 15 MEG. ½ W. CARBON RESISTOR |
| R4 | 55491 | 2.2 MEG. ½ W. CARBON RESISTOR |
| R5 | 55479 | 22,000 OHM ½ W. CARBON RESISTOR |
| R6 | 55469 | 470 OHM ½ W. CARBON RESISTOR |
| R7 | 55466 | 150 OHM ½ W. CARBON RESISTOR |
| R8 | 55460 | 15 OHM ½ W. CARBON RESISTOR |
| R9 | 55491 | 2.2 MEG. ½ W. CARBON RESISTOR |
| R10, S1 | 56340 | 500,000 OHM VOL. CONTROL & LINE SW. |
| R11 | 55406 | 820 OHM ½ W. CARBON RESISTOR |
| R12 | 55494 | 6.8 MEG. ½ W. CARBON RESISTOR |
| R13 | 61172 | 1.2 MEG. OHM ½ W. CARBON RESISTOR |
| R14 | 55485 | 220,000 OHM ½ W. CARBON RESISTOR |
| R15, R16 | 55483 | 100,000 OHM ½ W. CARBON RESISTOR |
| R17 | 55487 | 470,000 OHM ½ W. CARBON RESISTOR |
| R18 | 55466 | 150 OHM ½ W. CARBON RESISTOR |
| R19 | 55940 | 1,200 OHM 2 W. CARBON RESISTOR |
| R20 | | 47,000 OHM ½ W. CARBON RESISTOR |
| L1, L2<br>C21, C22 | 54284 | SLUG TUNER AND PULLEY ASS'Y |
| C23 | 52326 | 50-30 MFD. 150 V. ELECTROLYTIC |
| L3 | 60516 | R.F. WAVE TRAP |
| S2 | 54452 | RADIO-PHONO SWITCH |
| P1 | 54989 | ANTENNA CABLE ASS'Y LOOP CONNECTION |
| J1 | 54988 | ANTENNA CABLE ASS'Y CHASSIS CONNECT'N |
| P2<br>J3 | 54647 | CABLE ASS'Y, PHONO POWER AND AUDIO |
| J2 | 54807 | SOCKET ON RECEIVER |
| PC, S3, P3 | PC-206 | RECORD CHANGER ASS'Y |
| L.C. | 53091 | LINE CORD |
| D.L. | 70535 | DIAL LIGHT, TYPE 47 |
| P.M.S. | 53631 | 5" PERMANENT MAGNET SPEAKER |

B.C. BAND 540–1620 KC.
INTERMEDIATE FREQUENCY 455 KC.
– – – – – – – SHIELDED
⏚ – CHASSIS
S2 SHOWN IN RADIO POSITION

ALL VOLTAGES SHOWN ARE D.C. MEASUREMENTS TAKEN FROM B– WITH A 1000 OHM PER VOLT VOLTMETER. SET OPERATING ON 117V., 60 ~ WITH VOLUME CONTROL ON FULL.
ALLOW ± 10% ON ALL MEASUREMENTS.

For Dial Drive and Loop, see P.16-5
For Alignment, see P.16-6

FIRST ISSUE—MARCH, 1947


6SK7
R-F
6SA7
MIXER
6SK7
I-F
6J5
DET-AVC
6J5
1ST A-F
6SN7
INVERTER
6V6GT
POWER
6V6GT
POWER
6U5
TUNING INDICATOR.
5Y3GT
RECTIFIER
SECTION 1 FRONT
SECTION 2 FRONT
SECTION 1 REAR
SECTION 2 REAR
SECTION 3 FRONT
SECTION 3 REAR
1ST I-F
2ND I-F
SWITCH ON TREBLE CONTROL
SW
BC
LOOP
LOOP ANT.
ANT.
GND.
MUTING SWITCH
1 MEG. VOLUME
EXT.
PHONO INPUT
BASS 150 K
1 MEG. TREBLE
FIELD .1000
BK
GR
R
BR
Y
PHONO POWER
SWITCH ON BASS CONTROL
FM POWER OUTLET
R/Y
GR/Y
JUMPER ON SPEAKER PLUG
TUNING EYE SOCKET BACK VIEW
6V6GT OUTPUT
6J5 1ST A-F
6J5 DET-A.V.C.
6SN7 INVERTER
6SK7 I-F
6SA7 MIXER
6SK7 R-F
5Y3GT RECTIFIER
VOLTAGE TABLE
FRONT

NOTE-
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHMS/VOLT VOLTMETER WITH BAND SWITCH IN SHORT WAVE. POSITION.
HEATERS (H) 6.3 V. A.C.
MEASURE CATHODES ON 30 V SCALE-ALL OTHERS ON 600 V. SCALE.
LINE VOLTAGE 117 V. A.C.
140 WATTS.

I-F 455 K.C.

NOTES

1. BAND SWITCH SHOWN IN CLOCKWISE (SHORT WAVE) POSITION. THIS CONDITION OBTAINS WITH KNOB IN COUNTERCLOCKWISE POSITION.
2. BAND EXPANDER SWITCH SHOWN BENEATH FIRST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB.
3. ALL ELECTRICAL VALUES SHOWN ARE IN MICRO-FARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

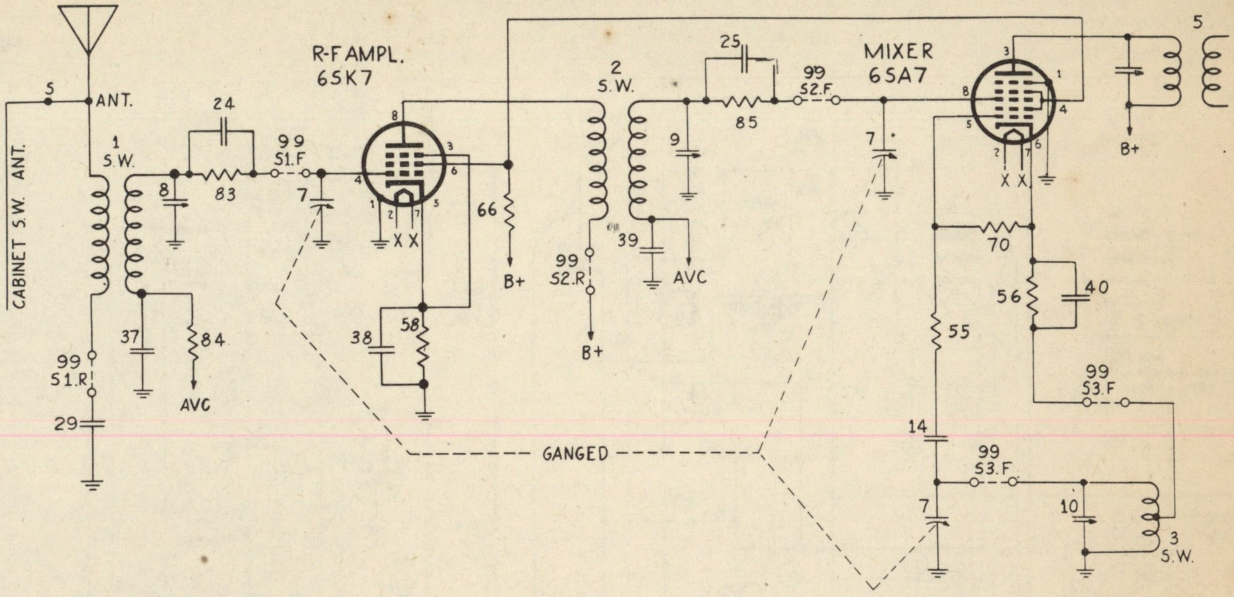
FIGURE 6

## GENERAL

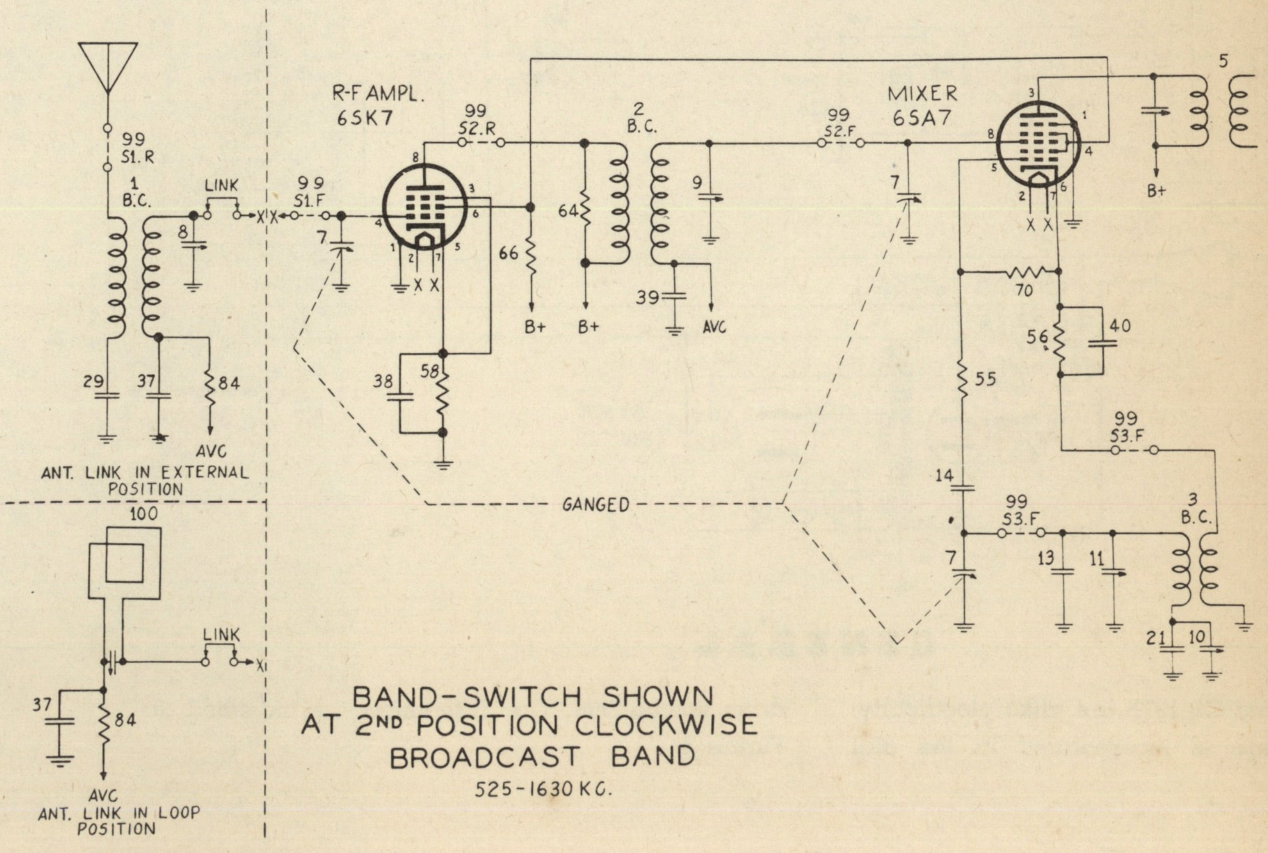
Models CR-197A and CR-197B are alike electrically. However, a change is incorporated in the dial drive mechanism. The differences are indicated on Figure 4.

THE MAGNAVOX CO.

MODELS CR-197, CR-197A, CR-197B


5
ANT.
CABINET S.W. ANT.
1
S.W.
24
8
83
99
S1.F
7
R-F AMPL.
6SK7
66
B+
99
S1.R
29
37
84
AVC
38
58
2
S.W.
99
S2.R
B+
9
39
AVC
25
85
99
S2.F
MIXER
6SA7
7
GANGED
5
B+
70
56
40
55
99
S3.F
14
99
S3.F
7
10
3
S.W.

BAND-SWITCH SHOWN
AT 1ST POSITION
SHORT WAVE BAND
4.95-18.4 MC.


99
S1.R
1
B.C.
LINK
8
X1
X
99
S1.F
7
29
37
84
AVC
ANT. LINK IN EXTERNAL POSITION
100
LINK
X1
37
84
AVC
ANT. LINK IN LOOP POSITION
R-F AMPL.
6SK7
99
S2.R
66
B+
38
58
2
B.C.
64
B+
9
39
AVC
99
S2.F
MIXER
6SA7
7
GANGED
5
B+
70
56
40
55
99
S3.F
14
99
S3.F
7
13
11
3
B.C.
21
10

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BROADCAST BAND
525-1630 KC.

THE MAGNAVOX CO.

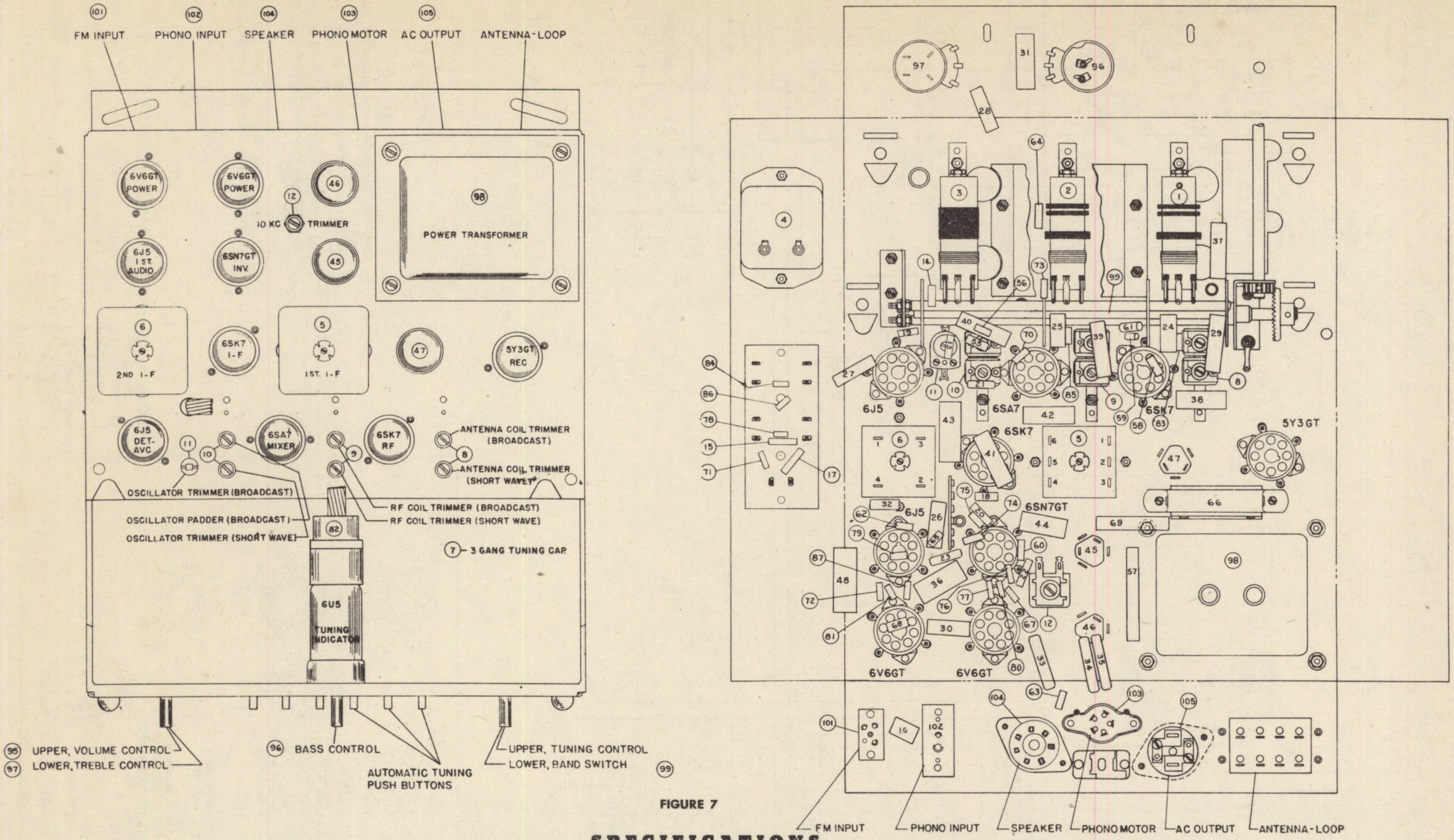

(101) FM INPUT
(102) PHONO INPUT
(104) SPEAKER
(103) PHONO MOTOR
(105) AC OUTPUT
ANTENNA-LOOP
6V6GT POWER
6V6GT POWER
46
(12) 10 KC TRIMMER
(98) POWER TRANSFORMER
6J5 1 ST. AUDIO
6SN7GT INV.
45
(6) 2ND I-F
6SK7 I-F
(5) 1ST. I-F
47
5Y3GT REC
6J5 DET-AVC
6SA7 MIXER
6SK7 RF
(11)
(10)
(9)
ANTENNA COIL TRIMMER (BROADCAST)
(8)
ANTENNA COIL TRIMMER (SHORT WAVE)
OSCILLATOR TRIMMER (BROADCAST)
RF COIL TRIMMER (BROADCAST)
RF COIL TRIMMER (SHORT WAVE)
OSCILLATOR PADDER (BROADCAST)
OSCILLATOR TRIMMER (SHORT WAVE)
(82)
(7) 3 GANG TUNING CAP.
6U5 TUNING INDICATOR
(95) UPPER, VOLUME CONTROL
(97) LOWER, TREBLE CONTROL
(96) BASS CONTROL
AUTOMATIC TUNING PUSH BUTTONS
UPPER, TUNING CONTROL
LOWER, BAND SWITCH
(99)
97
96
31
28
3
2
1
64
37
4
14
73
56
99
25
39
61
24
29
40
55
70
27
11
10
85
9
59
58
83
8
38
6J5
6SA7
6SK7
42
43
41
5Y3GT
84
86
78
15
71
17
6
5
47
66
32
6J5
75
18
74
6SN7GT
44
69
62
79
26
60
45
98
57
87
48
23
36
77
72
76
81
68
30
67
12
46
34
35
33
6V6GT
6V6GT
80
63
103
104
105
101
16
102
FM INPUT
PHONO INPUT
SPEAKER
PHONO MOTOR
AC OUTPUT
ANTENNA-LOOP

FIGURE 7

## SPECIFICATIONS

| | |
|---|---|
| Power supply | 117 volts 50/60 cycles AC |
| Power consumption | 95 watts |
| Power output | 12 watts |
| Intermediate frequency | 455 kc. |
| Tuning frequency range: | |
| Broadcast band | 525—1630 kc. |
| Short Wave band | 4.95—18.4 mc. |
| Tubes: | |
| R-F Amplifier | 6SK7 |
| Converter | 6SA7 |
| I-F Amplifier | 6SK7 |
| Detector and AVC | 6J5 |
| First Audio | 6J5 |
| Inverter | 6SN7GT |
| Power output (push-pull stage) | (2) 6V6GT |
| Rectifier | 5Y3GT |
| Tuning Indicator | 6U5 |
| Dial lamps | Mazda No. 44 |
| Speakers: | |
| Field coil resistance | 1000 ohms |
| Voice coil impedance (400 cycles) | 3.0 ohms |
| Output transformer | 8,000/3 ohms |

## Method for Removing Chassis from Cabinet

THE DATA ON THIS ENTIRE PAGE ALSO APPLIES TO THE CR-198 SERIES

Model CR-197 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service.

To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hook should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated S-L-H. The end of the short wave antenna that is fastened to the inside of the cabinet connects to S. Always disconnect this antenna from terminal S when an outdoor antenna is used as it may pick up noise. The two terminals on the loop are designated L and H. The leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

## ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 7. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings. *Always set the Selectivity Switch to SHARP TUNE before aligning the i-f stages.* This is done by turning the Treble Control counter-clockwise as far as possible.

### I-F Alignment

1. Connect the output of the signal generator to the oscillator grid (pin No. 5) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2. Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the band selector switch to BDCST as for broadcast band reception.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

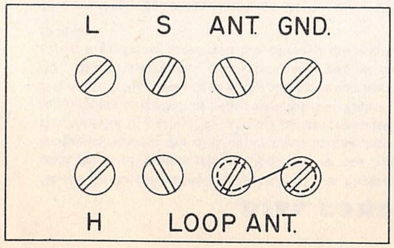


FIGURE 1

On some models of the CR-197 chassis, the two i-f trimmers are located in the top of the respective i-f transformers, while in others one trimmer is accessible from the top and the other from the bottom of each transformer as shown in the layout diagram, Figure 7.

### Broadcast Band Alignment

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The link on the antenna terminal board must be set in the ANT position as shown in Figure 1.

2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, loosen the set screws in the hub of pulley "D" shown on Figure 3 and make the necessary adjustment.

3. With the band selector still set for broadcast band reception, adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc., adjust the 1400 kc. oscillator trimmer, the 1400 kc. r-f trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the link on the antenna terminal board to the LOOP position as shown in Figure 2. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.

6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

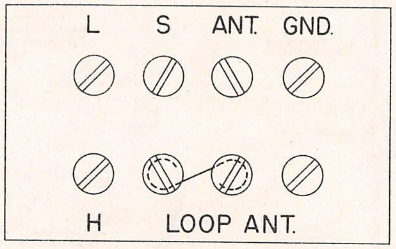


FIGURE 2

## SHORT WAVE BAND ALIGNMENT

1. Set the band selector switch to SW as for short wave reception and substitute a 400 ohm resistor for the capacitor in series with the signal generator lead connected to the antenna terminal on the receiver.

2. Set the signal generator and the radio receiver to 15 mc.; then adjust the 15 mc. oscillator trimmer, the 15 mc. r-f trimmer and the 15 mc. antenna trimmer for maximum output. While adjusting the 15 mc. oscillator trimmer two peaks may be observed; only one is the correct peak for 15 mc. alignment. Screw in the trimmer to maximum capacity—then decrease the capacity until the first peak is observed. This is the correct one.

## 10 KC FILTER ADJUSTMENT

This chassis incorporates a 10 kc. filter circuit to eliminate the beat note heard as a whistle between stations on the broadcast band. If the trimmer is out of adjustment, the following procedure should be observed.

1. Set the Selectivity Switch to FULL RANGE by turning the Treble Control knob clockwise as far as possible.

2. Connect the output of an audio oscillator to the phonograph pickup socket on the radio chassis and adjust the oscillator to EXACTLY 10,000 cycles.

3. Set the band selector to PHONO and adjust the 10 kc. trimmer for minimum output.

4. If an audio oscillator is not available for making this adjustment, set the band selector to BDCST, connect an antenna to the receiver and set the gang condenser to a point between two stations on adjacent channels having approximately the same power. If the 10 kc. trimmer is out of adjustment, a whistle will be heard. Adjust the trimmer until the whistle is eliminated.

## SETTING THE PUSH BUTTONS

1. Loosen each of the push button knobs several turns.

2. Select a station that is to be automatically tuned by one of the push buttons, using the Dial Tuning knob. Be sure to set the Selectivity Switch to Sharp Tune and observe that the shaded portion of the green circle in the tuning indicator is as narrow as possible.

3. Press inward on the Dial Tuning knob (without turning it to the left or right) to hold the station in tune and press one of the push button knobs in as far as it will go—while holding it in this position, tighten the push button knob by turning it clockwise as far as possible.

4. Insert the correct tab with the call letters of the selected station in the space provided and proceed with setting up the remaining push buttons in the same manner. Stations should be set up on the push buttons in the order of their frequency so that the lowest frequency station is tuned by the button at the extreme left of the assembly; the highest frequency station should be selected by the button at the right end.

## SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

**STAGE GAINS***

| | | |
|---|---|---|
| Antenna Post to Converter Grid at: | | |
| 600 kc. | 4.1 | |
| 6 mc. | 1.85 | |
| R-F to Converter Grid at: | | |
| 600 kc. | 14.3 | |
| 6 mc. | 2.8 | |
| R-F on Converter to I-F Grid at: | | |
| 600 kc. | 46 | |
| 6 mc. | 42 | |
| I-F on Converter Grid to I-F Grid at: | | |
| 455 kc. | 60 | |
| I-F Grid to Detector Plate at: | BDCST | SW |
| 455 kc. | 30 | 70 |

**OSCILLATOR OUTPUT VOLTAGE**

The DC voltage developed across Oscillator Grid Resistor (48) at:

| | |
|---|---|
| 600 kc. | 6.6 |
| 6 mc. | 5.3 |

**AUDIO GAIN**

Voltage required across Volume Control to produce .05 watt speaker output** at 400 cycles is .0075 volt with Band Selector Switch in BDCST setting.

---

* Variations of ±20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

** .05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the voice coil of either speaker.

## DIAL CORD REPLACEMENT

Rotate the brass pulley designated "A" in Figure 3 until the dial pointer strikes the stop at the high frequency end of the dial calibration. In this condition the slot in pulley "A" should be approximately ten degrees to the left of being vertical—see Figure 3. If the slot in the pulley is in some other position under the above mentioned conditions, the pointer set screw is probably loose and has allowed the pointer to slip.

To correct this condition, first remove the glass dial and loosen the pointer screw. Then while holding pulley "A" so that its slot is approximately ten degrees to the left of vertical (when viewed from the rear) adjust the pointer until it is resting against the stop at the high frequency end of its travel. Then tighten the pointer set screw securely and replace the glass dial.

Completely unmesh the condenser gang and check the location of the hole or slot in pulley "D." If this hole is not approximately 45 degrees back from vertical as shown on Figure 3, loosen the two No. 6 Allen set screws in the hub of pulley "D" and slip the pulley on its shaft (while holding the condenser gang unmeshed) until the specified adjustment is obtained; then tighten one of the set screws securely. It will be shown later that this is a temporary setting. Next, tie a double knot in the exact center of a 25-inch length of dial cable and fold the cable back on itself so that the knot is at one end. The correct method for tying this knot is shown as an inset on Figure 3. Grasp the cable near the knotted end and slide it into the pulley slot so that the knot is against the inside rim of the pulley as shown in the sketch. The piece of cable nearest the dial frame should be wound in the direction shown for one-half turn; then over the lower pulley "B," around the bottom of the large pulley "D" and into the hole. Pull the cable taut and wrap the end around the small hook on pulley "D" temporarily.

The remaining piece of cable should be wound around pulley "A" in the direction shown, for one complete turn, over the upper pulley "C," and over the top of pulley "D." Thread the end through the small hole in pulley "D" and pull both ends of the cable taut. With one end of tension spring "E" fastened to the hook on pulley "D" lace the two free ends of the cable through the opposite end of the spring and tie a knot at a point that will allow ¼" to 5/16" of cable between the spring and the inside rim of pulley "D." Be sure to tie the knot around one coil of the spring in the manner shown.

Now with the condenser gang completely meshed, check the position of the dial pointer. If it is not in line with the last calibration mark at the low frequency end of the dial, loosen the set screw in pulley "D" and turn it until the pointer is in the specified position. Be sure that the condenser gang does not move during this adjustment. Then tighten the two screws in pulley "D" securely completing the operation.

## CONDENSER GANG DRIVE ADJUSTMENTS

Whenever any of the mechanical parts in the condenser gang drive assembly require replacement due to rough handling or for any other reason, it is extremely important that clearances and adjustments shown on Figures 4 and 5 are correct; otherwise, the tuning mechanism will be sluggish or it may slip during operation.

In reassembling the mechanism after any part was replaced, follow the procedure outlined below:

1. Assemble the Tuning Shaft, Drive Collar, Compression Spring and Flywheel in the order shown on Figure 5. The distance between the front of the Drive Collar and the front of the Tuning Shaft must be 1⅛ inches as specified on Figure 4. Install the Flywheel on the rear of the Tuning Shaft and slide it forward until it nearly touches the edge of the Drive Wheel; then tighten one of the set screws in the Flywheel hub. Insert a .010" gauge between the Flywheel and the Pin, and while holding the gauge in this position, loosen the set screw in the Flywheel hub that was previously tightened. The Compression Spring should force the Flywheel back against the gauge—when this occurs, tighten both set screws in the Flywheel hub.

2. Adjust the Muting Switch contact clearance by loosening the two screws in the Contact Bracket and sliding the bracket in the required direction until a 1/16" clearance is obtained. If this adjustment cannot be obtained in the manner prescribed, bend the Contact Bracket until proper clearance is realized.

3. The Drive Wheel is properly located on its shaft when its edge nearest the hub is in line with the outside edge of the Drive Collar as shown on Figure 5. Two Allen set screws in the Drive Wheel hub provide a means of adjusting the position of this wheel.

4. When the adjustment outlined in paragraph 2 is correct, the proper contact clearance will automatically be obtained when the Muting Switch is to be "unmuted" while the push buttons are being set. While pressure is applied to any one of the push buttons while they are being set up, a pressure applied simultaneously to the Tuning Control knob will cause the Muting Switch contacts to open. Detailed instructions on setting up these push buttons are shown elsewhere in this bulletin.

5. If the push button shafts at both ends do not engage the Treadle Bar as shown on Figure 5, the three screws in the Treadle Bar must be loosened and the Treadle Bar should be moved until the required condition is obtained.

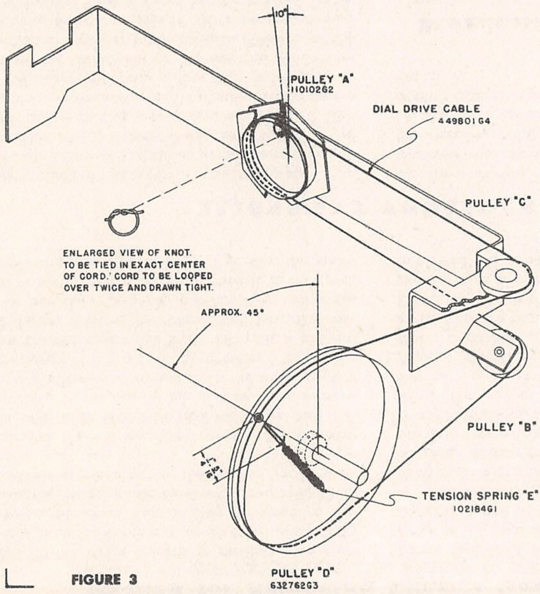

10°
PULLEY "A"
110102G2
DIAL DRIVE CABLE
449801G4
PULLEY "C"
ENLARGED VIEW OF KNOT. TO BE TIED IN EXACT CENTER OF CORD. CORD TO BE LOOPED OVER TWICE AND DRAWN TIGHT.
APPROX. 45°
¼"-5/16"
PULLEY "B"
TENSION SPRING "E"
102184G1
PULLEY "D"
632762G3

FIGURE 3

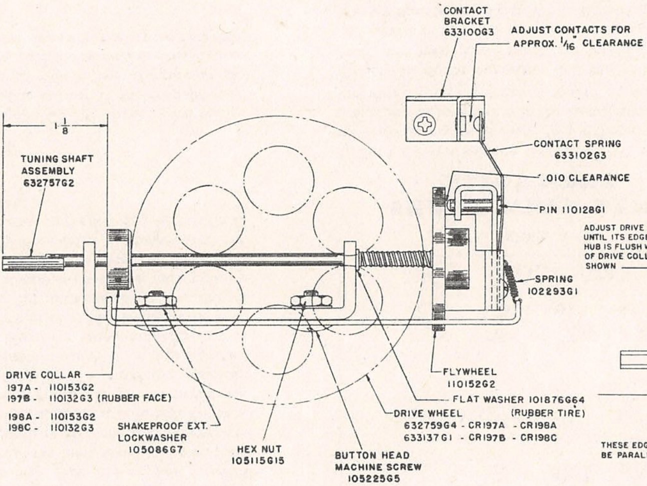

CONTACT BRACKET 633100G3
ADJUST CONTACTS FOR APPROX. 1/16" CLEARANCE
1 1/8
TUNING SHAFT ASSEMBLY 632757G2
CONTACT SPRING 633102G3
.010 CLEARANCE
PIN 110128G1
SPRING 102293G1
DRIVE COLLAR
197A - 110153G2
197B - 110132G3 (RUBBER FACE)
198A - 110153G2
198C - 110132G3
SHAKEPROOF EXT. LOCKWASHER 105086G7
HEX NUT 105115G15
BUTTON HEAD MACHINE SCREW 105225G5
FLYWHEEL 110152G2
FLAT WASHER 101876G64
DRIVE WHEEL (RUBBER TIRE)
632759G4 - CR197A - CR198A
633137G1 - CR197B - CR198C

FIGURE 4

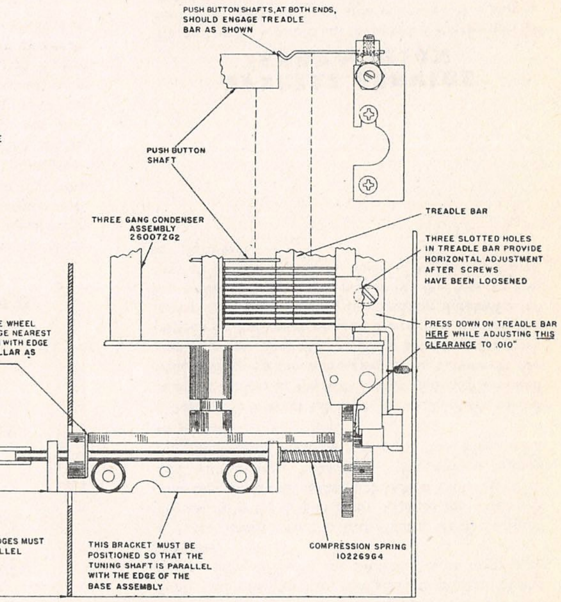

PUSH BUTTON SHAFTS, AT BOTH ENDS, SHOULD ENGAGE TREADLE BAR AS SHOWN
PUSH BUTTON SHAFT
THREE GANG CONDENSER ASSEMBLY 260072G2
TREADLE BAR
THREE SLOTTED HOLES IN TREADLE BAR PROVIDE HORIZONTAL ADJUSTMENT AFTER SCREWS HAVE BEEN LOOSENED
PRESS DOWN ON TREADLE BAR HERE WHILE ADJUSTING THIS CLEARANCE TO .010"
ADJUST DRIVE WHEEL UNTIL ITS EDGE NEAREST HUB IS FLUSH WITH EDGE OF DRIVE COLLAR AS SHOWN
THESE EDGES MUST BE PARALLEL
THIS BRACKET MUST BE POSITIONED SO THAT THE TUNING SHAFT IS PARALLEL WITH THE EDGE OF THE BASE ASSEMBLY
COMPRESSION SPRING 102269G4

FIGURE 5

# THE MAGNAVOX CO. MODELS CR-197, CR-197A, CR-197B
# MODELS CR-198. CR-198A, CR-198B

## PARTS LIST

MODELS CR-197, CR-197A, CR-197B

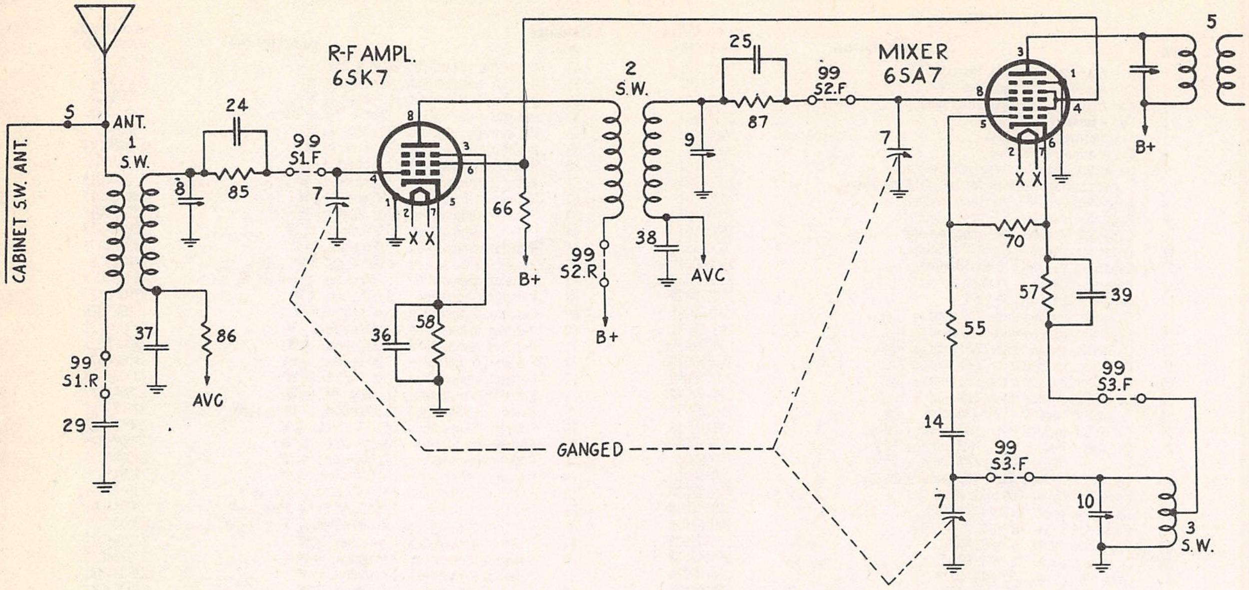
| REFERENCE NO. | DESCRIPTION | MAGNAVOX PART NO. |
|---|---|---|
| 1 | Coil Assembly, Antenna, two band | 360273G1 |
| 2 | Coil Assembly, r-f, two band | 360274G1 |
| 3 | Coil Assembly, Oscillator, two band | 360275G1 |
| 4 | Coil Assembly, 10KC filter | 360278G1 |
| 5 | Transformer, First i-f | 360024G1 |
| 6 | Transformer, Second i-f | 360025G1 |
| 7 | Capacitor, Variable, three-gang, tuning | 260071G1 |
| | Push button assembly for 260071G1 capacitor | 260063G1 |
| 8 | Capacitor, Variable, two-gang trimmer | 260021G1 |
| 9 | Capacitor, Variable, two-gang trimmer | 260021G1 |
| 10 | Capacitor, Variable, two-gang trimmer | 260021G1 |
| 11 | Capacitor, Variable, Oscillator padder | 260067G3 |
| 12 | Capacitor, Variable, 10 KC trimmer | 250008G1 |
| 13 | Capacitor, Ceramic, 20 mmf | 250088G32 |
| 14 | Capacitor, Ceramic, 50 mmf | 250088G24 |
| 15 | Capacitor, molded mica, 100 mmf ± 20% | 250159G98 |
| 16 | Capacitor, molded mica, 100 mmf ± 10% | 250159G82 |
| 17 | Capacitor, molded mica, 220 mmf ± 20% | 250159G100 |
| 18 | Capacitor, molded mica, 220 mmf ± 20% | 250159G100 |
| 19 | Capacitor, molded mica, 330 mmf ± 10% | 250159G88 |
| 20 | Capacitor, molded mica, 330 mmf ± 10% | 250159G88 |
| 21 | Capacitor, silvered mica, 490 mmf ± 1% | 250085G32 |
| 22 | Capacitor, molded mica, 1000 mmf ± 20% | 250160G82 |
| 23 | Capacitor, molded mica, 1800 mmf ± 10% | 250160G67 |
| 24 | Capacitor, molded mica, 4700 mmf ± 2% | 250160G5 |
| 25 | Capacitor, molded mica, 4700 mmf ± 2% | 250160G5 |
| 26 | Capacitor, paper .005 mfd, 400V | 250152G30 |
| 27 | Capacitor, paper .01 mfd, 200V | 250152G18 |
| 28 | Capacitor, paper .01 mfd, 200V | 250152G18 |
| 29 | Capacitor, paper .01 mfd, 600V | 250152G38 |
| 30 | Capacitor, paper .01 mfd, 600V | 250152G38 |
| 31 | Capacitor, paper .015 mfd, 200V | 250152G70 |
| 32 | Capacitor, paper, .02 mfd, 400V | 250152G26 |
| 33 | Capacitor, molded paper, .02 mfd, 600V | 250129G3 |
| 34 | Capacitor, molded paper, .02 mfd, 600V | 250129G3 |
| 35 | Capacitor, molded paper, .02 mfd., 600V | 250129G3 |
| 36 | Capacitor, paper, .03 mfd, 400V | 250152G25 |
| 37 | Capacitor, paper, .05 mfd, 200V | 250152G15 |
| 38 | Capacitor, paper, .05 mfd, 200V | 250152G15 |
| 39 | Capacitor, paper, .05 mfd, 200V | 250152G15 |
| 40 | Capacitor, paper, .05 mfd, 200V | 250152G15 |
| 41 | Capacitor, paper, .05 mfd, 200V | 250152G15 |
| 42 | Capacitor, paper, .1 mfd, 200V | 250152G13 |
| 43 | Capacitor, paper, .1 mfd, 400V | 250152G22 |
| 44 | Capacitor, paper, .1 mfd, 400V | 250152G22 |
| 45 | Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V | 270023G6 |
| 46 | Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V | 270023G6 |
| 47 | Capacitor, electrolytic, 10-30 mfd, 450V | 270023G2 |
| 48 | Capacitor, electrolytic, 20 mfd, 25V | 270027G2 |
| 55 | Resistor, composition, 100 ohms, ½ W | 230084G7 |
| 56 | Resistor, composition, 150 ohms, ½ W | 230084G8 |
| 57 | Resistor, composition, 220 ohm, 2W ± 10% | 230064G54 |
| 58 | Resistor, composition, 470 ohms, ½ W | 230084G11 |
| 59 | Resistor, composition, 470 ohms, ½ W | 230084G11 |
| 60 | Resistor, composition, 1500 ohms, ½ W | 230084G14 |
| 61 | Resistor, composition, 2200 ohms, ½ W | 230084G15 |
| 62 | Resistor, composition, 4700 ohms, ½ W | 230084G17 |
| 63 | Resistor, composition, 4700 ohms, ½ W | 230084G17 |
| 64 | Resistor, composition, 10,000 ohms, ½ W | 230084G19 |
| 65 | Resistor, composition, 10,000 ohms, ½ W | 230084G31 |
| 66 | Resistor, Wire wound, 10,000 ohms, 3 W ± 10% | 240035G2 |
| 67 | Resistor, composition, 15,000 ohms, ± 5%, ½ W | 230084G187 |
| 68 | Resistor, composition, 15,000 ohms, 2 W | 230086G20 |
| 69 | Resistor, composition, 15,000 ohms, 1 W | 230085G20 |
| 70 | Resistor, composition, 22,000 ohms, ½ W | 230084G21 |
| 71 | Resistor, composition, 22,000 ohms, ½ W | 230084G21 |
| 72 | Resistor, composition, 22,000 ohms, ½ W | 230084G21 |
| 73 | Resistor, composition, 47,000 ohms, ½ W | 230084G23 |
| 74 | Resistor, composition, 47,000 ohms, ½ W | 230084G23 |
| 75 | Resistor, composition, 82,000 ohms, ± 10%, ½ W | 230084G85 |
| 76 | Resistor, composition, 100,000 ohms, ½ W | 230084G25 |
| 77 | Resistor, composition, 100,000 ohms, ½ W | 230084G25 |
| 78 | Resistor, composition, 150,000 ohms, ½ W | 230084G26 |
| 79 | Resistor, composition, 150,000 ohms, ½ W | 230084G26 |
| 80 | Resistor, composition, 220,000 ohms ± 5%, ½ W | 230084G215 |
| 81 | Resistor, composition, 270,000 ohms, ± 10%, ½ W | 230084G91 |
| 82 | Resistor, composition, 560,000 ohms, ± 10%, ½ W | 230084G95 |
| 83 | Resistor, composition, 1 megohm, ½ W | 230084G31 |
| 84 | Resistor, composition, 1 megohm, ½ W | 230084G31 |
| 85 | Resistor, composition, 1 mehohm, ½ W | 230084G31 |
| 86 | Resistor, composition, 1 megohm, ½ W | 230084G31 |
| 87 | Resistor, composition, 1 megohm ± 10%, ½ W | 230084G98 |
| 95 | Control, Volume, 1 megohm | 220044G23 |
| 96 | Control, Bass, 150,000 ohm with Power Switch | 220045G61 |
| 97 | Control, Treble, 1 megohm with Band Expander Switch | 220071G2 |
| 98 | Transformer, Power, 117 V., 50/60 cycle | 300034G1 |
| 99 | Switch, Rotary, Band Selector | 16012G1 |
| 100 | Antenna Loop Assembly | * |
| 101 | Socket, FM Input | 180060G1 |
| 102 | Socket, Phonograph Input | 189741G1 |
| 103 | Socket, Phonograph Motor | 180501G5 |
| 104 | Socket, Speaker | 180504G16 |
| 105 | Socket, FM Power | 180428G1 |
| | Dial Glass Assembly | 150291G1 |

## PARTS LIST

MODELS CR-198, CR-198A, CR-198B

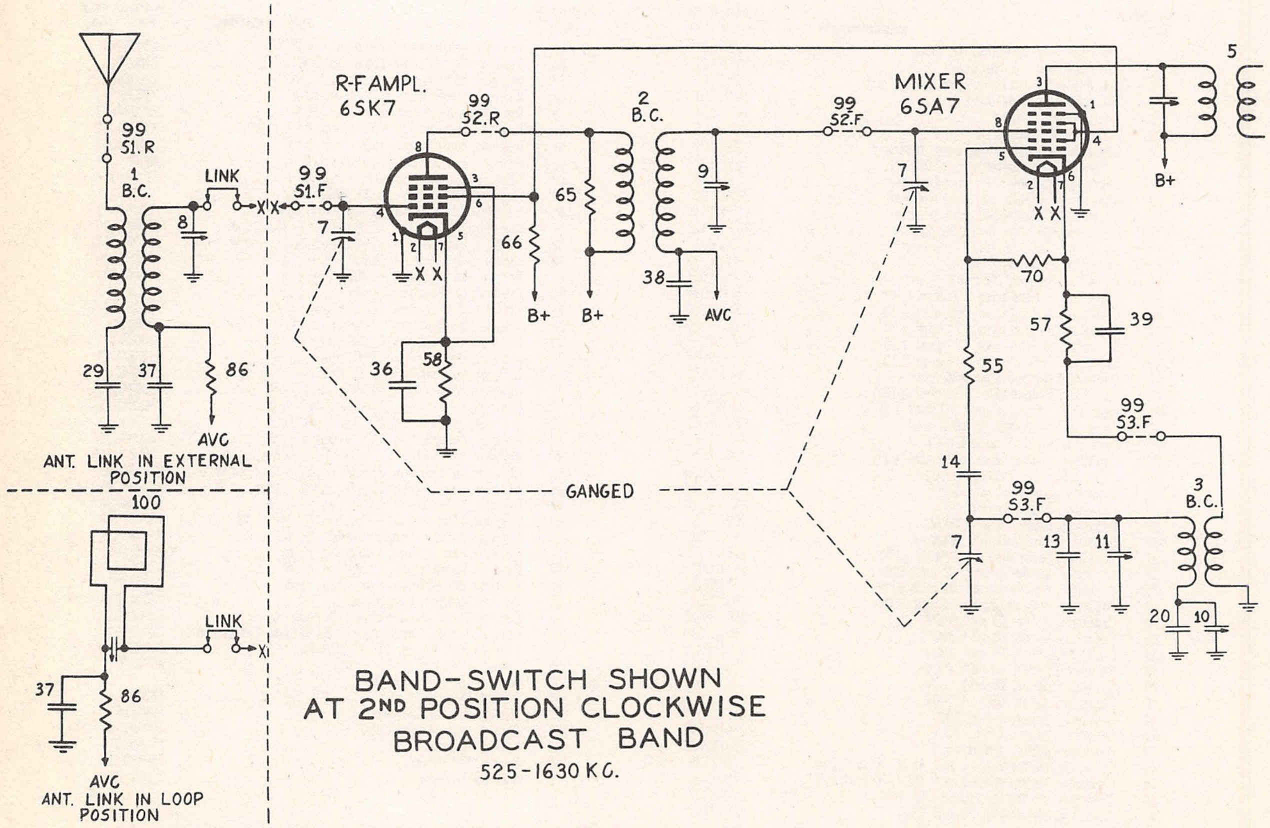
| REFERENCE NO. | DESCRIPTION | MAGNAVOX PART NO. |
|---|---|---|
| 1 | Coil Assembly, Antenna, two band | 360273G1 |
| 2 | Coil Assembly, r-f, two band | 360274G1 |
| 3 | Coil Assembly, Oscillator, two band | 360275G1 |
| 4 | Coil Assembly, 10KC filter | 360278G1 |
| 5 | Transformer, First i-f | 360024G1 |
| 6 | Transformer, Second i-f | 360025G1 |
| 7 | Capacitor, Variable, three gang, tuning | 260071G1 |
| | Push Button assembly for 260071G1 | 260063G1 |
| 8 | Capacitor, Variable, two gang trimmer | 260021G1 |
| 9 | Capacitor, Variable, two gang trimmer | 260021G1 |
| 10 | Capacitor, Variable, two gang trimmer | 260021G1 |
| 11 | Capacitor, Variable, Oscillator padder | 260067G3 |
| 12 | Capacitor, Variable, 10KC trimmer | 250008G1 |
| 13 | Capacitor, Ceramic, 20 mmf | 250088G32 |
| 14 | Capacitor, Ceramic, 50 mmf | 250088G24 |
| 15 | Capacitor, molded mica, 100 mmf ±20% | 250159G98 |
| 16 | Capacitor, molded mica, 100 mmf ±10% | 250159G82 |
| 17 | Capacitor, molded mica, 220 mmf ±20% | 250159G100 |
| 18 | Capacitor, molded mica, 220 mmf ±20% | 250159G100 |
| 19 | Capacitor, molded mica, 330 mmf ±10% | 250159G88 |
| 20 | Capacitor, silvered mica, 490 mmf ±1% | 250085G32 |
| 21 | Capacitor, molded mica, 680 mmf ±10% | 250159G131 |
| 22 | Capacitor, molded mica, 1000 mmf ±20% | 250160G82 |
| 23 | Capacitor, molded mica, 1800 mmf ±10% | 250160G67 |
| 24 | Capacitor, molded mica, 4700 mmf ±2% | 250161G5 |
| 25 | Capacitor, molded mica, 4700 mmf ±2% | 250161G5 |
| 26 | Capacitor, paper .005 mfd, 400V | 250152G30 |
| 27 | Capacitor, paper .01 mfd, 200 V | 250152G18 |
| 28 | Capacitor, paper .01 mfd, 200V | 250152G18 |
| 29 | Capacitor, paper .01 mfd, 600V | 250152G38 |
| 30 | Capacitor, paper .01 mfd, 600V | 250152G38 |
| 31 | Capacitor, paper .015 mfd, 200V, ±10% | 250152G70 |
| 32 | Capacitor, molded paper, .02 mfd, 600V | 250129G3 |
| 33 | Capacitor, molded paper, .02 mfd, 600V | 250129G3 |
| 34 | Capacitor, molded paper, .02 mfd, 600V | 250129G3 |
| 35 | Capacitor, paper, .03 mfd, 400V | 250152G25 |
| 36 | Capacitor, paper, .05 mfd, 200V | 250152G15 |
| 37 | Capacitor, paper, .05 mfd, 200V | 250152G15 |
| 38 | Capacitor, paper, .05 mfd, 200V | 250152G15 |
| 39 | Capacitor, paper, .05 mfd, 200V | 250152G15 |
| 40 | Capacitor, paper, .05 mfd, 200V | 250152G15 |
| 41 | Capacitor, paper, .1 mfd, 200V | 250152G13 |
| 42 | Capacitor, paper, .1 mfd, 400V | 250152G22 |
| 43 | Capacitor, paper, .1 mfd, 400V | 250152G22 |
| 44 | Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V | 270023G6 |
| 45 | Capacitor, electrolytic, 10 mfd, 450V, 20 mfd, 25V | 270023G6 |
| 46 | Capacitor, electrolytic, 10-30 mfd, 450V | 270023G2 |
| 47 | Capacitor, electrolytic, 20 mfd, 25V | 270027G2 |
| 55 | Resistor, composition, 100 ohms, ½ W | 230084G7 |
| 56 | Resistor, Wire wound, 125 ohms, 5 W | 240021G11 |
| 57 | Resistor, composition, 150 ohms, ½ W | 230084G8 |
| 58 | Resistor, composition, 470 ohms, ½ W | 230084G11 |
| 59 | Resistor, composition, 470 ohms, ½ W | 230084G11 |
| 60 | Resistor, composition, 1000 ohms, 2 W ±10% | 230064G62 |
| 61 | Resistor, composition, 1500 ohms, ½ W | 230084G14 |
| 62 | Resistor, composition, 2200 ohms, ½ W | 230084G15 |
| 63 | Resistor, composition, 4700 ohms, ½ W | 230084G17 |
| 64 | Resistor, composition, 4700 ohms, ½ W | 230084G17 |
| 65 | Resistor, composition, 10,000 ohms, ½ W | 230084G19 |
| 66 | Resistor, Wire wound, 10,000 ohms, ±10%, 3 W | 240035G2 |
| 67 | Resistor, composition, 15,000 ohms, ±5%, ½ W | 230084G187 |
| 68 | Resistor, composition, 15,000 ohms, 2 W | 230086G20 |
| 69 | Resistor, composition, 15,000 ohms, 1 W | 230085G20 |
| 70 | Resistor, composition, 22,000 ohms, ½ W | 230084G21 |
| 71 | Resistor, composition, 22,000 ohms, ½ W | 230084G21 |
| 72 | Resistor, composition, 22,000 ohms, ½ W | 230084G21 |
| 73 | Resistor, composition, 47,000 ohms, ½ W | 230084G23 |
| 74 | Resistor, composition, 47,000 ohms, ½ W | 230084G23 |
| 75 | Resistor, composition, 82,000 ohms, ±10%, ½ W | 230084G85 |
| 76 | Resistor, composition, 100,000 ohms, ½ W | 230084G25 |
| 77 | Resistor, composition, 100,000 ohms, ½ W | 230084G25 |
| 78 | Resistor, composition, 150,000 ohms, ½ W | 230084G26 |
| 79 | Resistor, composition, 150,000 ohms, ½ W | 230084G26 |
| 80 | Resistor, composition, 220,000 ohms, ±5%, ½ W | 230084G215 |
| 81 | Resistor, composition, 270,000 ohms, ±10%, ½ W | 230084G91 |
| 82 | Resistor, composition, 560,000 ohms, ±10%, ½ W | 230084G95 |
| 83 | Resistor, composition, 680,000 ohms, ½ W | 230084G30 |
| 84 | Resistor, composition, 1 megohm, ±10%, ½ W | 230084G98 |
| 85 | Resistor, composition, 1 megohm, ½ W | 230084G31 |
| 86 | Resistor, composition, 1 megohm, ½ W | 230084G31 |
| 87 | Resistor, composition, 1 megohm, ½ W | 230084G31 |
| 88 | Resistor, composition, 1 megohm, ½ W | 230084G31 |
| 95 | Control, Volume, 1 megohm | 220044G23 |
| 96 | Control, Bass, 150,000 ohm with Power Switch | 220045G6 |
| 97 | Control, Treble, 1 megohm with Band Expander Switch | 220071G2 |
| 98 | Transformer, Power, 117 V., 50/60 cycle | 300035G1 |
| 99 | Switch, Rotary, Band Selector | 160172G1 |
| 100 | Antenna Loop Assembly | * |
| 101 | Socket, FM Input | 180060G1 |
| 102 | Socket, Phonograph Input | 189741G1 |
| 103 | Socket, Phonograph Motor | 180501G5 |
| 104 | Socket, Speaker | 180504G16 |
| 105 | Socket, FM Power | 180428G1 |
| | Dial Glass Assembly | 150291G1 |

*The part number of the loop antenna assembly changes with different cabinets. It is therefore important that you specify the *Style Number* of the instrument when ordering a replacement loop antenna assembly.


CABINET S.W. ANT.
5
ANT.
1
S.W.
24
85
8
99
51.F
7
R-F AMPL.
6SK7
66
B+
2
S.W.
99
52.R
B+
9
38
AVC
25
87
99
52.F
MIXER
6SA7
7
5
B+
70
57
39
55
99
53.F
14
99
53.F
7
10
3
S.W.
37
86
AVC
36
58
99
51.R
29
GANGED

BAND-SWITCH SHOWN AT 1ST POSITION SHORT WAVE BAND

4.95-18.4 MC.

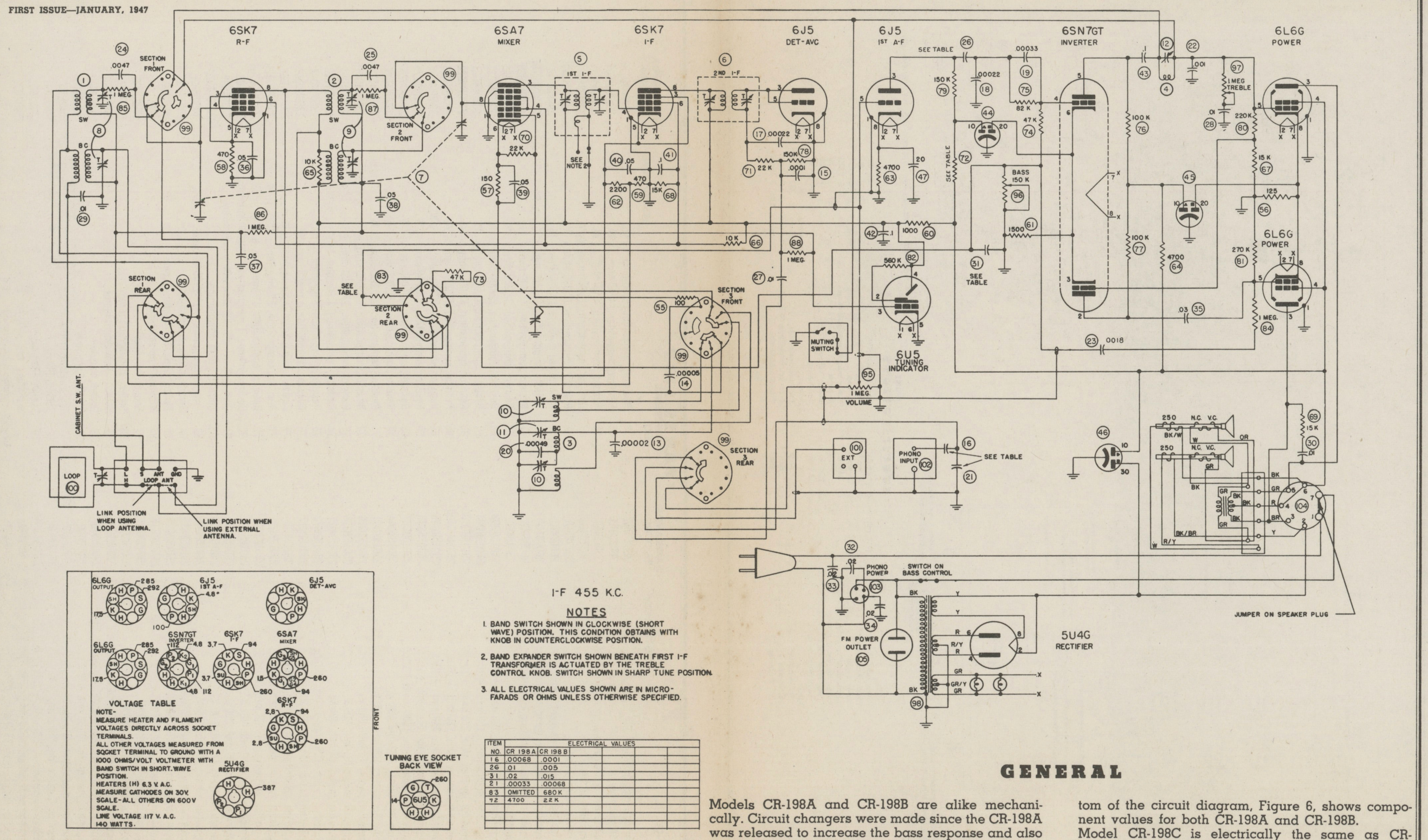

99
51.R
1
B.C.
LINK
99
51.F
7
8
29
37
86
AVC
ANT. LINK IN EXTERNAL POSITION
100
LINK
37
86
AVC
ANT. LINK IN LOOP POSITION
R-F AMPL.
6SK7
99
52.R
2
B.C.
65
66
B+
B+
9
38
AVC
36
58
99
52.F
MIXER
6SA7
7
5
B+
70
57
39
55
99
53.F
14
99
53.F
3
B.C.
7
13
11
20
10
GANGED

BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE BROADCAST BAND

525-1630 KC.

THE MAGNAVOX CO.

FIRST ISSUE—JANUARY, 1947


6SK7
R-F
6SA7
MIXER
6SK7
I-F
6J5
DET-AVC
6J5
1ST A-F
6SN7GT
INVERTER
6L6G
POWER
6L6G
POWER
6U5
TUNING INDICATOR
5U4G
RECTIFIER
1ST I-F
2ND I-F
SECTION 1 FRONT
SECTION 2 FRONT
SECTION 1 REAR
SECTION 2 REAR
SECTION 3 FRONT
SECTION 3 REAR
SEE NOTE 2
SEE TABLE
MUTING SWITCH
1 MEG. VOLUME
BASS 150 K
1 MEG TREBLE
CABINET S.W. ANT.
LOOP
LOOP ANT
LINK POSITION WHEN USING LOOP ANTENNA.
LINK POSITION WHEN USING EXTERNAL ANTENNA.
EXT
PHONO INPUT
PHONO POWER
SWITCH ON BASS CONTROL
FM POWER OUTLET
JUMPER ON SPEAKER PLUG
N.C. V.C.
6L6G OUTPUT
6J5 1ST A-F
6J5 DET-AVC
6SN7GT INVERTER
6SK7 I-F
6SA7 MIXER
6SK7 R-F
5U4G RECTIFIER
TUNING EYE SOCKET BACK VIEW
FRONT

I-F 455 K.C.

NOTES

1. BAND SWITCH SHOWN IN CLOCKWISE (SHORT WAVE) POSITION. THIS CONDITION OBTAINS WITH KNOB IN COUNTERCLOCKWISE POSITION.

2. BAND EXPANDER SWITCH SHOWN BENEATH FIRST I-F TRANSFORMER IS ACTUATED BY THE TREBLE CONTROL KNOB. SWITCH SHOWN IN SHARP TUNE POSITION.

3. ALL ELECTRICAL VALUES SHOWN ARE IN MICRO-FARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

VOLTAGE TABLE

NOTE-
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHMS/VOLT VOLTMETER WITH BAND SWITCH IN SHORT. WAVE POSITION.
HEATERS (H) 6.3 V. A.C.
MEASURE CATHODES ON 30V. SCALE-ALL OTHERS ON 600V SCALE.
LINE VOLTAGE 117 V. A.C.
140 WATTS.

| ITEM NO. | ELECTRICAL VALUES | | | | | |
|---|---|---|---|---|---|---|
| | CR 198A | CR 198B | | | | |
| 16 | .00068 | .0001 | | | | |
| 26 | .01 | .005 | | | | |
| 31 | .02 | .015 | | | | |
| 21 | .00033 | .00068 | | | | |
| 83 | OMITTED | 680K | | | | |
| 72 | 4700 | 22K | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

FIGURE 6

## GENERAL

Models CR-198A and CR-198B are alike mechanically. Circuit changers were made since the CR-198A was released to increase the bass response and also to increase the effective range of the bass control. Model CR-198B identifies the receiver in which these changes were incorporated and the table at the bottom of the circuit diagram, Figure 6, shows component values for both CR-198A and CR-198B.

Model CR-198C is electrically the same as CR-198B, however, a change is incorporated in the dial drive mechanism. The differences are indicated on Figure 4.

For Parts List, see P.16-7
For Alignment, see P.16-5
For Dial Data, see P.16-6

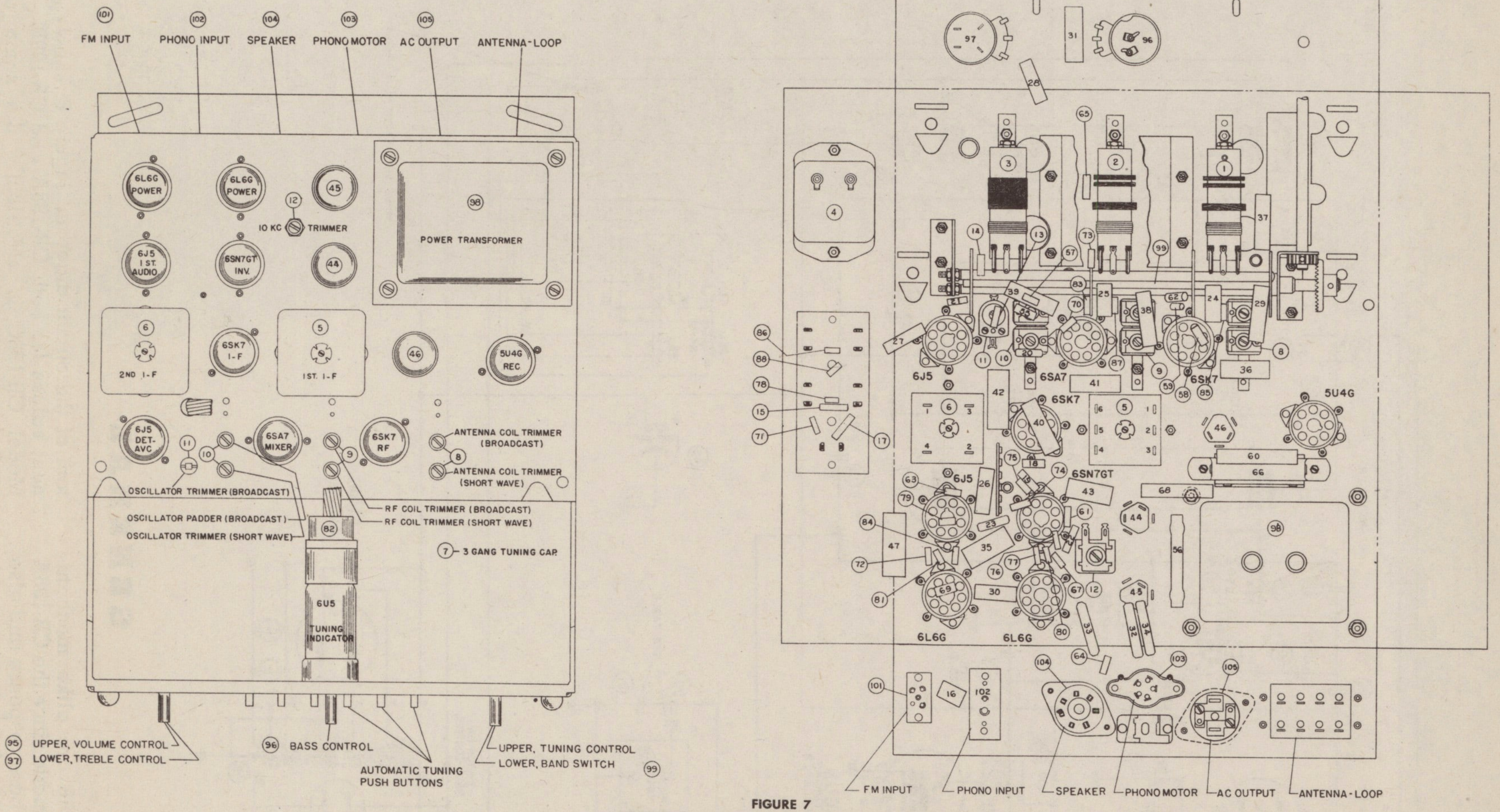

(101) FM INPUT
(102) PHONO INPUT
(104) SPEAKER
(103) PHONO MOTOR
(105) AC OUTPUT
ANTENNA-LOOP
6L6G POWER
6L6G POWER
(45)
(12) 10 KC TRIMMER
(98) POWER TRANSFORMER
6J5 1 ST. AUDIO
6SN7GT INV.
(44)
(6) 2ND I-F
6SK7 I-F
(5) 1ST. I-F
(46)
5U4G REC
6J5 DET-AVC
(11)
(10)
6SA7 MIXER
(9)
6SK7 RF
ANTENNA COIL TRIMMER (BROADCAST)
(8)
ANTENNA COIL TRIMMER (SHORT WAVE)
OSCILLATOR TRIMMER (BROADCAST)
OSCILLATOR PADDER (BROADCAST)
OSCILLATOR TRIMMER (SHORT WAVE)
RF COIL TRIMMER (BROADCAST)
RF COIL TRIMMER (SHORT WAVE)
(82)
(7) 3 GANG TUNING CAP.
6U5 TUNING INDICATOR
(95) UPPER, VOLUME CONTROL
(97) LOWER, TREBLE CONTROL
(96) BASS CONTROL
AUTOMATIC TUNING PUSH BUTTONS
UPPER, TUNING CONTROL
LOWER, BAND SWITCH
(99)
97
31
96
28
65
3
2
1
4
14
13
73
57
99
37
21
39
83
25
38
62
24
29
27
6J5
11
10
20
70
87
9
59
58
85
6SK7
8
36
6SA7
41
86
88
78
15
71
17
42
6
1
3
4
2
6SK7
40
5
5
4
2
3
46
5U4G
60
66
75
18
74
6SN7GT
63
6J5
26
43
68
79
23
61
44
98
84
47
35
56
72
76
77
12
45
81
69
30
67
33
32
34
6L6G
6L6G
80
64
104
103
105
101
16
102
FM INPUT
PHONO INPUT
SPEAKER
PHONO MOTOR
AC OUTPUT
ANTENNA-LOOP

FIGURE 7

## SPECIFICATIONS

| | |
|---|---|
| Power supply | 117 volts 50/60 cycles AC |
| Power consumption | 140 watts |
| Power output | 20 watts |
| Intermediate frequency | 455 kc. |
| Tuning frequency range: | |
| Broadcast band | 525–1630 kc. |
| Short Wave band | 4.95–18.4 mc. |
| Tubes: | |
| R-F Amplifier | 6SK7 |
| Converter | 6SA7 |
| I-F Amplifier | 6SK7 |

| | | |
|---|---|---|
| Detector and AVC | 6J5 | |
| First Audio | 6J5 | |
| Inverter | 6SN7GT | |
| Power output (push-pull stage) | (2) 6L6G | |
| Rectifier | 5U4G | |
| Tuning Indicator | 6U5 | |
| Dial lamps | Mazda No. 44 | |
| Speakers: | No. 582815 | No. 582847 |
| Field coil resistance | 250 ohms | 250 ohms |
| Voice coil impedance (400 cycles) | 5.7 ohms | 5.4 ohms |
| Output transformer | None | 5,000/3 ohms |

## PARTS LIST

| REFERENCE NO. | DESCRIPTION | MAGNAVOX PART NO. |
|---|---|---|
| 1 | Coil assembly, antenna | 360279G1 |
| 2 | Coil assembly, r-f | 360280G1 |
| 3 | Coil assembly, oscillator | 360281G1 |
| 4 | Transformer, first i-f | 363700G1 |
| 5 | Transformer, second i-f | 363700G1 |
| 6 | Capacitor, variable, three-gang tuning | 260074G1 |
| 7 | Capacitor, variable, two-gang trimmer | 260021G1 |
| 8 | Capacitor, variable, two-gang trimmer | 260078G1 |
| 9 | Capacitor, 8 mmf. | 250164G1 |
| 10 | Capacitor, molded mica, 100 mmf. ±20% | 250159G98 |
| 11 | Capacitor, molded mica, 150 mmf. ±10% | 250159G84 |
| 12 | Capacitor, molded mica, 220 mmf. ±20% | 250159G100 |
| 13 | Capacitor, molded mica, 220 mmf. ±20% | 250159G100 |
| 14 | Capacitor, molded mica, 330 mmf. ±10% | 250159G88 |
| 15 | Capacitor, silvered mica, 518 mmf. ±1% | 250085G35 |
| 16 | Capacitor, molded mica, 1800 mmf. ±10% | 250160G67 |
| 17 | Capacitor, paper, .002 mfd. 600 V. | 250152G44 |
| 18 | Capacitor, paper, .005 mfd. 600 V. | 250152G41 |
| 19 | Capacitor, paper, .01 mfd. 200 V. | 250152G18 |
| 20 | Capacitor, paper, .01 mfd. 200 V. | 250152G18 |
| 21 | Capacitor, paper, .01 mfd. 400 V. | 250152G27 |
| 22 | Capacitor, paper, .015 mfd. ±10%, 200 V. | 250152G70 |
| 23 | Capacitor, paper, .02 mfd. 200 V. | 250152G17 |
| 24 | Capacitor, molded paper, .02 mfd. 600 V. | 250129G3 |
| 25 | Capacitor, molded paper, .02 mfd. 600 V. | 250129G3 |
| 26 | Capacitor, molded paper, .02 mfd. 600 V. | 250129G3 |
| 27 | Capacitor, paper, .03 mfd. 400 V. | 250125G25 |
| 28 | Capacitor, paper, .05 mfd. 200 V. | 250152G15 |
| 29 | Capacitor, paper, .05 mfd. 200 V. | 250152G15 |
| 30 | Capacitor, paper, .05 mfd. 200 V. | 250152G15 |
| 31 | Capacitor, paper, .05 mfd. 200 V. | 250152G15 |
| 32 | Capacitor, paper, .05 mfd. 200 V. | 250152G15 |
| 33 | Capacitor, paper, .1 mfd. 200 V. | 250152G13 |
| 34 | Capacitor, paper, .1 mfd. 400 V. | 250152G22 |
| 35 | Capacitor, paper, .1 mfd. 400 V. | 250152G22 |
| 36 | Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25 V. | 270023G6 |
| 37 | Capacitor, electrolytic, 10 mfd. 450 V., 20 mfd. 25 V. | 270023G6 |
| 38 | Capacitor, electrolytic, 10-30 mfd. 475 V. | 270023G2 |
| 39 | Capacitor, electrolytic, 20 mfd. 25 V. | 270027G2 |
| 50 | Resistor, Composition, 150 ohm, ½ W. | 230084G8 |
| 51 | Resistor, wire wound, 220 ohm, ±10%, 2 W. | 230064G54 |
| 52 | Resistor, composition, 1500 ohm, ½ W. | 230084G14 |
| 53 | Resistor, composition, 3300 ohm, ½ W. | 230084G16 |
| 54 | Resistor, composition, 3300 ohm, ½ W. | 230084G16 |
| 55 | Resistor, composition, 4700 ohm, ½ W. | 230084G17 |
| 56 | Resistor, composition, 4700 ohm, ½ W. | 230084G17 |
| 57 | Resistor, composition, 10,000 ohm, ½ W. | 230084G19 |
| 58 | Resistor, composition, 10,000 ohm, 1 W. | 230085G19 |
| 59 | Resistor, wire wound, 10,000 ohm ±10%, 3 W. | 240035G2 |
| 60 | Resistor, composition, 15,000 ohm ±5%, ½ W. | 230084G187 |
| 61 | Resistor, composition, 15,000 ohm, 2 W. | 230086G20 |
| 62 | Resistor, composition, 22,000 ohm, ½ W. | 230084G21 |
| 63 | Resistor, composition, 22,000 ohm, ½ W. | 230084G21 |
| 64 | Resistor, composition, 22,000 ohm, ½ W. | 230084G21 |
| 65 | Resistor, composition, 33,000 ohm, ½ W. | 230084G22 |
| 66 | Resistor, composition, 47,000 ohm, ½ W. | 230084G23 |
| 67 | Resistor, composition, 82,000 ohm, ±½ W. | 230084G85 |
| 68 | Resistor, composition, 100,000 ohm, ½ W. | 230084G25 |
| 69 | Resistor, composition, 100,000 ohm, ½ W. | 230084G25 |
| 70 | Resistor, composition, 150,000 ohm, ½ W. | 230084G26 |
| 71 | Resistor, composition, 150,000 ohm, ½ W. | 230084G26 |
| 72 | Resistor, composition, 220,000 ohm, ±5%, ½ W. | 230084G215 |
| 73 | Resistor, composition, 270,000 ohm, ±10%, ½ W. | 230084G91 |
| 74 | Resistor, composition, 1 megohm, ±10%, ½ W. | 230084G98 |
| 75 | Resistor, composition, 1 megohm, ½ W. | 230084G31 |
| 76 | Resistor, composition, 1 megohm, ½ W. | 230084G31 |
| 77 | Resistor, composition, 1.5 megohm, ½ W. | 230084G32 |
| 78 | Resistor, composition, 3.9 megohm, ±10%, ½ W. | 230084G105 |
| 79 | Resistor, composition, 4.7 megohm, ±10%, ½ W. | 230084G106 |
| 90 | Control, volume, 1 megohm with 100,000 ohm tap | 220074G1 |
| 91 | Control, bass, 150,000 ohm with power switch | 220045G6 |
| 92 | Control, treble, 500,000 ohm | 220044G22 |
| 93 | Transformer, power, 117 V. 50-60 cycle | 300036G1 |
| 94 | Switch, rotary, band selector | 160175G1 |
| 95 | Switch, slide, SPDT antenna loop | 160176G1 |
| 96 | Antenna loop assembly | * |
| 97 | Socket, fm input | 180060G1 |
| 98 | Socket, phonograph input | 189741G1 |
| 99 | Socket, phonograph motor | 180501G5 |
| 100 | Socket, speaker | 180504G16 |
| 101 | Socket, fm power | 180428G1 |
|  | Dial glass assembly | 150293G1 |
| 97 | Socket, FM input | 180060G1 |
| 101 | Socket, FM power | 180428G1 |
|  | Dial Glass Assembly | 150293G1 |

All resistor tolerances not given are ±20%

THE MAGNAVOX CO.

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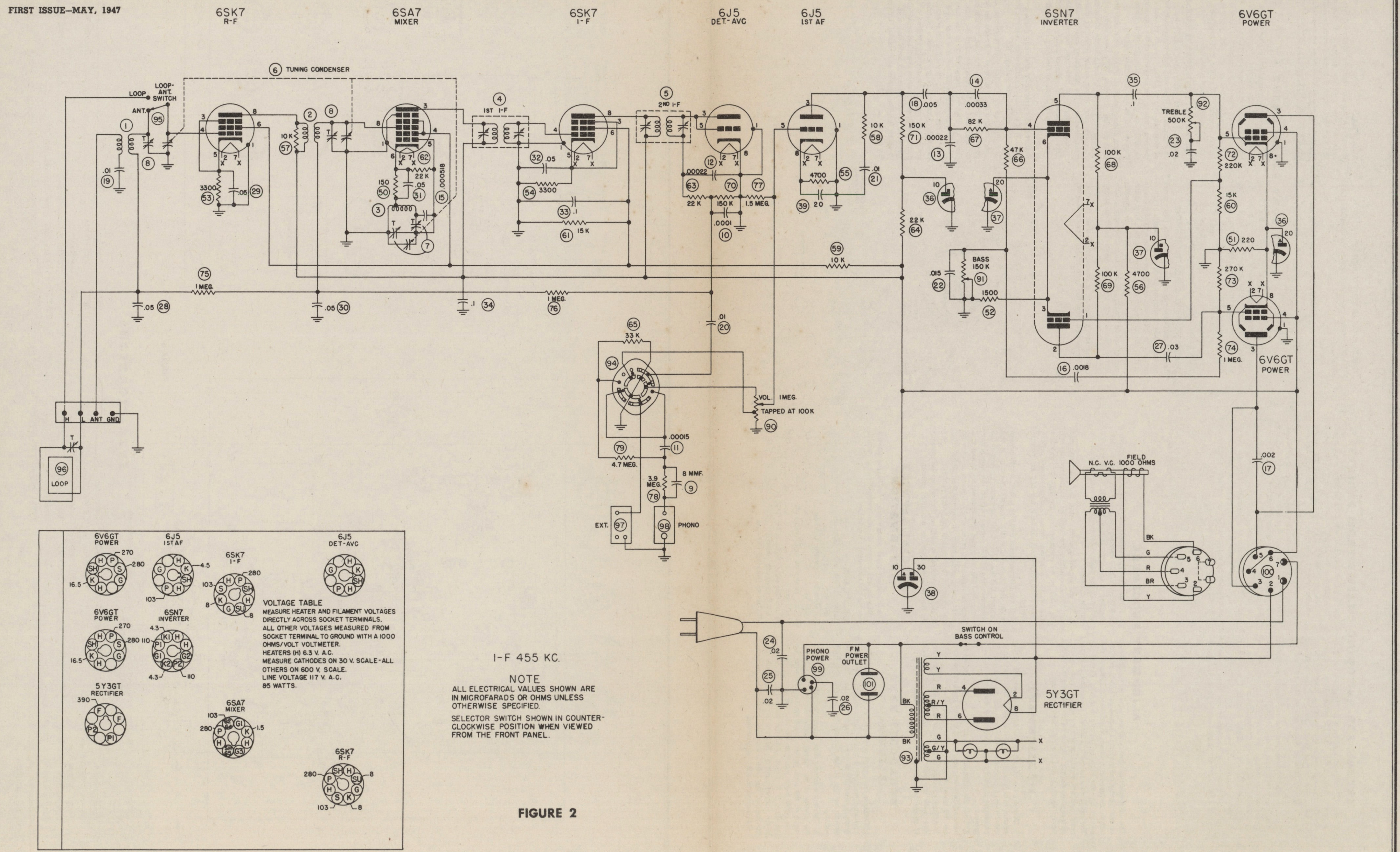
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6SA7
MIXER
6SK7
I-F
6J5
DET-AVC
6J5
1ST AF
6SN7
INVERTER
6V6GT
POWER
6V6GT
POWER
5Y3GT
RECTIFIER
⑥ TUNING CONDENSER
LOOP
LOOP-ANT. SWITCH
ANT.
④ 1ST I-F
⑤ 2ND I-F
10 K
150
22 K
.000518
3300
.05
.05
.1
15 K
.00022
22 K
150 K
1.5 MEG.
.0001
4700
20
10 K
.01
.005
.00033
150 K
.00022
82 K
47 K
22 K
10 K
BASS 150K
.015
1500
100 K
100 K
4700
TREBLE 500K
.02
220K
15K
220
270 K
1 MEG.
.03
.0018
.1
1 MEG
1 MEG.
.05
.05
.1
.01
33 K
VOL. 1 MEG.
TAPPED AT 100K
.00015
4.7 MEG.
3.9 MEG.
8 MMF.
EXT.
PHONO
H L ANT GND
LOOP
N.C. V.C.
FIELD 1000 OHMS
BK
G
R
BR
Y
.002
PHONO POWER
FM POWER OUTLET
SWITCH ON BASS CONTROL
.02
.02
.02
Y
R
R/Y
BK
G
G/Y
X
X

I-F 455 KC.

NOTE

ALL ELECTRICAL VALUES SHOWN ARE IN MICROFARADS OR OHMS UNLESS OTHERWISE SPECIFIED.

SELECTOR SWITCH SHOWN IN COUNTER-CLOCKWISE POSITION WHEN VIEWED FROM THE FRONT PANEL.

VOLTAGE TABLE

MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000 OHMS/VOLT VOLTMETER.
HEATERS (H) 6.3 V. A.C.
MEASURE CATHODES ON 30 V. SCALE-ALL OTHERS ON 600 V. SCALE.
LINE VOLTAGE 117 V. A.C.
85 WATTS.

FIGURE 2

## METHOD FOR REMOVING CHASSIS FROM CABINET

Model CR-199 radio chassis is designed for easy removal from the cabinet in which it is installed. As the radio panel is permanently fastened to the chassis, the control knobs need not be removed when the chassis is taken out of the cabinet for service.

To remove the chassis, first remove the antenna leads from their terminals and all plugs from the receptacles on the rear of the chassis. Then remove the two Phillips-head screws from the angular slots in the flange at the rear of the chassis. Lift the rear of the chassis about one inch and pull it straight back. Never remove the chassis tray from the cabinet—it has been properly positioned to bring the radio panel in place when the chassis is replaced. In replacing the chassis, slide it so that the small hooks near the front, ride inside the flanges on the sides of the chassis tray. Push the chassis forward as far as it will go and the hook should then engage the slots in the chassis tray. Replace the two Phillips-head screws and nuts and tighten securely. Replace all plugs in their receptacles and the antenna leads on their correct terminals. The antenna terminal board for the loop antenna connections is designated L-H. The two terminals on the loop are designated L and H; the leads connected to these terminals should be wired to the corresponding terminals (L and H) on the chassis.

## ALIGNMENT PROCEDURE

The alignment of this receiver requires the use of an accurately calibrated r-f signal generator and an output meter. All trimmer condenser locations are shown on the chassis layout diagram, Figure 3. The radio volume control should be turned to maximum and the signal generator output kept as low as possible during alignment to prevent the AVC from operating and giving false readings.

### I-F ALIGNMENT

1. Connect the output of the signal generator to the control grid (pin No. 8) of the 6SA7 tube through a .00025 mfd. capacitor. The ground on the signal generator should be connected to the radio chassis ground.

2, Turn the condenser gang until it is completely meshed, (low-frequency end of dial calibration) and set the input selector switch to RAD.

3. Adjust the signal generator to EXACTLY 455 kc. and peak the second i-f transformer and the first i-f transformer trimmers in that order.

### BROADCAST BAND ALIGNMENT

1. Remove the signal generator lead from the 6SA7 grid and connect it to the radio antenna terminal through the .00025 mfd. capacitor. The Ant-Loop switch on top of the chassis must be in the ANT setting.

2. Check the tuning dial pointer adjustment. When the plates of the tuning condenser are completely meshed, the dial pointer must be in line with the last calibration mark at the low frequency end of the dial. If it is not, slide the pointer on its string to the correct position. Be sure to crimp the lugs (on the rear of the pointer) tightly around the string to hold the pointer in adjustment.

3. Adjust the signal generator and the radio receiver to 600 kc. While rocking the gang condenser a few degrees to the right and to the left, adjust the 600 kc. oscillator padder for maximum indication on the output meter.

4. Set the signal generator and the radio receiver to 1400 kc., adjust the 1400 kc. oscillator trimmer, the 1400 kc. r-f trimmer and the 1400 kc. antenna trimmer for maximum output. If considerable adjustment was necessary, recheck the 600 kc. padder setting.

5. If the loop antenna trimmer is out of adjustment it should be set after the radio chassis is in the cabinet. Set the ANT-LOOP switch on the top of the chassis to the LOOP setting. Adjust the signal generator to 1400 kilocycles and connect its output to a loop containing approximately five turns of wire eight inches in diameter placed eighteen inches from the receiver loop and in the same plane.

6. Set the receiver to 1400 kc. and adjust the trimmer on the receiver loop for maximum output.

### SPECIAL SERVICE INFORMATION

The following information is provided for the service man who has a vacuum tube voltmeter or a similar measuring instrument available.

**STAGE GAINS***

| | |
|---|---|
| Antenna Post to R-F Grid at: | |
| 600 kc. | 4.88 |
| R-F Grid to Converter Grid at: | |
| 600 kc. | 4.7 |
| R-F on Converter to I-F Grid at: | |
| 600 kc. | 42.6 |
| I-F on Converter Grid to I-F Grid at: | |
| 455 kc. (gang closed) | 50.7 |
| I-F Grid to Detector Plate at: | |
| 455 kc. | 72 |

**OSCILLATOR OUTPUT VOLTAGE**

The DC voltage developed across the Oscillator Grid Resistor at:

600 kc. ............ 12 V.
or 0.55 ma. through 22,000 ohm Oscillator Grid Resistor (62).

**AUDIO GAIN**

Voltage required across the Volume Control to produce .05 watt speaker output** at 400 cycles is .011 volt with Input Selector Switch in RAD setting.

*Variations of ±20% are permissible. All readings made with sufficient input signal to provide .05 watt speaker output.

**.05 watt speaker output at 400 cycles is equivalent to a reading of 0.4 volts as measured by a high resistance AC voltmeter across the voice coil of speaker.

## DIAL CORD REPLACEMENT

Two separate drive cables are used in the CR-199 dial assembly. One cable is used to transmit the motion from the tuning knob to the large pulley that is coupled to the condenser gang; the other cable actuates the dial pointer whenever the large pulley on the condenser gang is rotated. Separate instructions for replacing either of these cables is given in the following paragraphs.

**CONDENSER DRIVE CABLE REPLACEMENT**

Remove dial assembly after taking out two screws on each side of chassis. Slide a short length (approximately ½ inch) of sleeving over one end of a length of dial cable, form a small loop and tie a knot in the manner shown on Figure 1. Tie spring to opposite end of cable making length including spring 20¾ inches. Hook loop over the metal hook in pulley "C" and lace the cable through the pulley slot and around the pulley in a counterclockwise direction when viewed from the rear of the chassis keeping the cable to the rear of the pulley groove. Lace the cable around the smaller diameter portion of the tuning control shaft wrapping 2½ turns *from front to back;* then around the opposite side of pulley "C" into the pulley through the slot. Hook the end of tension spring "D" in the hole provided in pulley "C"; completing this operation.

**DIAL POINTER DRIVE CABLE REPLACEMENT**

Remove dial assembly after taking out two screws on each side of chassis. Slip a one-half inch length of sleeving into a 42-inch length of dial cable. Tie the two ends to the loop end of the cable spring "E" securely so that the cable doubled measures 20¾ inches end to end including spring.

Place spring hook in bottom hole and draw cable through slot of pulley "C". Loop one end of cable around pulley "C" in a clockwise direction in front of condenser drive cable (viewing chassis from front) then loop the remaining end around pulley in a counterclockwise direction. Secure both ends of cable to chassis at edge of pulley slot with scotch tape, keeping piece of sleeving on remaining loop of cable.

Replace dial assembly and loop cable over pulley "A". While holding cable taut remove scotch tape and loop cable over pulley "B".

Turn the tuning control shaft until the condenser gang is completely meshed and slide the dial pointer on its track until it is in line with the last calibration mark at the low frequency end of the dial. The short piece of sleeving installed prior to the stringing operation should be slid to the rear of the dial pointer and the crimping lug on the pointer pressed over the sleeving. After checking to make certain that the condenser gang is completely meshed and the dial pointer is in the position specified previously, apply a few drops of cement to each end of the sleeving to which the dial pointer is fastened. This completes the operation.

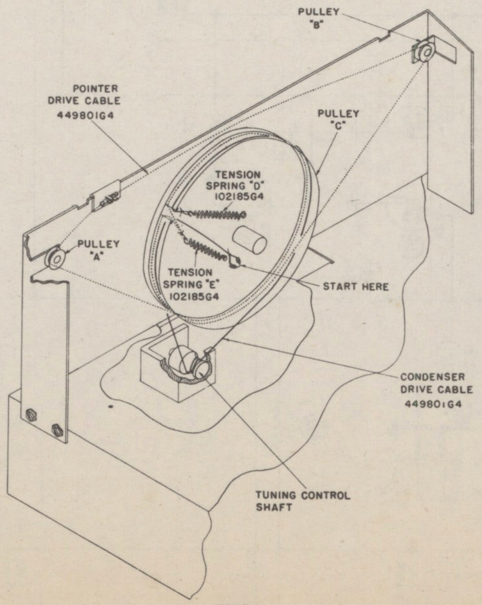

PULLEY "B"
POINTER DRIVE CABLE 44980IG4
PULLEY "C"
TENSION SPRING "D" 102185G4
PULLEY "A"
TENSION SPRING "E" 102185G4
START HERE
CONDENSER DRIVE CABLE 44980IG4
TUNING CONTROL SHAFT

FIGURE 1

# THE MAGNAVOX CO.

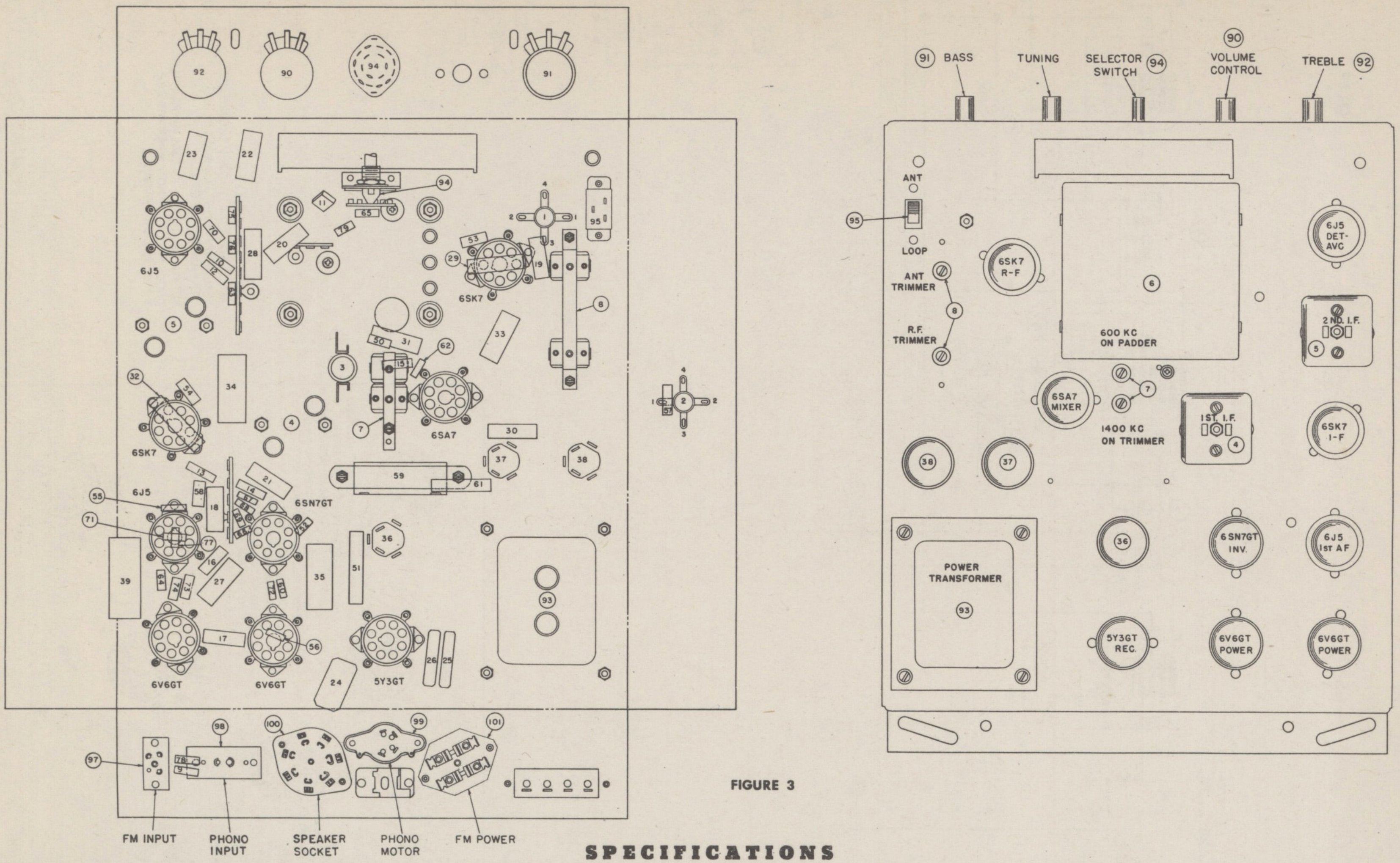

92
90
94
91
23
22
6J5
6SK7
6SA7
6SN7GT
6V6GT
5Y3GT
FM INPUT
PHONO INPUT
SPEAKER SOCKET
PHONO MOTOR
FM POWER
97
98
99
100
101
BASS
TUNING
SELECTOR SWITCH
VOLUME CONTROL
TREBLE
ANT
LOOP
ANT TRIMMER
R.F. TRIMMER
95
6SK7 R-F
600 KC ON PADDER
6SA7 MIXER
1400 KC ON TRIMMER
1ST. I.F.
2 ND. I.F.
6J5 DET-AVC
6SK7 I-F
6J5 1ST AF
6SN7GT INV.
6V6GT POWER
5Y3GT REC.
POWER TRANSFORMER
93
36
37
38

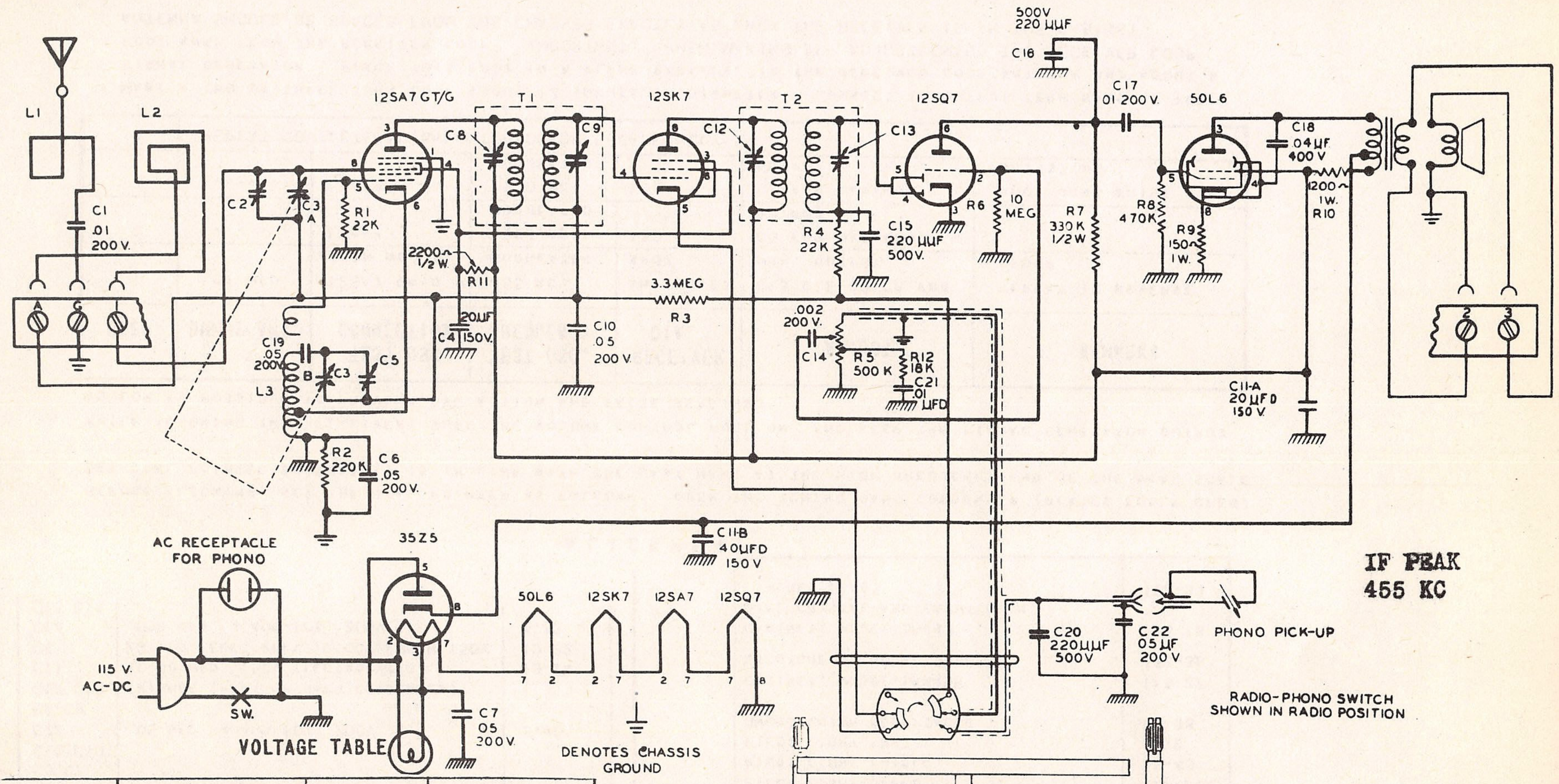
FIGURE 3

## SPECIFICATIONS

| | |
|---|---|
| Power supply | 117 volts 50/60 cycles AC |
| Power consumption | 85 watts |
| Power output | 10 watts |
| Intermediate frequency | 455 kc. |
| Tuning frequency range | 534–1620 kc. |
| Tubes: | |
| R-F Amplifier | 6SK7 |
| Converter | 6SA7 |
| I-F Amplifier | 6SK7 |
| Detector and AVC | 6J5 |
| First Audio | 6J5 |
| Inverter | 6SN7GT |
| Power output (push-pull stage) | (2) 6V6GT |
| Rectifier | 5Y3GT |
| Dial lamps | Mazda No. 44 |
| Speakers: | |
| Field coil resistance | 1000 ohms |
| Voice coil impedance (400 cycles) | 3.0 ohms |
| Output transformer | 8,000/3 ohms |

## MAJESTIC RADIO & TELEV. CORP.

**MODELS 5A445,5A445R**

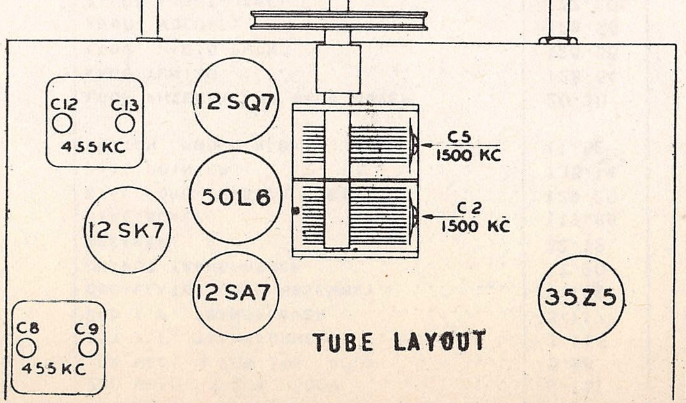

L1
L2
C1 .01 200V.
A G
12SA7GT/G
C2 C3 A
R1 22K
C8
T1
C9
2200~ 1/2W
R11
20UF C4 150V.
C19 .05 200V
B C3 C5
L3
R2 220K
C6 .05 200V.
C10 .05 200V
12SK7
C12
T2
C13
3.3MEG R3
R4 22K
.002 200V. C14
R5 500K
R12 18K
C21 .01 UFD
C15 220 UUF 500V.
12SQ7
R6
10 MEG
500V 220 UUF C18
C17 .01 200V.
R7 330K 1/2W
50L6
R8 470K
R9 150~ 1W.
C18 .04UF 400V
1200~ 1W. R10
C11-A 20UFD 150V
2 3
C11B 40UFD 150V
35Z5
AC RECEPTACLE FOR PHONO
115 V. AC-DC
SW.
50L6 12SK7 12SA7 12SQ7
C7 .05 200V
DENOTES CHASSIS GROUND
C20 220UUF 500V
C22 .05UF 200V
PHONO PICK-UP
RADIO-PHONO SWITCH SHOWN IN RADIO POSITION

**IF PEAK 455 KC**

### VOLTAGE TABLE

| TUBE | ELEMENT | PIN | VOLTS |
|---|---|---|---|
| 12SA7 | PLATE | 3 | 80-89 |
| | S. GRID | 4 | 80-89 |
| | GRID | 5 | -.7 |
| 12SK7 | PLATE | 8 | 80-89 |
| | S. GRID | 6 | 80-89 |
| | GRID | 4 | -.65 |
| 12SQ7 | PLATE | 6 | 55-65 |
| | GRID | 2 | -.8 |
| 50L6 | PLATE | 3 | 110-118 |
| | S. GRID | 4 | 80-89 |

**NOTE:** ALL VOLTAGES MEASURED WITH VOLTOHMYST TO B MINUS (LOW END OF VOL CONTROL, PIN 8 OF 12SQ7, ETC.) LINE VOLTAGE 117 VOLTS, NO SIGNAL, VOLUME CONTROL FULL OFF


C12 C13 455KC
12SQ7
C5 1500 KC
C2 1500 KC
50L6
12SK7
12SA7
35Z5
C8 C9 455KC

TUBE LAYOUT

©John F. Rider

**MODELS 5A445,5A445R**

# MAJESTIC RADIO & TELEV. CORP.

## PARTS LIST

| ITEM | DESCRIPTION | PART NO. |
|---|---|---|
| R1 R4 | 22,000 OHM, 20%, 1/4 WATT | 9-184 |
| R2 | 220,000 OHM, 20%, 1/4 WATT | 9-182 |
| R3 | 3.3 MEGOHM, 20%, 1/4 WATT | 9-206 |
| R5 | VOLUME CONTROL WITH SWITCH, ½ MEGOHM | 13-28 |
| R6 | 10 MEGOHM, 20%, 1/4 WATT | 9-160 |
| R7 | 330,000 OHM 20%, 1/2 WATT | 9-89 |
| R8 | 470,000 OHM 20%, 1/4 WATT | 9-207 |
| R9 | 150 OHM, 20%, 1 WATT | 9-251 |
| R10 | 1200 OHM, 10%, 1 WATT | 9-216 |
| R11 | 2200 OHM, 10%, 1/2 WATT | 02-100 |
| R12 | 18,000 OHM, 20%, 1/4 WATT | 9-269 |
| C1,C17,<br>C21 | .01 MFD. + 40%-10%, 200V | 5-57 |
| C2,C3,C5 | GANGED TUNING CONDENSER | 7-24 |
| C6,C7,<br>C10,C19,<br>C22 | .05 MFD. + 40%-10%, 200V | 5-40 |
| C8,C9,<br>C12,C13, | TRIMMER (PART OF GANG CONDENSER) | |
| C11 | 20-40 MFD 150V ELECTROLYTIC | 19-24 |
| C4 | 20 MFD ELECTROLYTIC CONDENSER 150V. | 19-32 |
| C14<br>C15,C16. | .002 MFD. + 40%-10%, 200V | 5-52 |
| C20 | 220 MMFD. ± 20%, 500V | 6-151 |
| C18 | .04 MFD + 20%-10%, 400V | 5-58 |
| T1 | 1ST I.F. TRANSFORMER | 3-116 |
| T2 | 2ND I.F. TRANSFORMER | 3-117 |
| L3 | OSCILLATOR COIL ASSEMBLY | 3-158 |
| | OUTPUT TRANSFORMER | 12-20 |
| | SPEAKER | 22-32 |
| | DIAL SCALE | 117-66 |
| | DIAL CORD TENSION SPRING | 129-29 |
| | DIAL POINTER | 135-14 |
| | SWITCH, PHONO-RADIO | 11-52 |
| | LOOP ANTENNA AND BACK COVER | 20-30 |
| | KNOB-TUNING | 128-54 |
| | KNOB, RADIO-PHONO | 128-55 |
| | KNOB, VOLUME | 128-56 |
| | PILOT LIGHT JEWEL | 127-205 |
| | PILOT LIGHT SHIELD | 23-45 |
| | PILOT LIGHT, #47 | 26-2 |
| | PHONO MOTOR RECEPTACLE | 15-98 |
| | CABINET, MODEL 5A445R | 115-22 |
| | ESCUTCHEON, MODEL 5A445R | 122-38 |
| | CABINET MODEL 5A445 | 115-18 |
| | DIAL CRYSTAL AND ESCUTCHEON, MODEL 5A445 | 122-33 |

## ALIGNMENT

BEFORE ALIGNING, SET THE DIAL POINTER AS FOLLOWS: OPEN THE TUNING GANG CONDENSER (PLATES FULLY OPEN) SET DIAL POINTER SO THAT IT IS IN LINE WITH THE LAST MARK AT THE HIGH FREQUENCY END OF THE DIAL SCALE

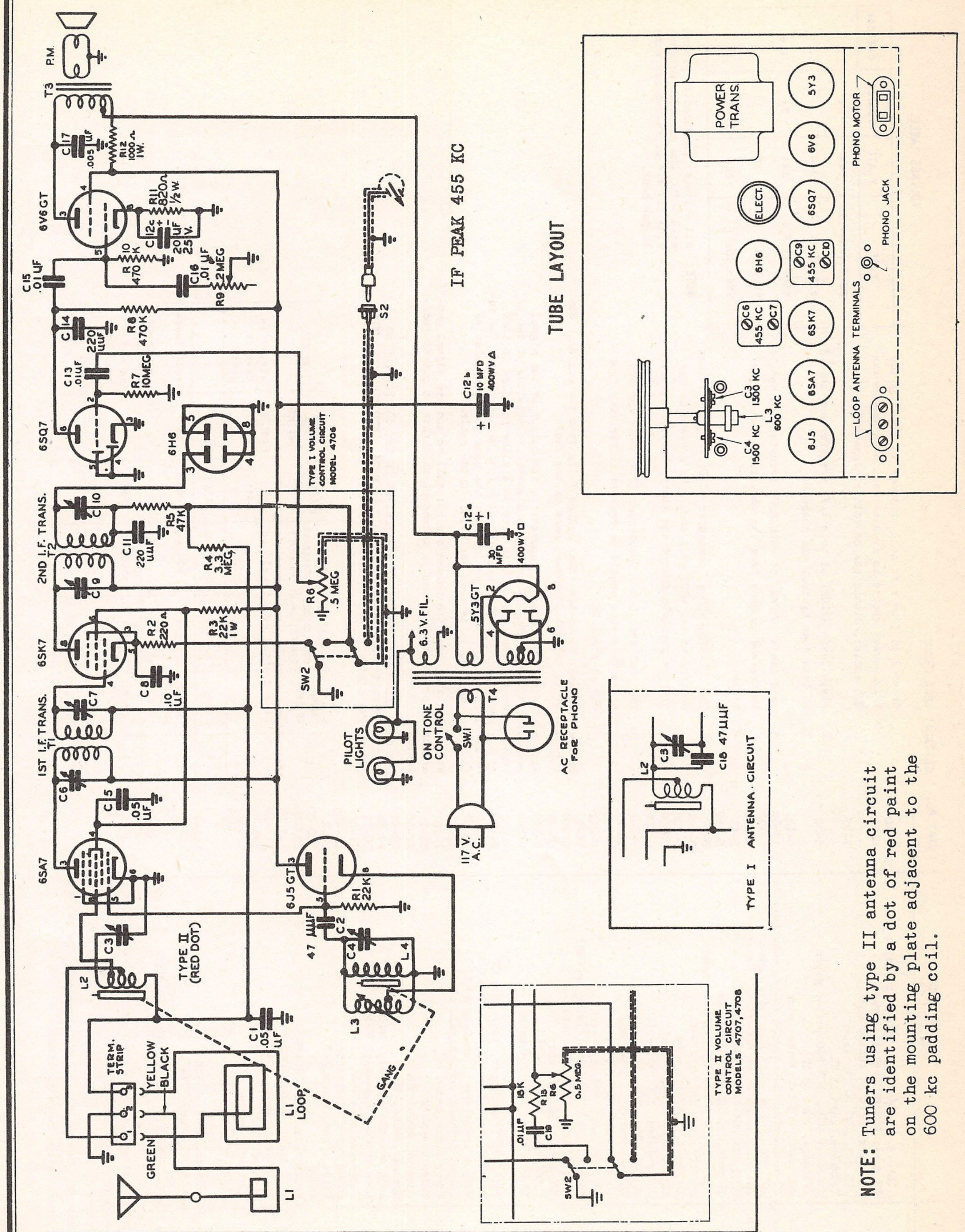
WHILE ALIGNING THIS RECEIVER, TURN THE VOLUME CONTROL FULL ON, AND KEEP THE SIGNAL GENERATOR OUTPUT AS LOW AS POSSIBLE TO PREVENT AVC ACTION AND FALSE READINGS

| STEP | DUMMY ANT. | TEST OSC. CONNECTION | TEST OSC. FREQUENCY | RECEIVER DIAL | ADJUST | REMARKS |
|---|---|---|---|---|---|---|
| 1 | .01 MFD | 12SA7 GRID (PIN NO 5) | 455 KC. MODULATED | ANY QUIET SPOT | C13,C12,C9,C8 FOR MAX. OUTPUT | REPEAT IN REVERSE ORDER |
| 2 | -------- | LOOP* | 1500 KC MODULATED | 150 | C5 FOR MAXIMUM OUTPUT | |
| 3 | -------- | LOOP* | 1500 KC MODULATED | 150 | C2 FOR MAXIMUM OUTPUT | ROCK GANG WHILE ADJUSTING |
| 4 | REPEAT COMPLETE ALIGNMENT PROCEDURE CAREFULLY | | | | | |

* MAKE A TWO OR THREE TURN LOOP ABOUT 12 INCHES IN DIAMETER CONNECT TO OUTPUT TERMINALS OF THE SIGNAL GENERATOR PLACE THIS LOOP IN A PLANE PARALLEL TO THE RECEIVER LOOP ANTENNA AND ABOUT A FOOT AWAY FROM THE RECEIVER LOOP IMPORTANT: WHEN MAKING RF ADJUSTMENTS, THE RECEIVER LOOP ANTENNA SHOULD BE SPACED FROM THE CHASSIS EXACTLY AS WHEN THE RECEIVER IS IN THE CABINET

MODELS 7C432,7C447
Chassis 4706,4707

# MAJESTIC RADIO & TELEV. CORP.


P.M.
T3
C17 .005 UF
R12 1000Ω 1W.
6V6GT
R11 820Ω 1/2W
C12c 20 UF 25 V.
C15 .01 UF
R 470 K
R10
C16 .01 UF
R9 2 MEG
C14 220 UUF
R8 470 K
C13 .01UF
R7 10MEG
6SQ7
6H6
2ND I.F. TRANS. T2
C10
C11 220 UUF
R5 47K
R4 3.3 MEG
C9
R6 .5 MEG
6SK7
R2 220Ω
R3 22K 1W
C8 .10 UF
1ST I.F. TRANS. T1
C7
C6
C5 .05 UF
6SA7
TYPE I VOLUME CONTROL CIRCUIT MODEL 4706
SW2
S2
C12b 10 MFD 400WV
C12a 30 MFD 400WV
5Y3GT
6.3 V. FIL.
PILOT LIGHTS
ON TONE CONTROL
SW.1
T4
AC RECEPTACLE FOR PHONO
117 V. A.C.
6J5GT
R1 22K
47 UUF C2
C4
L4
L3
TYPE II (RED DOT)
C3
L2
C1 .05 UF
TERM. STRIP
YELLOW
BLACK
GREEN
L1 LOOP
L1
GANG
IF PEAK 455 KC
TUBE LAYOUT
POWER TRANS.
5Y3
6V6
6SQ7
ELECT.
6H6
C9 455 KC C10
6SK7
C6 455 KC C7
6SA7
6J5
C3 1500 KC
L3 600 KC
C4 1500 KC
LOOP ANTENNA TERMINALS
PHONO JACK
PHONO MOTOR
C18 47 UUF
TYPE I ANTENNA CIRCUIT
TYPE II VOLUME CONTROL CIRCUIT MODELS 4707,4708
.01 UF C19
15K R15
R6 0.5 MEG.

**NOTE:** Tuners using type II antenna circuit are identified by a dot of red paint on the mounting plate adjacent to the 600 kc padding coil.

**MODELS 7C432,7C447**
**Chassis 4706,4707**

## MAJESTIC RADIO & TELEV. CORP.

| ITEM | DESCRIPTION | PART NO. |
|---|---|---|
| C1 | .05 mfd, + 40% - 10%, 200 volt, paper | 5-40 |
| C2 | 47 mmfd. 20% 500 volts, ceramic | 6-159 |
| C3, C4 | Trimmers, part of tuning unit | |
| C5 | .05 mfd, 30% 600 v. paper | 5-77 |
| C6, C7 | Trimmers, part of T1 | |
| C8 | .1 mfd + 40% - 10% 200 volts, paper | 5-39 |
| C9, C10 | Trimmers, part of T2 | |
| C11, C14 | 220 mmfd. 20% 500 volts, mica | 6-151 |
| C12a,b,c | 30-10-20 mfd., 400-400-25 volts, electrolytic | 19-26 |
| C13 | .01 mfd, + 20% - 10% 200 volts, paper | 6-112 |
| C15, C16 | .01 mfd, + 30% - 10% 400 volts, paper | 6-132 |
| C17 | .005 mfd 20% 600 volts, paper | 5-61 |
| C18 | 47 mmfd 20% 500 volts ceramic | 6-159 |
| C19 | .01 mfd., + 40% - 10% 200 v., paper | 5-57 |
| R1 | 22,000 ohms, 20%, 1/3 watt | 9-184 |
| R2 | 220 ohms, 20%, 1/3 watt | 9-208 |
| R3 | 22,000 ohms, 10%, 1 watt | 9-320 |
| R4 | 3.3 megohms, 20%, 1/3 watt | 9-206 |
| R5 | 47,000 ohms, 20%, 1/3 watt | 9-201 |
| R6 | Volume control, .5 megohms | 13-19 |
| R7 | 10 megohms, 20%, 1/3 watt | 9-160 |
| R8 | 470,000 ohms, 20%, 1/2 watt | 9-211 |
| R9 | Tone control, 2 megohm, (with switch) | 14-6 |
| R10 | 470,000 ohms, 20%, 1/3 watt | 9-207 |
| R11 | 820 ohms, 10%, 1/2 watt | 02-83 |
| R12 | 1,000 ohms, 20%, 1 watt | 9-169 |
| R13 | 18,000 ohms, 20%, 1/4 watt | 9-269 |
| T1 | 1st I.F. transformer, inc. C6 & C7 | 3-159 |
| T2 | 2nd I.F. transformer, inc. C9 & C10 | 3-160 |
| T3 | Output transformer (chassis 4706) | 12-27 |
| | Output transformer (chassis 4707) | 12-26 |
| T4 | Power transformer | 2-16 |
| | Tuner assembly | 32-1 |
| | Speaker, Model 7C432 | 22-20 |
| | Speaker, Model 7C447 | 22-26 |
| | Loop antenna assembly, Model 7C432 | 20-23 |
| | Loop antenna assembly, Model 7C447 | 20-24 |
| SW2 | Phono-radio switch | 11-52 |
| | Phono motor receptacle | 15-98 |
| | Pilot light, Mazda #47 | 26-2 |
| | Knobs | 128-50 |
| | Escutcheon, Model 7C447 | 122-30 |
| | Dial scale, Model 7C432 | 117-56 |
| | Dial scale, Model 7C447 | 117-59 |
| | Dial pointer | 135-8 |
| | Dial cord spring | 129-29 |
| | Dial cord assembly | S-1297 |
| | Cabinet, Model 7C432 | 115-7 |
| | Cabinet, Model 7C447 | 115-14 |

Model 7C447 - REMOVING CHASSIS FROM CABINET:

Always slide the chassis out through the BACK of the cabinet, NEVER through the bottom. On some cabinets there is a reinforcing block in the rear, lower left corner. Remove this block by removing the two wood screws before removing chassis.

CRITICAL LEAD DRESS:

1. Green lead from r.f. coil on tuner to pin 8 of the 6SA7 socket should be dressed well over toward the 6J5 socket, around the ceramic condenser C2.
2. Plate leads (BLUE) of both I.F. transformers should be laid down against the chassis.
3. Grid leads (GREEN) of both I.F. transformers should be dressed up away from the chassis as far as possible.
4. The .01 mfd. 400 v. condenser (C13) from the volume control to the 6SQ7 grid should be dressed as far over as possible toward the electrolytic condenser.
5. The .005 mfd. 600 v. condenser (C17) from the 6V6 plate to ground should be dressed as far away from C13 as possible.

Before aligning, close the tuner (slugs fully into the coils). Set the pointer to extreme left-hand mark on the dial.

When making r.f. adjustments, connect to the output of the signal generator a loop, about 12 inches in diameter, consisting of two or three turns of wire. Place this loop in a plane parallel to that of the receiver loop antenna and about a foot away from it. The receiver loop antenna should be in about the same position relative to the chassis as it is when installed in the cabinet.

While aligning, keep the volume control full on and the signal generator output no higher than is necessary to obtain an output indication.

USE ONLY ALL PLASTIC OR FIBRE SCREWDRIVER ON THE 600 KC PADDING COIL. INSERTION OF THE SLIGHTEST BIT OF METAL INTO THIS COIL WILL DETUNE THE CIRCUIT.

| STEP | DUMMY ANTENNA | TEST OSCILLATOR CONNECTION | TEST OSCILLATOR FREQUENCY | RECEIVER DIAL | ADJUST FOR MAXIMUM | NOTES |
|---|---|---|---|---|---|---|
| 1 | .01 MFD. | 6SA7 GRID | 455 KC | ANY QUIET SPOT | C10. C9<br>C7. C6 | REPEAT IN REVERSE ORDER |
| 2 | LOOP | ..... | 1500 KC. | 150 | C3. C4 | |
| 3 | LOOP | ..... | 600 KC | 60 | L3 | ROCK TUNER WHILE ADJUSTING |
| 4 | LOOP | ..... | 1500 KC. | 150 | C4 | DO NOT READJUST C3 |
| 5 | REPEAT STEPS 3 & 4 | | | | | |

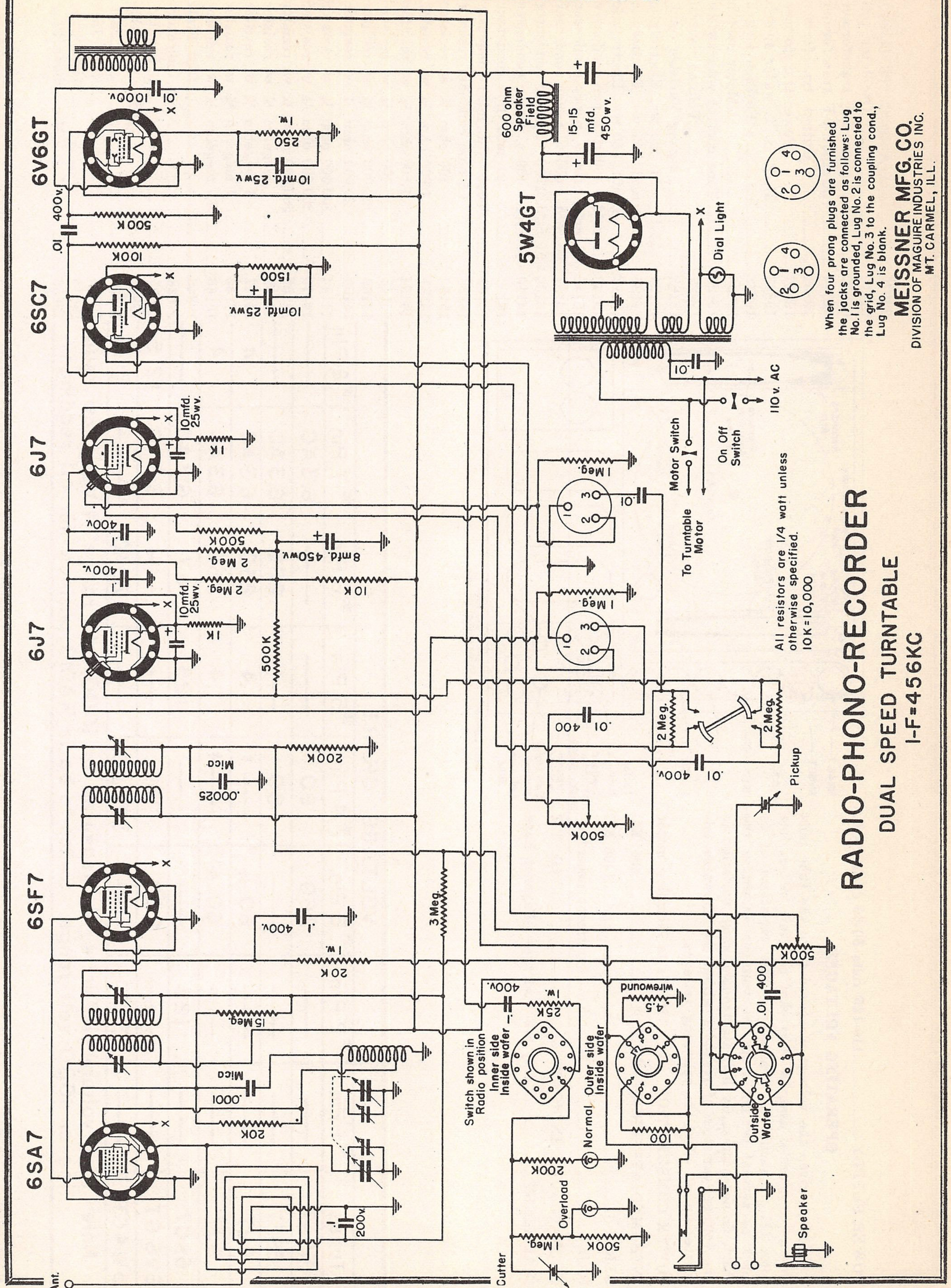
VOLTAGE TABLE

| TUBE | PLATE | SCREEN | CATHODE |
|---|---|---|---|
| 6SA7 (CONV.) | 244 | 74 | -- |
| 6J5 (OSC.) | 244 | -- | -- |
| 6SK7 (I.F.) | 244 | 74 | 1.6 |
| 6SQ7 (A.F.) | 75 | | |
| 6V6 (OUT) | 268 | 243 | 11 |

**NOTE:** All voltages measured to ground with 1,000 Ohm per volt meter; line 117 v.a.c. values may vary 10 per cent.

MEISSNER MFG. DIV.-
MAGUIRE INDUSTRIES INC.

MODEL 9-1065


6V6GT
6SC7
6J7
6J7
6SF7
6SA7
5W4GT
.01 1000v.
250 1w.
10mfd. 25wv.
.01 400v.
500 K
100K
1500
10mfd. 25wv.
10mfd. 25wv.
1K
.1 400v.
500K
2 Meg.
8mfd. 450wv.
.1 400v.
2 Meg.
10mfd. 25wv.
1K
500K
10 K
.00025 Mica
200K
3 Meg.
.1 400v.
20 K 1w.
15 Meg.
.0001 Mica
20K
.1 200v.
Ant.
600 ohm Speaker Field
15-15 mfd. 450wv.
Dial Light
X
.01
110 v. AC
On Off Switch
Motor Switch
To Turntable Motor
1 Meg.
.01
1 Meg.
.01 400
2 Meg.
2 Meg.
.01 400v.
Pickup
500K
500K
.01 400
.1 400v.
25K 1w.
4.5 wirewound
100
Switch shown in Radio position
Inner side Inside wafer
Outer side Inside wafer
Outside Wafer
Normal
Overload
200K
1 Meg.
500K
Cutter
Speaker

When four prong plugs are furnished the jacks are connected as follows: Lug No. 1 is grounded, Lug No. 2 is connected to the grid, Lug No. 3 to the coupling cond., Lug No. 4 is blank.

**MEISSNER MFG. CO.**
DIVISION OF MAGUIRE INDUSTRIES INC.
MT. CARMEL, ILL.

All resistors are 1/4 watt unless otherwise specified.
10K=10,000

## RADIO-PHONO-RECORDER
DUAL SPEED TURNTABLE
I-F=456KC

RECORD CHANGER: General Industries Model R-90L, ARC P.242

MODEL 9-1065

# MEISSNER MFG. DIV.-
# MAGUIRE INDUSTRIES INC.

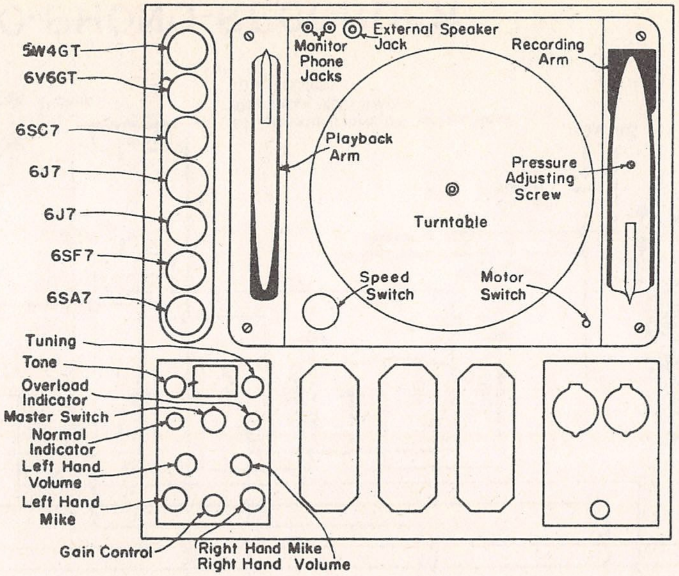
| | |
|---|---|
| 02076 | Antenna coil (Loop) |
| 01710 | Oscillator coil |
| 02072 | Input I-F transformer |
| 02074 | Output I-F transformer |
| 19851 | Output transformer |
| 19847 | Power transformer |
| 19843 | D. P. S. T. wafer switch |
| 19842 | 5 Position switch |
| 19696 | Motor switch |
| 19828 | Tone control with switch |
| 19827 | Volume control |
| 18162 | 2-gang Variable cond. |
| 16124 | 15-15 mfd. 450 wv. Electrolytic |
| 24126 | 10-10 mfd. 25 wv. Electrolytic |
| 16113 | 8 mfd. 450 wv. Electrolytic |
| 15143 | .1 mfd. 400 v. paper condenser |
| 15142 | .1 mfd. 200 v. paper condenser |
| 14181 | .05 mfd. 400 v. paper condenser |
| 16136 | .01 mfd. 1000 v. paper condenser |
| 14110 | .01 mfd. 400 v. paper condenser |
| 18107 | .01 mfd. line condenser |
| 14102 | .00025 mfd. mica condenser |
| 16198 | 4.5 ohm candohm resistor |
| 15152 | 100 ohm ¼ w. resistor |
| 14191 | 1,000 ohm ¼ w. resistor |
| 14194 | 1,500 ohm ¼ w. resistor |
| 14143 | 10,000 ohm ¼ w. resistor |
| 14169 | 20,000 ohm ¼ w. resistor |
| 14190 | 20,000 ohm 1 w. resistor |
| 14144 | 100,000 ohm ¼ w. resistor |
| 14170 | 200,000 ohm ½ w. resistor |
| 14155 | 500,000 ohm ¼ w. resistor |
| 18152 | 1 megohm ¼ w. resistor |
| 24127 | 2 megohm ¼ w. resistor |
| 17146 | 3 megohm ¼ w. resistor |
| 18166 | 15 megohm ¼ w. resistor |
| 19846 | Dial Scale |
| 19628 | Neon Indicators |
| 19695 | Speaker |
| 19821 | Motor turntable |
| 19470 | Jack |
| 19468 | Pin Jack |
| 19855 | Microphone |
| 19856 | Microphone Plug |

| | |
|---|---|
| POWER SUPPLY | 110-125 volts 50-60 cycles A.C. |

## OPERATING VOLTAGES

Below is given the voltage measured from the tube pins shown—to chassis, using a 1000 ohm per volt meter, line volts 117. It should be remembered that variations of as much as several percent from the voltages shown in the chart, do not necessarily indicate trouble, since variation in line voltage, variation of resistors within the allowable tolerance, etc. all effect the operating voltages.

| | |
|---|---|
| POWER CONSUMPTION | 110 Watts including motor |
| INTERMEDIATE FREQUENCY | 456 KC |
| ALIGN | 1400 KC |
| PAD | No adjustment necessary |
| NEON VOLUME INDICATORS | GE T-2 |
| DIAL LIGHT | Any 6-8 Volt type—Bayonet Base |


5W4GT
6V6GT
6SC7
6J7
6J7
6SF7
6SA7
Tuning
Tone
Overload Indicator
Master Switch
Normal Indicator
Left Hand Volume
Left Hand Mike
Gain Control
Right Hand Mike
Right Hand Volume
Monitor Phone Jacks
External Speaker Jack
Recording Arm
Playback Arm
Pressure Adjusting Screw
Turntable
Speed Switch
Motor Switch

## VOLTAGE CHART

| Tubes | #1 Pin | #2 Pin | #3 Pin | #4 Pin | #5 Pin | #6 Pin | #7 Pin | #8 Pin |
|---|---|---|---|---|---|---|---|---|
| 6SA7 | — | — | 260 | 80 | — | — | 6.3AC | — |
| 6SF7 | — | — | — | 80 | — | 260 | 6.3AC | — |
| 6J7 | — | — | 60 * | — ‡ | .4 | 250 | 6.3AC | .4 |
| 6J7 | — | — | 60 * | — ‡ | .4 | 250 | 6.3AC | .4 |
| 6SC7 | — | 125 | — | — | 125 | 1.7 | 6.3AC | — |
| 6V6 GT | — | — | 230 | 260 | — | — | 6.3AC | 12.5 |
| 5W4GT | — | 310 | — | 320AC | — | 320AC | — | 310 |

Note: Line voltage = 117 volts * Measured on 1000 volt range. ‡ Very low reading on 1000 volt range. Switch to be in RADIO position for all readings

MEISSNER MFG. DIV.-
MAGUIRE INDUSTRIES INC.

# OPERATION

The following chart is designed to give the user of the Meissner Radio-Recorder a quick insight of the functions of the various controls. For best results the notes and instructions following the chart should be read and followed, since the chart alone cannot contain all the information essential to the proper use of the equipment.

In the top row of the chart are listed the five functions of the unit, corresponding to the five positions of the selector switch in the center of the control panel. In the left hand column are listed the different controls and other devices on the control panel. By glancing down any vertical column it can be immediately determined what controls and indicators are in use for that position of the selector switch.

In operating the Meissner Radio-Recorder as a radio receiver, a record player, a recorder, or a public address system; there are certain precautions that must be observed and also several special hook-ups that may be used to get the best results and to take advantage of the full flexibility of which the unit is capable. These are listed under sub-headings following, and should be studied carefully before attempting to operate the equipment, and should also be referred to often until the user is fully acquainted with his equipment and all functions it will perform.

| Position of Selector Switch | Radio Only | Phono Playback | Record Mike | Record Radio | Public Address |
|---|---|---|---|---|---|
| Tuning | Radio Tuning | ——— | ——— | Radio Tuning | ——— |
| Tone | Tone Control & Line Switch | | | | |
| Normal and Overload | ——— | ——— | Volume Level Indicators | Volume Level Indicators | ——— |
| Volume (Left Hand) | Volume Control for Left Hand Mike | | | | |
| Volume (Right Hand) | Radio Volume Contol | Phono Volume Control | Volume Control for Right Hand Mike | Radio Volume Control | Volume Control for Right Hand Mike |
| Mike (Left Hand) | Input for Mike, External Radio, or External Phono | | | | |
| Mike (Right Hand) | ——— | ——— | Input for Mike<br>Ext. Phono<br>Ext. Radio | ——— | Input for Mike<br>Ext. Phono<br>Ext. Radio |
| Gain | Gain Control for using different types of Microphones | | | | |

## POWER SUPPLY

This Radio-Recorder is designed to operate from a 110-125 volt 50-60 cycle alternating current supply. Never attempt to operate it from other source of supply—serious damage to the equipment is almost sure to occur.

## LINE SWITCH

The line switch for the unit is located on the tone control. The switch for the turntable is located in the front, right hand corner of the turnable base. The turntable will not operate unless both the master switch on the tone control and the motor switch are turned on.

## ADJUSTMENT

### CUTTER ARM HEIGHT

The cutter arm height is adjusted at the factory for a standard ⅝" stylus. If recoring blanks of the usual home recording type are used, the cutter arm height should not have to be changed. If recording blanks of unusual thickness are used, it will be necessary to re-adjust the cutter arm height. For instructions for performing this adjustment, refer to the section of this instruction sheet entitled SERVICE NOTES.

### CUTTER ARM PRESSURE

Variation in the hardness of different record coatings may require different cutting pressures for different makes of records.

The normal depth of cut produces a width of groove approximately equal to the width of the uncut portion left between grooves. When changing kinds or make of records examine a portion of the new record after having made a trial cutting to see if it approaches this condition. If not, refer to the SERVICE NOTES of this sheet and make the proper adjustment according to the instructions given there.

## REPRODUCING NEEDLES

In choosing the correct reproducing needles to use, it should be kept in mind that while most any good make of reproducing needle is satisfactory for reproducing commercial records, the same is not true with home recordings. The material used to make instantaneous recording blanks is necessarily softer than the material used in commercial records and is more easily damaged by a reproducing needle which is not properly made to fit the groove in the record. There are a number of good needles on the market made especially for reproducing instantaneous recordings and one of these should be chosen.

## RECORDING SPEED

Two recording speeds are provided on the Meissner Radio-Recorder, 78 RPM and 33⅓ RPM. In general it may be said that the 78 RPM speed is for quality, the 33⅓ RPM speed for economy.

The 33⅓ RPM speed is not recommended where the best fidelity is desired. It will be found that at the center of the record, made at this speed, music loses its brilliance and does not have the high frequency notes recorded faithfully. The same is true of speech recordings but to a much lesser degree, since the high frequencies contained in voice are negligible. Thus when recording long speeches the 33⅓ RPM speed offers the advantage of being able to record for longer time intervals without interruptions to change records, as well as the advantage of record economy. For instance, a 10 inch record when operated at 78 RPM will record 4½ minutes of program material, while at 33⅓ RPM it will record 10 minutes of program material.

In other cases where the best fidelity is not essential, it may be found that the economy of the lower recording speed is more desirable than the better quality of the higher speed.

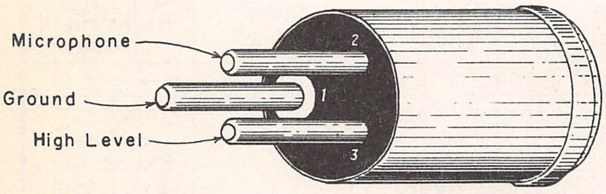
The switch that controls the turntable speed is located on the front left-hand corner of the turntable base.

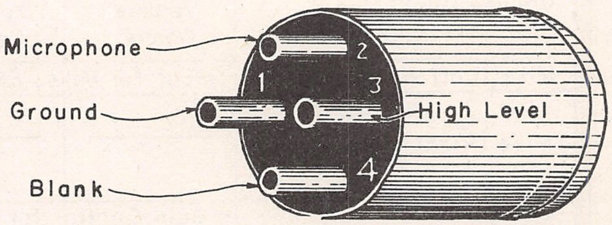
# INPUT OTHER THAN MICROPHONES

In many cases it may be desirable to introduce external input to the amplifier other than that from the microphone. For either recording or Public Address work it may be desirable to feed in the output of (a) an external radio (b) FM Tuner (c) external phono pickup or other electronic devices. Such sources are considered high level inputs and the gain switch should be set accordingly.

Any high level input may be introduced into either of the mike jacks through a plug like the extra plug supplied with the unit and should be connected as shown below.

Some trouble may be experienced in the making of instrumental recordings. There may be heard what appears to be distortion but due to the fact that the ordinary room does not have the accoustical properties of a recording studio there will be room reverberation. The ear does not notice this at the time but the microphone will. Frequently this trouble is corrected by the use of contact microphones. Placed directly on the sounding boards of the instrument, (Piano, Violin etc.), it gives a true reproduction of the tones and overtones produced by the instrument.





## CUTTING ARM ADJUSTMENTS

### CUTTING ARM HEIGHT

1. Place on the turntable an uncut record of the type that is to be used for recording.

2. Place stylus in the cutting head. Insert it as far as it will go, rotate it until the long flat on the shank of the stylus faces the stylus screw, then firmly tighten the screw.

3. Raise the cutter arm well up from its rest, swing it over the record and carefully lower it so that the stylus rests on the record near the center (which should not be revolving). Observe the position of the stylus screw in the slot in the cutter arm. If the screw is approximately in the middle of the slot no adjustment of the cutter arm height is required, but if the stylus screw is close to either the top or the bottom of the slot the arm should be adjusted in the following manner:

(a) Lift the cutter arm into a vertical position. Underneath the arm will be found a machine screw on which the arm rests. The adjustment of this screw is preserved by a lock nut. Loosen the lock nut and rotate this screw until the stylus screw occupies the center position in the slot when the cutter arm is in the recording position, then tighten the lock nut and again check the position of the stylus screw to see that the adjustment has not been disturbed by tightening the lock nut.

(b) Cut a few blank grooves (volume control at zero) while watching the stylus screw to see that as the record revolves, the stylus screw does not approach either end of the slot. If this condition holds true, the height of the cutter arm is properly adjusted until a new stylus is used having a length a great deal different than the stylus used in the original adjustment, or unless records of a new thickness are used that are sufficiently different from the original records to require readjustment of cutter arm height. NEVER ATTEMPT TO MAKE A RECORDING WITH MORE THAN ONE DISC ON THE TURNTABLE.

If the normal position of the screw is too high, the entire weight of the cutting arm is placed on the stylus when the stylus screw hits the top of the slot. This heavy weight will cause the stylus to dig into the record base and ruin at least the record and in all probability the stylus as well.

### CUTTING PRESSURE

Variation in the hardness of different record coatings may require different cutting pressures for different makes of records.

The normal depth of cut produces a width of groove approximately equal to the width of the uncut portion left standing between grooves. Examine the blank grooves cut during the preliminary adjustment to see whether they approach this condition. If not, the adjusting screw exposed through the top of the cutting arm can be changed quite easily to accomplish the desired result. If the cut is too light, the playback needle may not "track" and may jump out of the groove and scratch across the record. If the cut is too heavy the stylus may cut over into the adjacent groove on loud notes, or in cutting one groove, the stylus may push some of the wall material into the previously cut groove producing what is called an "echo", although when played back the "echo" precedes rather than follows the normally recorded sound.

The most common error in adjusting cutting pressure is making the cutting pressure greater than necessary, which increases the wear on the stylus, increases echo, and increases the difference in speed between recording and playback.

## MAKING A RECORD

The first attempt at cutting a record may best be done by recording from the microphone. After having plugged the microphone into the left-hand mike jack, turn on the line switch and set the selector switch to "Record Mike", speak into the microphone in a normal tone of voice about four to six inches away from it and adjust the left hand volume control until the "normal" neon indicator is flashing most of the time but the "overload" neon indicator flashes only occasionally. Touch a finger lightly to the needle in the cutting head and you will feel the needle vibrate in accordance with the sound impressed on the microphone.

In placing the recording disc on the turntable make certain that the drive pin enters the hole provided for it in all recording discs. NEVER PUT ON OR REMOVE A DISC WHILE TURNTABLE IS ROTATING. To do otherwise will injure the drive mechanism. ALWAYS HAVE TURNTABLE IN MOTION BEFORE LOWERING CUTTING STYLUS DOWN ON DISC as the stylus may easily be damaged if this care is not taken.

Pick up the cutting head, swing it over the record and lower it gently onto the record at the desired starting point. Permit two or three grooves to be cut before beginning the recording so that when the record is played back it will not be essential that the pickup start at the beginning of the first groove in order to reproduce the beginning of the recording. During the entire recording very careful attention should be paid to the volume indicators as explained in the section "Volume Indicators." Note: The mechanism which traverses the cutting head is engaged when the cutting head is lowered onto the record. Never attempt to force the cutting head sideways. Lift it first, which will disengage the cross-feed mechanism and allow the arm to be swung freely into any desired position. Lowering the arm onto its rest does not engage the cross-feed because the mechanism does not operate at such a great radius. For the same reason, the recorder will not cut 12 inch discs.

When the recording is finished, the "thread" that the stylus has cut out of the disc must be removed before the record is played. The best device for this purpose is a camels hair brush with which the thread is "picked up" rather than merely brushed to the center for manual removal, but if no brush is available, a wad of cotton, a piece of soft cloth or even a finger drawn lightly over the disc may be used to gather the thread around the spindle where it can be easily removed. The "thread" should be deposited in some fireproof container since many of the "Instantaneous Recording" discs are coated with highly inflamable cellulose nitrate (celluloid) although there are others coated with cellulose acetate (safety film) which do not require such precautions. It is very wise operating procedure to assume that all "threads" are inflammable and to dispose of them accordingly.

## EXTERNAL ANTENNA

A built in loop antenna is supplied with the unit. This antenna should give excellent results in localities reasonably near the stations to be received. However, in some localities the performance of loop antennas is not entirely satsifactory and for this reason provision has been made for connecting an external antenna.

A lead will be found in the microphone compartment to which an external antenna may be connected. No ground connection is ecessary.

## PUBLIC ADDRESS SYSTEM

The amplifier in the unit has ample power for many applications as a public address amplifier. When coverage of an area greater than that of a medium sized room in a home is desired, it is best to use an external speaker connected as explained under EXTERNAL SPEAKERS. Such a speaker should be mounted in a baffle or carrying case and a little experiment in its placement will soon show how best results may be obtained.

When using the unit as a public address system, it will be found that if the speaker is operated near the microphone the sound from the speaker will feed back into the microphone causing a "howl". This is true in any PA system and may be remedied by (a) removing the loud speaker farther from the microphone (b) reducing the volume (c) using a directional microphone turned so that its direction of greatest pickup is away from the loud speaker.

## EXTERNAL SPEAKER

If it is desired to use an external speaker instead of the one in the unit, provision is made for doing so. The voice coil of an external speaker may be plugged into the phone plug jack located on the back side of the turntable base. The voice coil impedence of the external speaker should be 6 to 8 ohms. This cuts out the internal speaker voice coil and substitutes the voice coil of the external speaker. An external speaker so used must either be of the permanent magnet type or of the electrodynamic type with self-contained field supply.

The advantages of such an arrangement are that for use as a public address system, the speaker may be placed in a remote position away from the amplifier to get better sound coverage in a room or building, at the same time, reducing the tendency for microphonic feed back from the speaker to the microphone when high output is desired.

## MIXING

The input from the left hand mike jack may be superimposd on any other input to the system at any time by merely turning up the left hand volume control. The input from this jack may be fed in any time regardless of the setting of the selector switch. Before attempting to make a recording by mixing in the input from this channel, it will be well to do a little experimenting with the setting of the two volume controls to assure that the signals from the two input channels have the correct relative levels when they reach the cutting head. This may be done by adjusting each volume control while the other is turned to zero, adjusting to the correct level by observing the neon indicators and noting the setting of the volume control knob. After the correct setting for each has been determined in this way, set each volume control knob to its correct position and make the recording.

## MICROPHONES

Microphones in general, as far as sensitivity is concerned, may be divided into two classes: (a) High level and (b) Low level. Ordinarily quality microphones will be found to fall in the low level classification. The crystal microphone supplied with this unit is this high quality low level type. The single button carbon type with transformer and battery and the contact microphones are high level microphones. Other high level sources will be discussed under the head, input other than microphone.

A gain switch has been provided to allow the use of high or normal input to the amplifier. When recording with a low level input the gain switch should be set on the High Gain position and when using a high level input, it should be set on the normal gain position.

## RE-RECORDING

Many novel effects may be obtained by Re-Recording, that is after a record is cut it may be placed on an external record player, the output of whose pickup head is fed into the right hand mike jack of the recorder. This should be fed in by a specially wired plug as shown above. As the record is being played on the record player and re-recorded on the Recorder, input from the Recorder microphone may be superimposed on it by turning up the left hand volume control. As an example of the novel effects obtainable, a person might record a song, re-record it, mixing in his own voice while re-recording, thus sing a duet with himself.

## RECORDING STYLI

Recording styli are made of three general types of material, ordinary hard steel, special tool steel and alloy such as Stellite or equivalent, or they may be made of the still harder material, sapphire. When samples of all three types of styli are in good condition, it can usually be demonstrated that the steel styli, either regular steel or tool steel, produce about equal surface noise, while the sapphire stylus will usually produce less.

The advantage of the special alloy steel stylus over the regular steel stylus is longer playing life, but this is accomplished at a sacrifice in ability to withstand abuse. The same thing applies to sapphire styli only to a much greater extent because the sapphire is quite brittle and can easily be chipped.

The two accidents most likely to damage a stylus are:

(1) Dropping the cutting arm so that the stylus strikes some surface thereby chipping or breaking the stylus.

(2) Cutting through the record coating into the base material.

The latter may be caused by poor quality or damaged records, either by cutting through thin spots that may exist, or by digging in after the stylus has been thrown off of the record surface by bumps or hard spots.

From the foregoing, it seems that in general home recording service, especially if the equipment may be handled by many people, as at parties, amateur dramatics, amateur concerts etc., it is more economical to use good quality regular steel styli that can be discarded without regret if accidentally damaged, rather than to invest in a supposedly long-lived high priced stylus, whose life may be greatly shortened by the careless act of some well meaning but uninformed person.

## RECORD BLANKS

The Meissner Radio-Recorder is designed to cut records up to 10 inches in diameter and to play records up to 12 inches in diameter.

"Instantaneous Recording" phonograph discs are comparatively new and consequently their manufacturer is far from being standardized. The only rule for selection is that of experience, either personal or that of your dealer. The record that performs best for you on your recorder is the best for you to use. Concentrate on that particular brand if you wish to produce consistently good recordings.

The most important characteristics of a record are listed below to be used as a guide in comparing and selecting records:

1. The blank should cut a clean shiny groove and produce a continuous thread. Records which produce a rough and dull looking groove, or which powder the material cut out of the groove, or which break the thread up into many pieces, or that produce a "sticky" thread, are not good records.

2. The "needle scratch" should be low. Generally the record producing the smoothest looking grooves will give the lowest needle scratch, but a more reliable method of testing is to cut a few blank grooves at the same radius with the same stylus on each of the records to be compared, and then to play them successively with the same setting of the volume control for all records, selecting the one producing the least volume of scratch, provided that its other characteristics are acceptable.

3. "Rumbel" is produced on some records having very flexible base materials. This is especially true of paper records. It is almost axiomatic that if a high quality recording is desired a paper (or other very flexible) base record should not be used, however, because of the economy that such discs offer they probably will enjoy the maximum volume of sale.

4. The "ageing" characteristics of records is a factor influencing the production of consistently good recordings but is somewhat difficult for the home recordist to check unless he is on the lookout for such differences and is a keen observer. Some records cut beautifully at a certain age and less well both before and after that time. Others cut well only when relatively fresh, while still others will not cut well until they have aged some time. This ageing characteristic may explain why a certain make of record may give excellent results at one time and not at another.

5. High Frequency Response is a characteristic in which wide variation can be expected. The variation between some makes of records is so great that only the most casual listening test is required to distinguish the record with good high-frequency response from that with poor high-frequency response. Such a test should, of course, be made with the same stylus, the same type of program, and the same type of play-back needle. Preferably the test should be made with live program material having a reasonable percentage of high-frequency notes. If the program is obtained from the radio, the tuning should be adjusted to produce a reasonable percentage of high notes and should not be changed between the several test runs because the tuning of most sets has a considerable influence on the high-frequency response.

6. Groove depth should be uniform. If there is any great difference in cutting depth a definite "pattern" will be evident on the record and the variable load on the motor will tend to produce a "wow" or unsteadiness in tone.

## VOLUME INDICATORS

ONE OF THE MOST IMPORTANT PHASES OF RECORDING IS CLOSE ATTENTION TO THE PROPER RECORDING VOLUME. THE BEST OPERATION IS OBTAINED WHEN THE "NORMAL" NEON INDICATOR IS LIT AS MUCH OF THE TIME AS POSSIBLE WHILE THE "OVERLOAD" NEON INDICATOR FLASHES ONLY AT RARE INTERVALS. A close control of program level is required to achieve such results but every bit of effort expended in the attempt will be well worth while.

If the volume is too high, it will cause distortion to be recorded on the disc. Once this distortion is recorded, no playback amplifier, however perfect it may be, can reproduce the program without distortion. Too much volume while recording will also cause overcutting, that is cutting into an adjoining groove, and may damage the cutting stylus itself.

If the recording level is too low, the surface noise is exaggerated and the playback has to be made with a high setting of the volume control. In the extreme case of very low recording volume, the volume control on playback may have to be set so high that a low frequency "microphonic howl" may be set up that can be eliminated only by turning down the volume control or by playing the record on an electric phonograph that has the speaker well isolated from the turntable and pickup.

When a musical program of a limited range of volume levels is being recorded, the volume control should be set so that the maximum volume operates the "overload" indicator only at very rare intervals. If the program has a very wide range of level, the volume will have to be turned up somewhat in the softest passages and reduced in the loudest passages. Such a practice is standard in professional recording and is the only way in which, for example, the tremendous volume range of a symphony orchestra from a single instrumental solo to full orchestra can be recorded without having the loud passages "cut over" into adjacent grooves, or having the softest passages covered up by needle scratch.

It will be helpful when recording to keep in mind that the volume indicators are giving a direct indication of the volume level being applied to the cutting head.

## TONE CONTROL WHEN RECORDING

The setting of the tone control when recording is partly a matter of choice and preference of the operator but it might well be pointed out here that usually the most satisfactory recordings are made with the tone control turned to the counter-clockwise position. There are exceptions to this and the operator, after a little experience in handling the equipment will learn what setting of the tone control is required for any particular set of conditions.

## MONITORING

There are several conditions under which it is desirable to be able to listen to the output of the amplifier when the speaker must of necessity be in-operative. The one such condition most commonly encountered is when recording from the self contained radio receiver, and is automatically taken care of in the switching. When the selector switch is turned to the "Record Radio" position, the speaker is put into the circuit but is operated at reduced volume. Thus the operator may hear the program material at the same time it is being recorded and can determine when the recordings should be stopped etc.

Other conditions under which it may be desirable to monitor the amplifier output are:

1. When recording from an external radio.

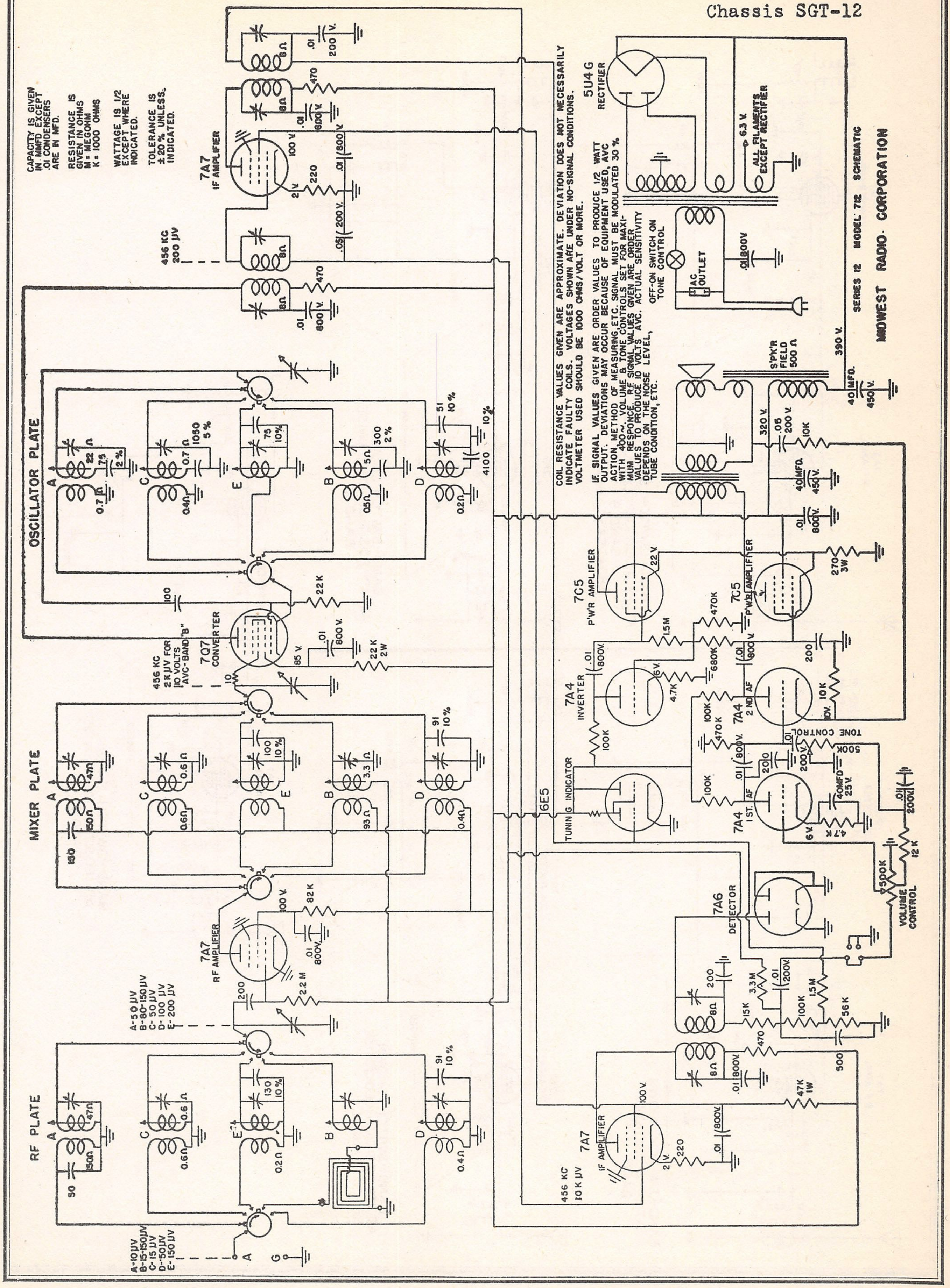
2. When recording from two mikes. The operator may desire to listen to the actual signal that is being applied to the cutting head to keep the levels from the two mikes equal.

3. When operating as a PA system using a remote speaker. If the remote speaker is located some distance away or in another room, the operator can use monitoring phones to adjust volume level etc.

Provision is made for plugging in high-impedence headphones for monitoring. They should plug into the Phone tip jacks located on the left hand rear side of the turntable base. Only high impedence phones should be used.

# MIDWEST RADIO CORP.

## MODEL 712; Series 12: S-12,ST-12,SG-12; Chassis SGT-12



CAPACITY IS GIVEN IN MMFD EXCEPT .01 CONDENSERS ARE IN MFD.

RESISTANCE IS GIVEN IN OHMS M = MEGOHM K = 1000 OHMS

WATTAGE IS 1/2 EXCEPT WHERE INDICATED.

TOLERANCE IS ± 20 % UNLESS. INDICATED.

COIL RESISTANCE VALUES GIVEN ARE APPROXIMATE. DEVIATION DOES NOT NECESSARILY INDICATE FAULTY COILS. VOLTAGES SHOWN ARE UNDER NO-SIGNAL CONDITIONS. VOLTMETER USED SHOULD BE 1000 OHMS/VOLT OR MORE.

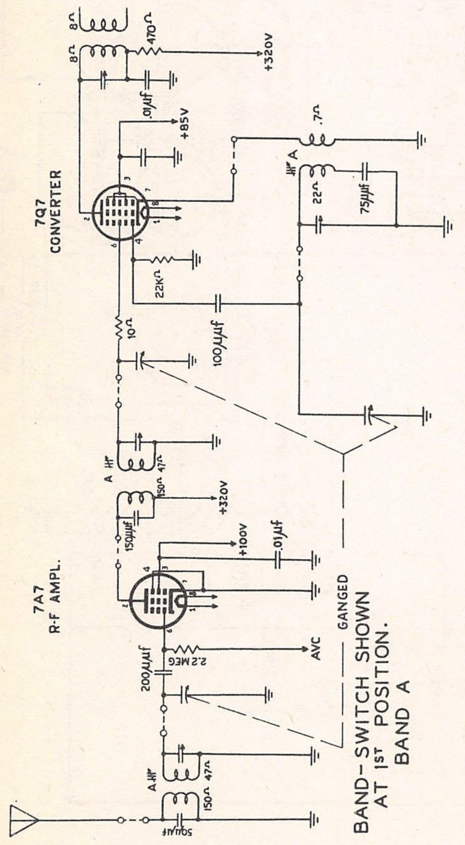
I.F. SIGNAL VALUES GIVEN ARE ORDER VALUES TO PRODUCE 1/2 WATT OUTPUT. DEVIATIONS MAY OCCUR BECAUSE OF EQUIPMENT USED, AVC ACTION, METHOD OF MEASURING, ETC. SIGNAL MUST BE MODULATED 30 % WITH 400~. VOLUME & TONE CONTROLS SET FOR MAXIMUM RESPONCE. R.F. SIGNAL VALUES GIVEN ARE ORDER VALUES TO PRODUCE 10 VOLTS AVC. ACTUAL SENSITIVITY DEPENDS ON THE NOISE LEVEL, TUBE CONDITION, ETC.

SERIES 12 MODEL 712 SCHEMATIC

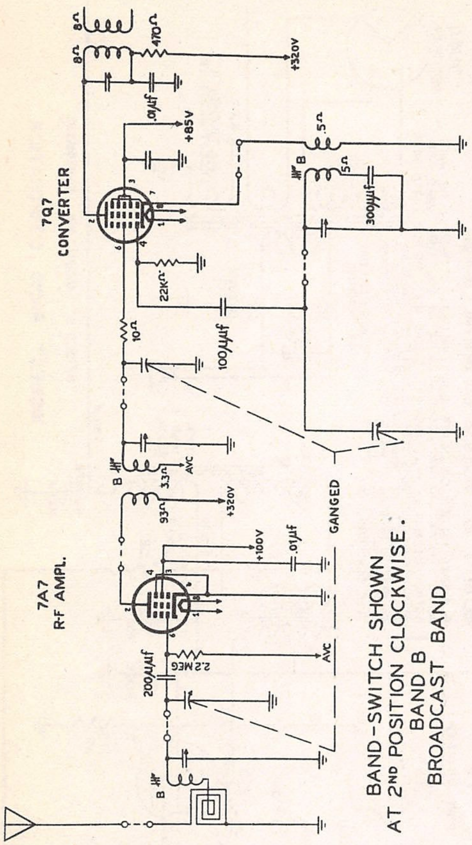
MIDWEST RADIO CORPORATION

RF PLATE
MIXER PLATE
OSCILLATOR PLATE
A-10 µV B-15-150 µV C-15 µV D-50 µV E-150 µV
A-50 µV B-80-150 µV C-50 µV D-100 µV E-200 µV
7A7 RF AMPLIFIER
7Q7 CONVERTER
456 KC 2 K µV FOR 10 VOLTS AVC-BAND "B"
7A7 IF AMPLIFIER
456 KC 200 µV
456 KC 10 K µV
7A6 DETECTOR
6E5 TUNING INDICATOR
7A4 1 ST. AF
7A4 2 ND AF
7A4 INVERTER
7C5 P'W'R AMPLIFIER
5U4G RECTIFIER
6.3 V. ALL FILAMENTS EXCEPT RECTIFIER
OFF-ON SWITCH ON TONE CONTROL
AC OUTLET
S'PK'R FIELD 500 Ω
390 V.
320 V.
40 MFD. 450 V.
TONE CONTROL 500 K
VOLUME CONTROL 500 K
270 3W
A
B
C
D
E
G

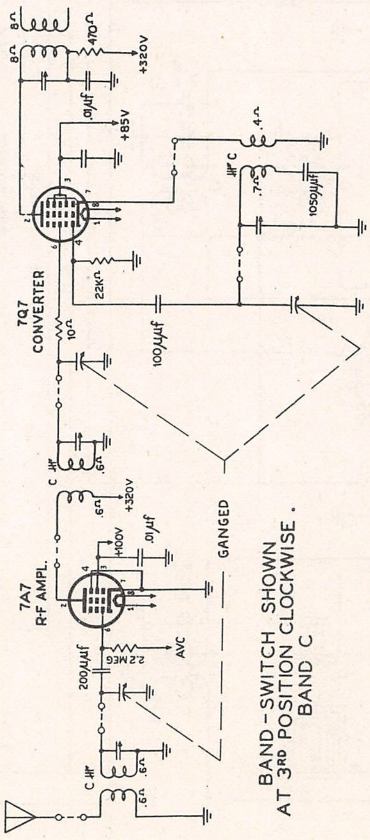
# MIDWEST RADIO CORP.


7A7
R-F AMPL.
7Q7
CONVERTER
A
50µµf
150Ω
47Ω
200µµf
2.2 MEG
AVC
.01µf
+100V
150µµf
+320V
10Ω
100µµf
22KΩ
+85V
8Ω
470Ω
.7Ω
22Ω
75µµf
GANGED

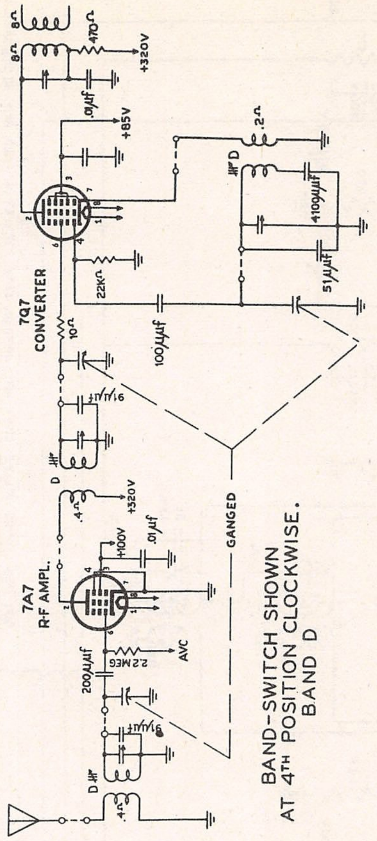
BAND-SWITCH SHOWN
AT 1ST POSITION.
BAND A


7A7
R-F AMPL.
7Q7
CONVERTER
B
200µµf
2.2 MEG
AVC
.01µf
+100V
93Ω
33Ω
+320V
10Ω
100µµf
22KΩ
+85V
8Ω
470Ω
.5Ω
300µµf
GANGED

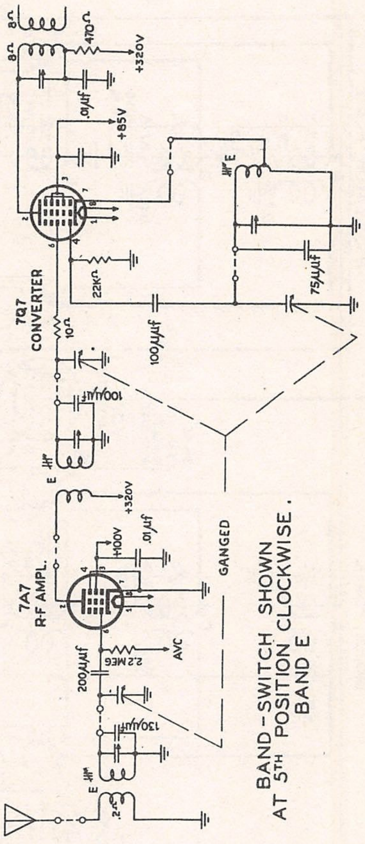
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BAND B
BROADCAST BAND


7A7
R-F AMPL.
7Q7
CONVERTER
C
.6Ω
200µµf
2.2 MEG
AVC
+100V
.01µf
+320V
10Ω
100µµf
22KΩ
+85V
8Ω
470Ω
.7Ω
.4Ω
1050µµf
GANGED

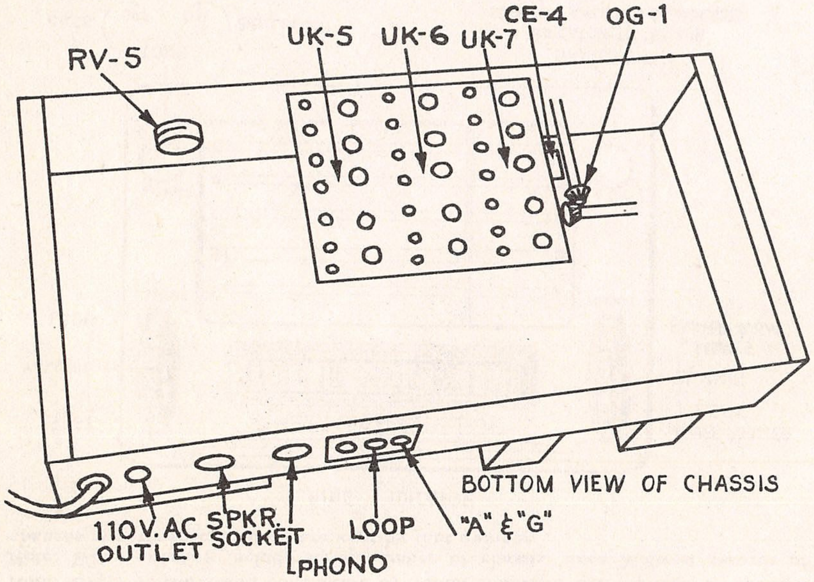
BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
BAND C


7A7
R-F AMPL.
7Q7
CONVERTER
D
.4Ω
200µµf
2.2 MEG
AVC
+100V
.01µf
+320V
10Ω
100µµf
22KΩ
51µµf
4100µµf
.2Ω
+85V
8Ω
470Ω
GANGED

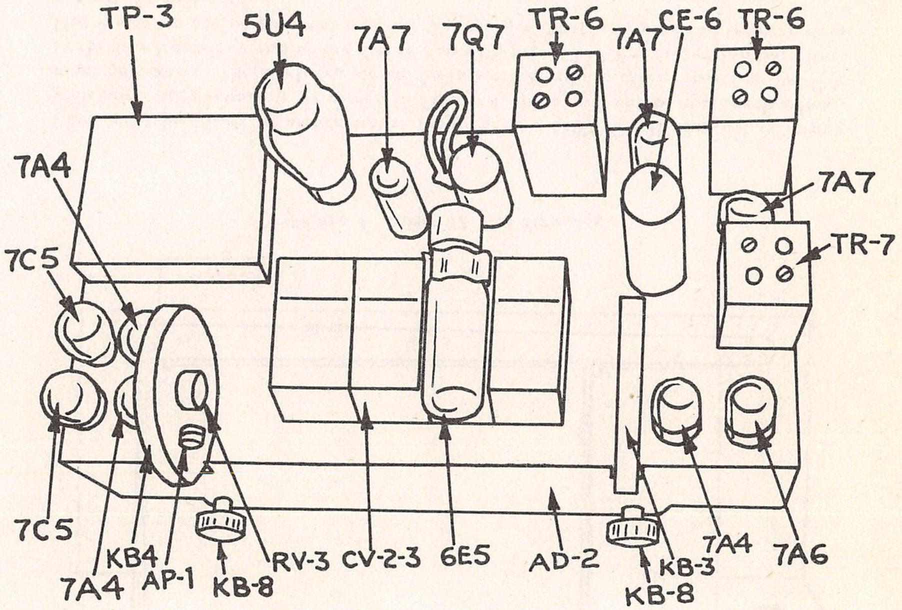
BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE.
BAND D


7A7
R-F AMPL.
7Q7
CONVERTER
E
.2Ω
130µµf
200µµf
2.2 MEG
AVC
+100V
.01µf
+320V
100µµf
10Ω
22KΩ
75µµf
+85V
8Ω
470Ω
GANGED

BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE.
BAND E



BOTTOM VIEW OF CHASSIS



TOP VIEW OF CHASSIS

## ALIGNMENT CHART

| Coupling | Signal | Band Switch | Dial | Adjustment |
|---|---|---|---|---|
| To converter grid thru .05 mfd capacitor | 456 KC | B | 1000 KC | Peak 1st, 2nd & 3rd IF trimmers. |
| To "A" on antenna-ground terminal strip through 200 mmfd. and 400 ohms in series. | 400 KC | A | 400 KC | Peak RF, converter and oscillator trimmers marked "A" |
| | 150 KC | A | 150 KC | Peak RF, converter and oscillator cores marked "A". |
| | 1600 KC | B | 1600 KC | Peak "B" trimmers. Loop must be plugged in. |
| | 550 KC | B | 550 KC | Peak "B" cores except RF. Loop must be plugged in. |
| | 4.7 MC | C | 4.7 MC | Peak "C" trimmers. |
| | 1.6 MC | C | 1.6 MC | Peak "C" cores. |
| | 10 MC | D | 10 MC | Peak "D" trimmers. |
| | 5 MC | D | 5 MC | Peak "D" cores. |
| | 22 MC | E | 22 MC | Peak "E" trimmers. |
| | 11.5 MC | E | 11.5 MC | Peak "E" cores. |

**ALIGNMENT** — The schematic includes the various signal strengths necessary for standard output of 0.5 watt for I. F. measurement, except at the converter grid. The output indicator may be an audio frequency meter across the voice coil or a vacuum tube voltmeter at the avc. For 0.5 watt the voltage at the voice coil is 1.5 volts or 2.5 to 3.5 volts avc. if a 30% modulated signal is used.

I. F. alignment should be made with the band switch on B, pointer turned to 1000KC and signal coupled to the mixer grid through a .05 mfd. condenser. Trim the three I. F. transformers for maximum reading at avc.

R. F. alignment should be made with meter across avc. There is no inter-action between bands. The only precaution is that a dummy antenna be used between the generator and the antenna post on the receiver. This may be simply a 200 micro micro fárad condenser in series with a 400 ohm resistor. The B band RF padder, 550 KC, is very broad and should not be adjusted. The loop must be plugged in when adjusting the B band RF trimmer, 1600 kc.

R. F. signal values given on the schematic will produce 10 volts of avc. This rather high level of signal is given to assure that the noise level will be overcome.

**SERVICE** — Series 12, Model 712, is a straight forward design, containing no trick circuits. Servicing of the coil plates or IF transformers should be avoided, except under special conditions, and rather than attempt to repair these assemblies a replacement should be ordered.

The Midwest Radio Corporation is anxious to help the service technician in every way; inquiries for special data will be promptly answered and your comments will be most welcome.

## PARTS LIST

| Part | Description |
|---|---|
| AD-2 | Dial |
| AE-1 | Escutcheon |
| AK-2 | Coil plate cover |
| AP-1 | Wood pulley |
| AP-6 | Pointer |
| AS-1 | Wood pulley mtg. stud |
| CE-6 | Filter condenser 40-40 |
| CE-4 | Cathode by pass 40 mfd. 25v. |
| *CV-2-3 | Tuning gang |
| EG-2 | Speaker grommet |
| ES-12 | Tube shield |
| HE-1 | Speaker mtg. eyelet |
| IL-1 | Panel lamp 6-8 volts |
| KB-3 | Tuning knob |
| KB-4 | Volume control knob |
| KB-8 | Tone or Band knob |
| KB-6 | Push buttons, set of 7 |
| OG-1 | Miter gear, pair |
| OS-3 | Dial string spring |
| PC-3 | Loop plug |
| PC-4 | Phonograph plug |
| RV-3 | Volume control |
| RV-5 | Tone control |
| *SP-2 | Speaker, 14 inch |
| TP-3 | Power transformer |
| TP-4 | Universal power transformer |
| *TR-6 | 1st IF and 2nd IF Transformer |
| *TR-7 | 3rd IF transformer |
| *TR-6 | 1st IF and 2nd IF transformer |
| *TR-7 | 3rd I F transformer |
| *UK-5 | R.F. Coil plate |
| *UK-6 | Mixer coil plate |
| *UK-7 | Oscillator coil plate |

Note: Order resistors and condensers by value, tolerance and wattage or voltage.

Note: When ordering include serial number of chassis, since Midwest records of changes in parts specifications are kept by that number.

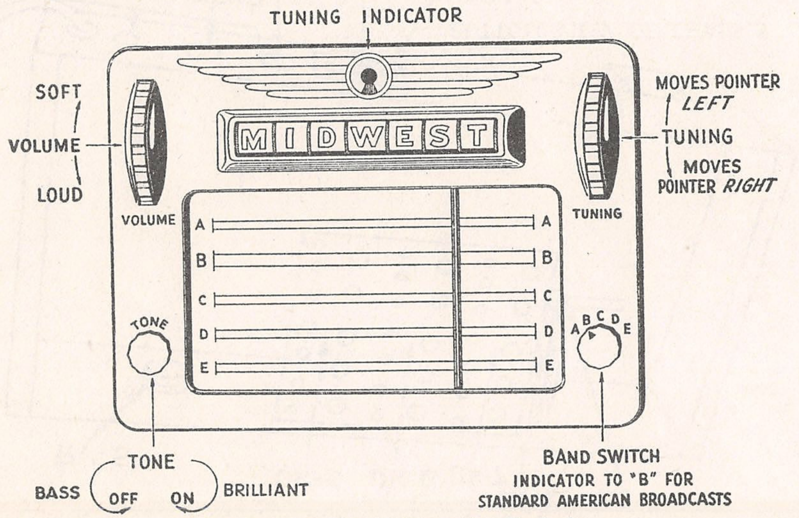


*Figure 1. Series 12 Operating Controls*

Note: Modulate the signal with 400 cycles 30%. The output indicator must be a VTUM on the avc. The I F sensitivity figures shown on the schematic are for ½ watt output except at converter grid; the voltage of the voice coil is 1.5 and the avc. voltage is between 2.5 and 3.5 for ½ watt output. The R F and IF alignment should be done with an avc. indicator only. The schematic shows R F signal values to produce 10 volts avc.

MODELS 712,716,716A

**DIAL STRINGING** — Use a light weight flexible dial cord when replacing worn or broken cord such as Beven-Wilcox FSN-25-12.

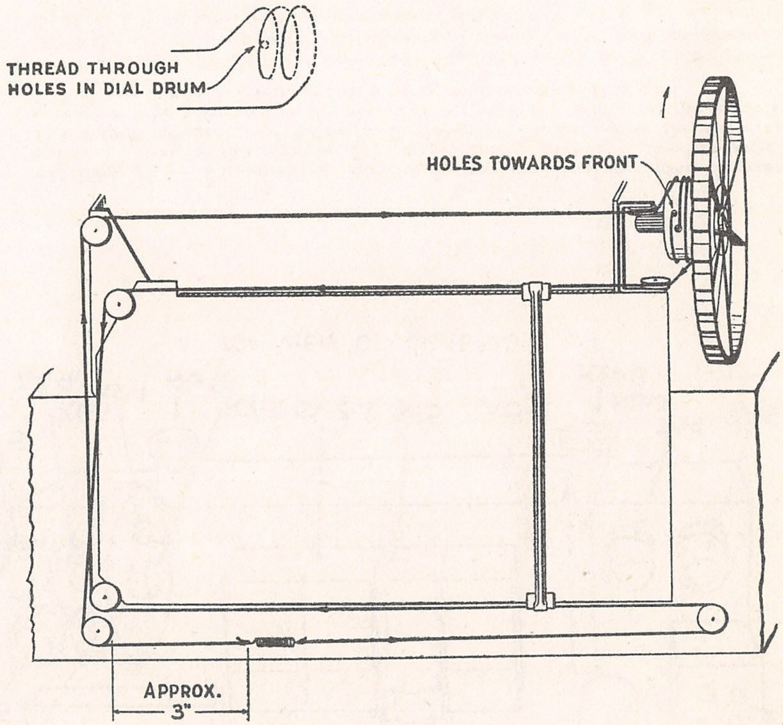
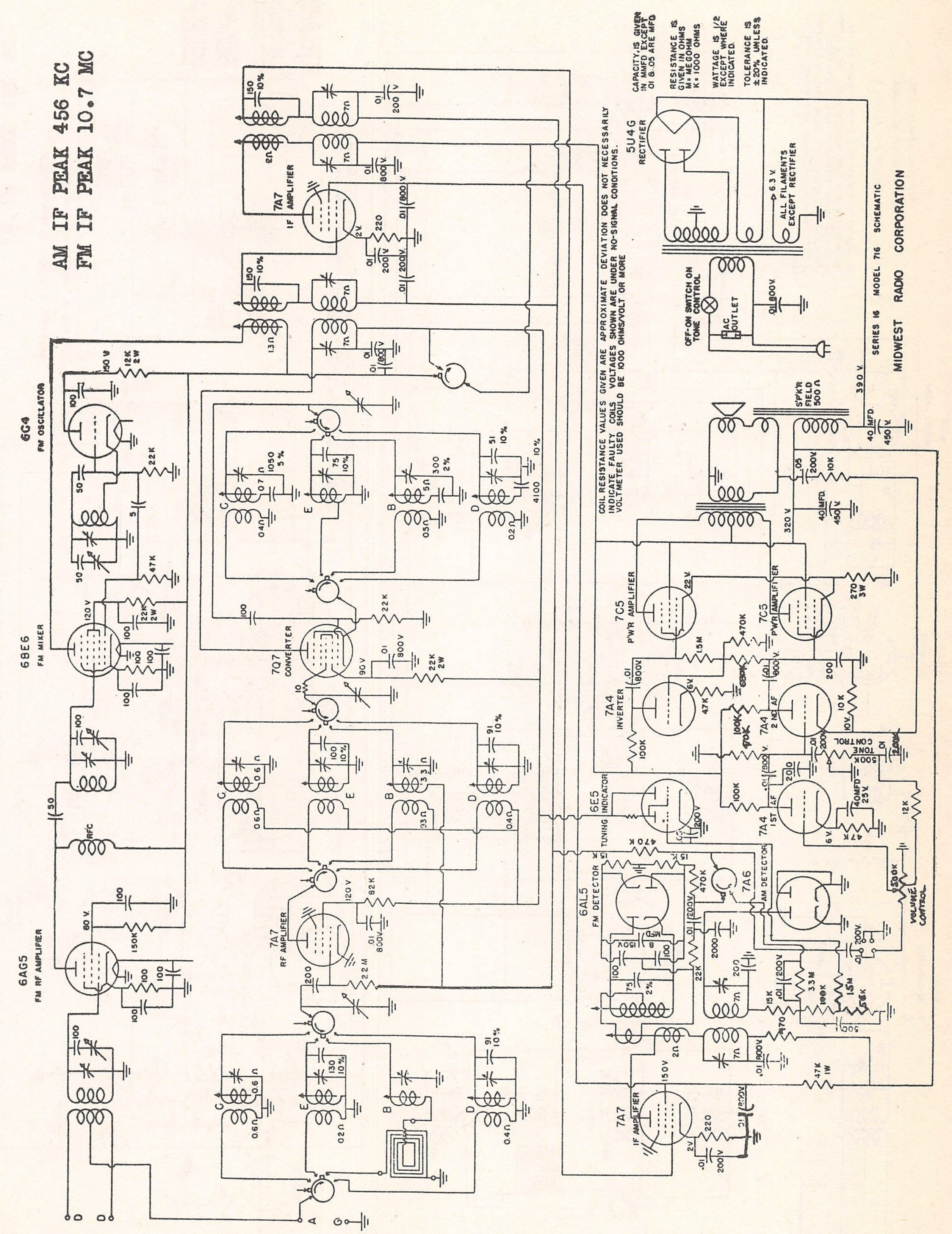


*Figure 4. Series 12 Dial Stringing*

Care must be taken to assure travel room for the SPRING. If the dial is strung with parts approximately as shown in Figure 4, there will not be too much adjustment necessary. The final step should be to set the pointer after replacing the dial, at the low frequency end of the dial in line with the end of the calibration base line. Use a small piece of gummed tape on the string so that clamping the pointer does not cut the dial cord.

# MIDWEST RADIO CORP.

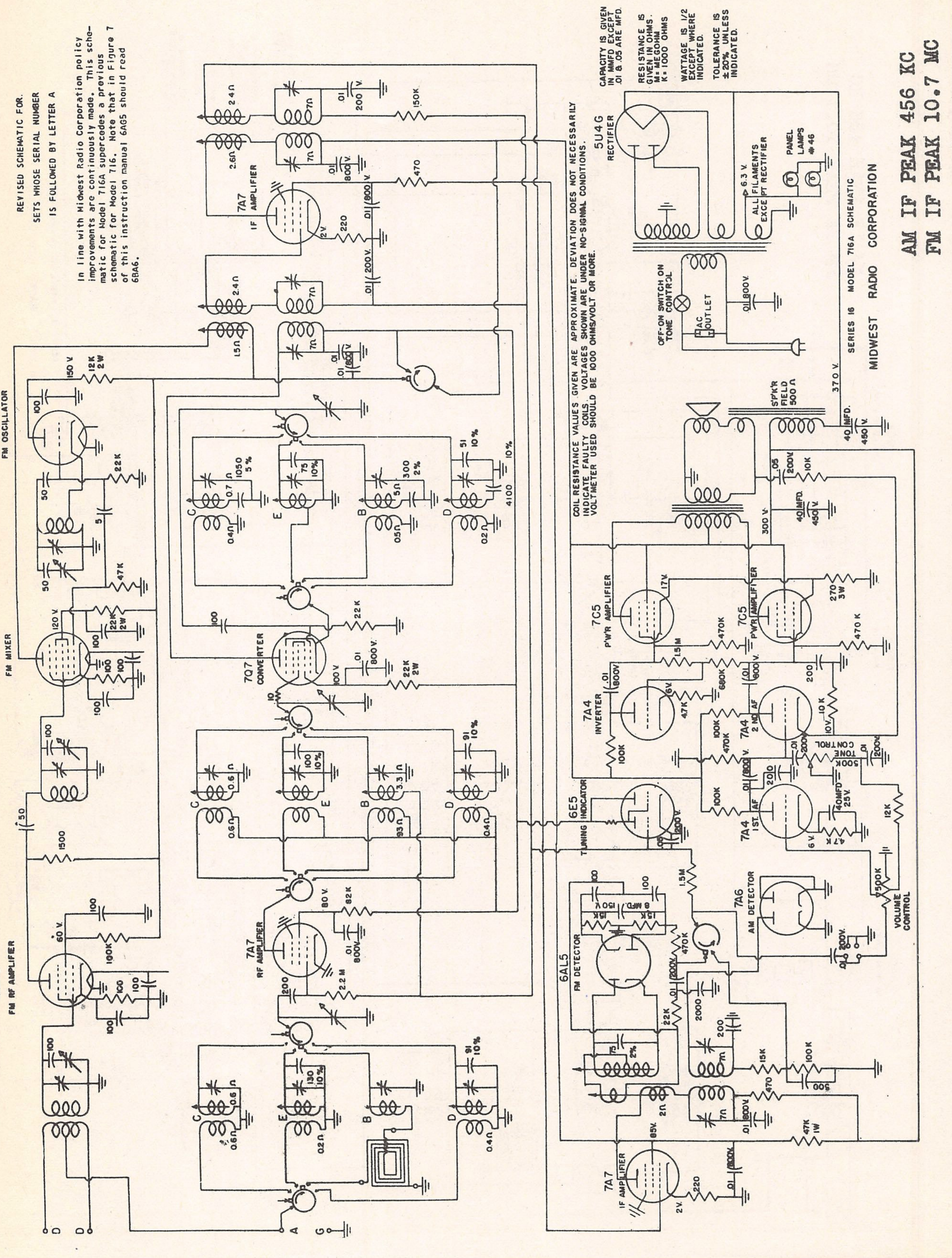
**MODEL 716; Series 16:**
**S-16,ST-16,SG-16;**
**Chassis SGT-16**


AM IF PEAK 456 KC
FM IF PEAK 10.7 MC
6AG5 FM RF AMPLIFIER
6BE6 FM MIXER
6G4 FM OSCILLATOR
7A7 RF AMPLIFIER
7Q7 CONVERTER
7A7 IF AMPLIFIER
7A7 IF AMPLIFIER
6AL5 FM DETECTOR
7A6 AM DETECTOR
6E5 TUNING INDICATOR
7A4 1ST AF
7A4 2ND AF
7A4 INVERTER
7C5 PWR AMPLIFIER
7C5 PWR AMPLIFIER
5U4G RECTIFIER
RFC
VOLUME CONTROL
TONE CONTROL
OFF-ON SWITCH ON TONE CONTROL
AC OUTLET
SPKR FIELD 500 Ω
6.3 V. ALL FILAMENTS EXCEPT RECTIFIER
390 V.
320 V
40 MFD 450 V
CAPACITY IS GIVEN IN MMFD EXCEPT .01 & .05 ARE MFD
RESISTANCE IS GIVEN IN OHMS M: MEGOHM K: 1000 OHMS
WATTAGE IS 1/2 EXCEPT WHERE INDICATED.
TOLERANCE IS ±20% UNLESS INDICATED.
COIL RESISTANCE VALUES GIVEN ARE APPROXIMATE DEVIATION DOES NOT NECESSARILY INDICATE FAULTY COILS VOLTAGES SHOWN ARE UNDER NO-SIGNAL CONDITIONS. VOLTMETER USED SHOULD BE 1000 OHMS/VOLT OR MORE
SERIES 16 MODEL 716 SCHEMATIC
MIDWEST RADIO CORPORATION
A
G
D
D
C
E
B
D

For dial data, see P.16-4
For clarified schematics. see P.16-7.8

**MODEL 716A; Series 16:**
**S-16,ST-16,SG-16;**
**Chassis SGT-16**

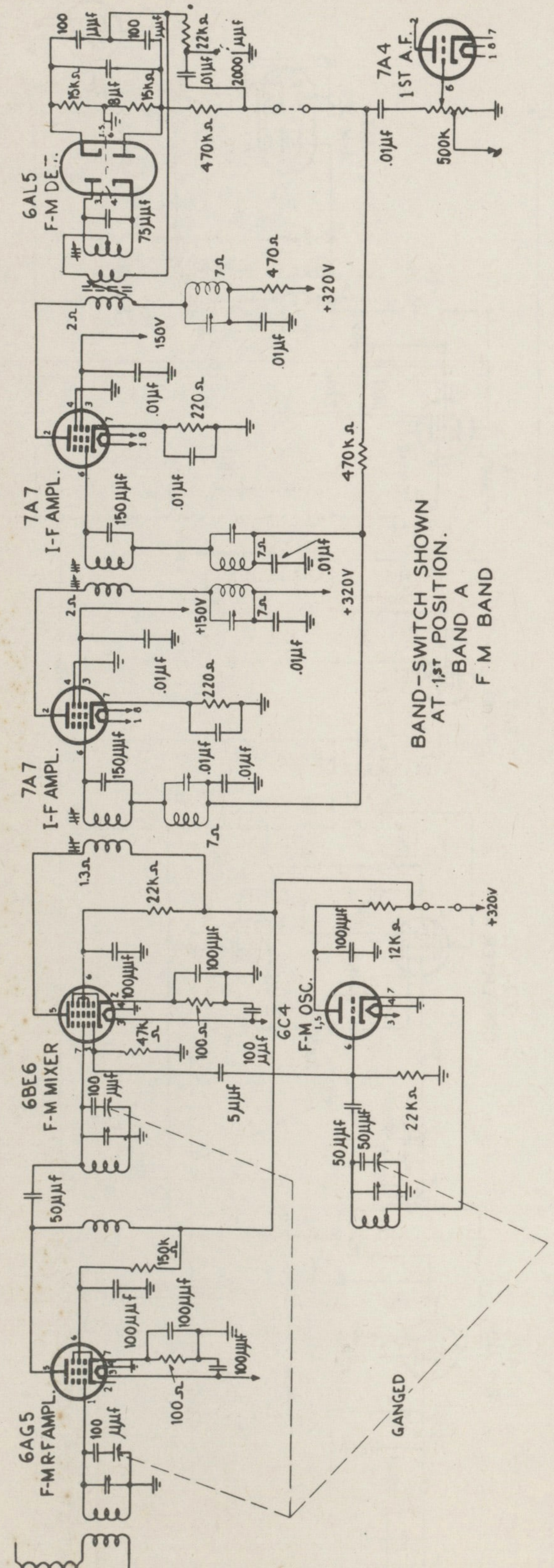
# MIDWEST RADIO CORP.


REVISED SCHEMATIC FOR.
SETS WHOSE SERIAL NUMBER
IS FOLLOWED BY LETTER A
In line with Midwest Radio Corporation policy improvements are continuously made. This schematic for Model 716A supercedes a previous schematic for Model 716. Note that in Figure 7 of this instruction manual 6AG5 should read 6BA6.
COIL RESISTANCE VALUES GIVEN ARE APPROXIMATE. DEVIATION DOES NOT NECESSARILY INDICATE FAULTY COILS. VOLTAGES SHOWN ARE UNDER NO-SIGNAL CONDITIONS. VOLTMETER USED SHOULD BE 1000 OHMS/VOLT OR MORE.
CAPACITY IS GIVEN IN MMFD EXCEPT .01 & .05 ARE MFD.
RESISTANCE IS GIVEN IN OHMS. M=MEGOHM K=1000 OHMS
WATTAGE IS 1/2 EXCEPT WHERE INDICATED.
TOLERANCE IS ±20% UNLESS INDICATED.
5U4G RECTIFIER
6.3 V. ALL FILAMENTS EXCEPT RECTIFIER
PANEL LAMPS #46
OFF-ON SWITCH ON TONE CONTROL
AC OUTLET
S'P'K'R FIELD 500 Ω
370 V.
300 V.
SERIES 16 MODEL 716A SCHEMATIC
MIDWEST RADIO CORPORATION
AM IF PEAK 456 KC
FM IF PEAK 10.7 MC
6C4 FM OSCILLATOR
6BE6 FM MIXER
6BA6 FM RF AMPLIFIER
7A7 IF AMPLIFIER
7Q7 CONVERTER
7A7 RF AMPLIFIER
7C5 P'W'R AMPLIFIER
7C5 P'W'R AMPLIFIER
7A4 INVERTER
7A4 2 ND AF
7A4 1ST. AF
6E5 TUNING INDICATOR
7A6 AM DETECTOR
6AL5 FM DETECTOR
7A7 IF AMPLIFIER
TONE CONTROL
VOLUME CONTROL
A
G
D
D

For dial data, see P.16-4
For clarified schematics, see P.16-9,10
Clarified schematics

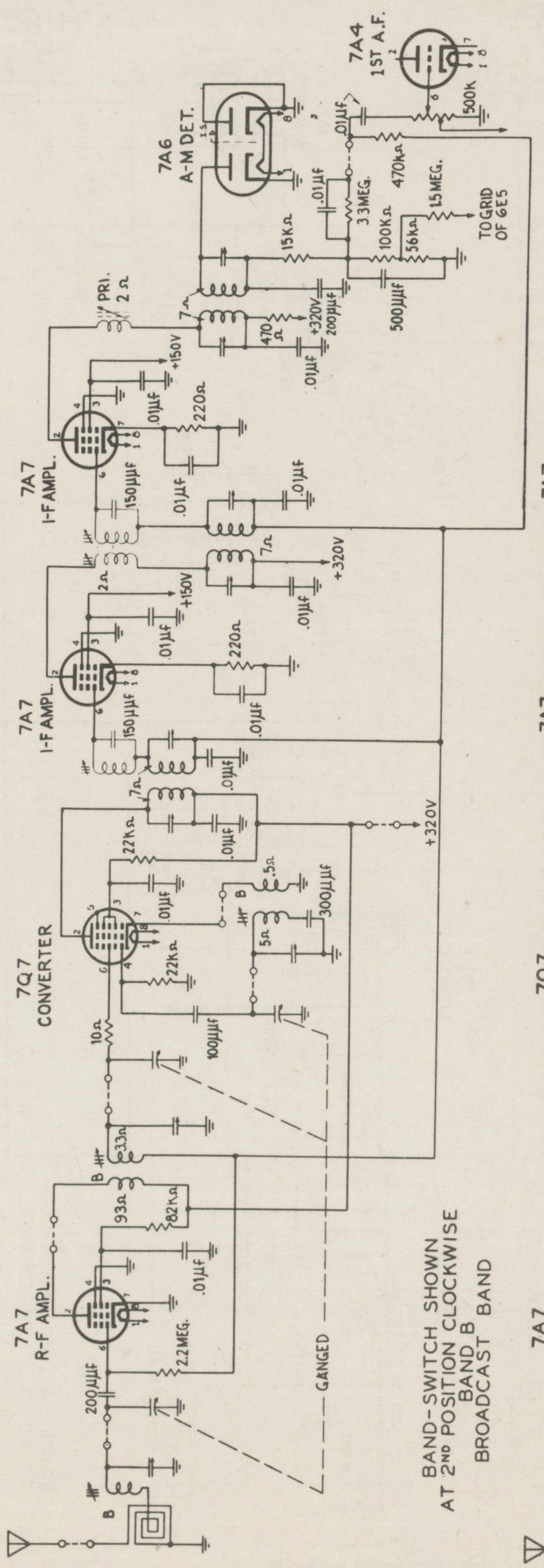
## MIDWEST RADIO CORP.

**MODEL 716**



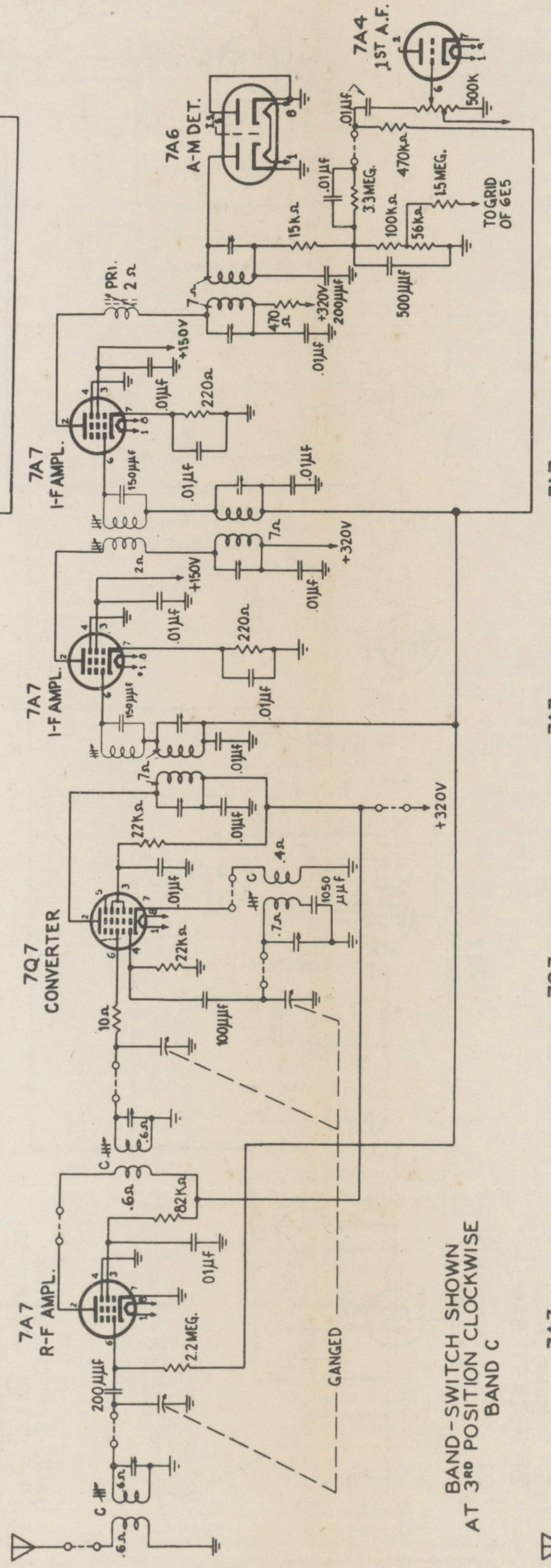
BAND-SWITCH SHOWN AT 1ST POSITION BAND A F M BAND

6AG5 F-M R-F AMPL.
6BE6 F-M MIXER
6C4 F-M OSC.
7A7 I-F AMPL.
7A7 I-F AMPL.
6AL5 F-M DET.
7A4 1ST A.F.
GANGED
+320V



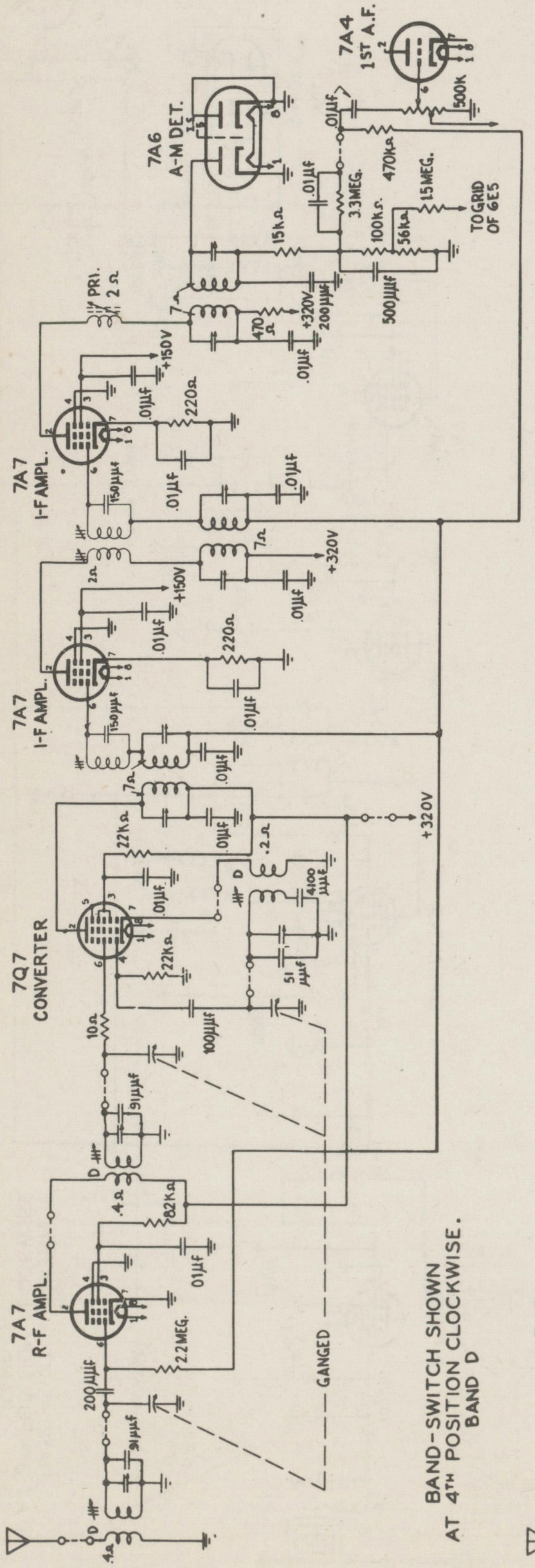
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE BAND B BROADCAST BAND

7A7 R-F AMPL.
7Q7 CONVERTER
7A7 I-F AMPL.
7A7 I-F AMPL.
7A6 A-M DET.
7A4 1ST A.F.
TO GRID OF 6E5
GANGED
+320V



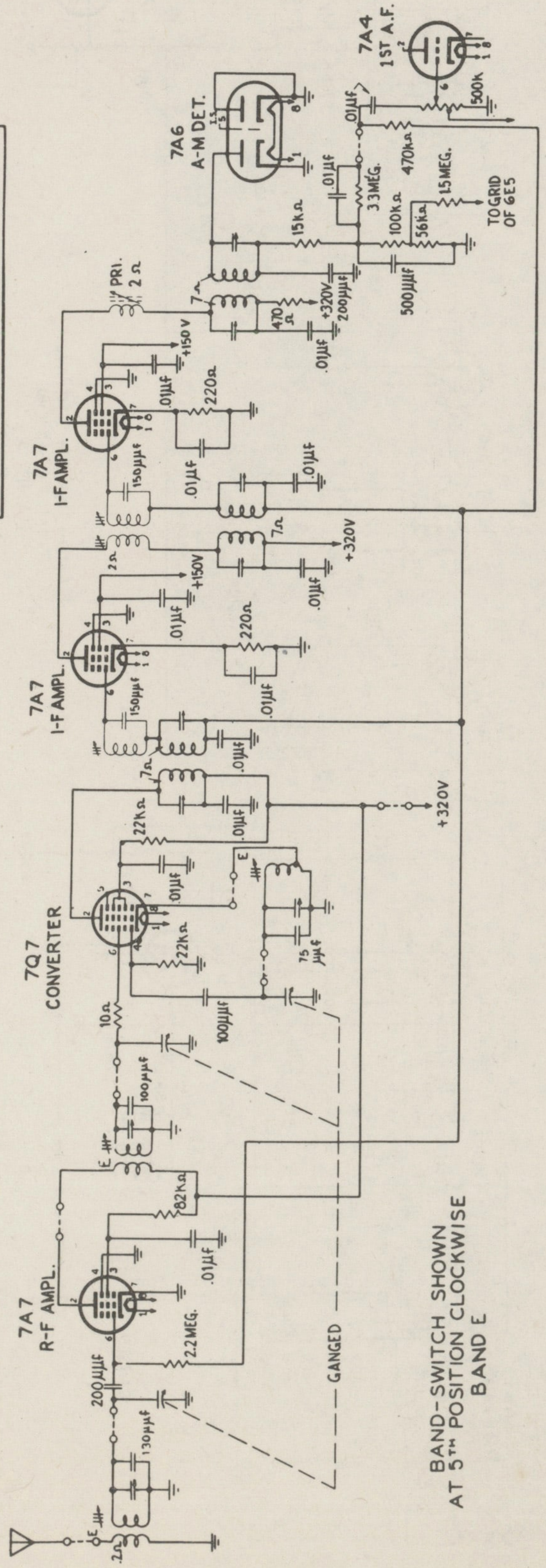
BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE BAND C

7A7 R-F AMPL.
7Q7 CONVERTER
7A7 I-F AMPL.
7A7 I-F AMPL.
7A6 A-M DET.
7A4 1ST A.F.
TO GRID OF 6E5
GANGED
+320V



BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE. BAND D

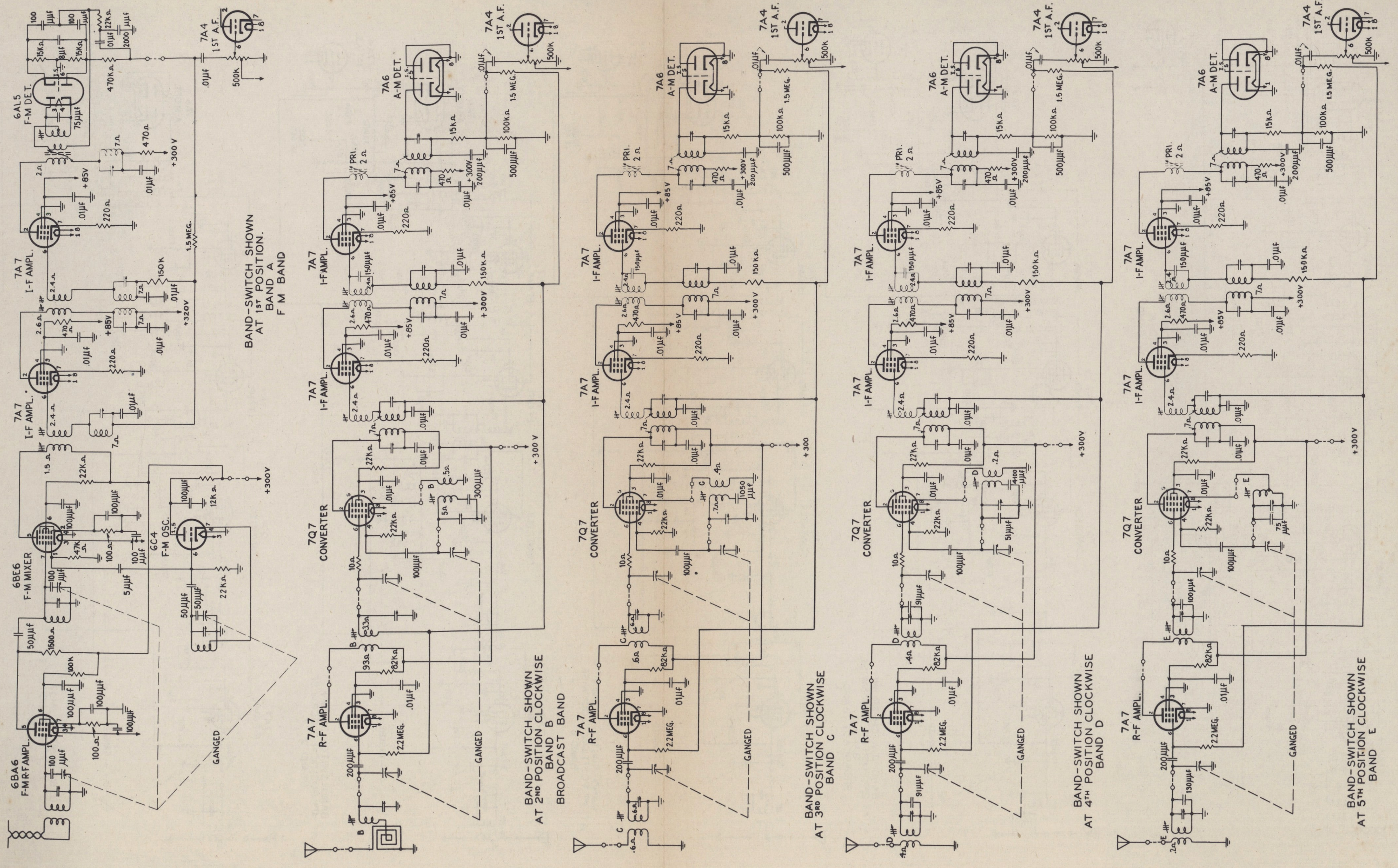
7A7 R-F AMPL.
7Q7 CONVERTER
7A7 I-F AMPL.
7A7 I-F AMPL.
7A6 A-M DET.
7A4 1ST A.F.
TO GRID OF 6E5
GANGED
+320V



BAND-SWITCH SHOWN AT 5TH POSITION CLOCKWISE BAND E

7A7 R-F AMPL.
7Q7 CONVERTER
7A7 I-F AMPL.
7A7 I-F AMPL.
7A6 A-M DET.
7A4 1ST A.F.
TO GRID OF 6E5
GANGED
+320V

## MIDWEST RADIO CORP.



BAND-SWITCH SHOWN AT 1ST POSITION. BAND A F M BAND

BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE BAND B BROADCAST BAND

BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE BAND C

BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE BAND D

BAND-SWITCH SHOWN AT 5TH POSITION CLOCKWISE BAND E

6BA6
F-M R-F AMPL.
6BE6
F-M MIXER
6C4
F-M OSC.
7A7
I-F AMPL.
6AL5
F-M DET.
7A4
1ST A.F.
7A6
A-M DET.
7Q7
CONVERTER
7A7
R-F AMPL.
GANGED
+300V
+320V
+85V
500K
1.5 MEG.
470KΩ
.01µf
2.2MEG.
82KΩ
22KΩ
100KΩ
15KΩ
150KΩ
500µµf
200µµf
PRI.
2Ω

**ALIGNMENT** — Refer to the alignment chart for step by step procedure. It is preferable to align the FM IF stages with an AM or CW Signal. It should be noted that all adjustment are made for peak avc reading except the secondary of the third transformer. At this point, if you use an AM signal, it may be tuned for minimum audio signal; or the discriminator voltage may be used, reading it with a VTVM, and the secondary may be adjusted to the zero voltage. There may be some discrepancy between these methods, and if it is not excessive, is of no importance; it is simply an indication of the exactness of equivalent capicitative and inductive coupling balance in the transformer.

The FM RF alignment should be made using an FM signal and either avc or audio for peaking. In doing this alignment, or when feeding the IF signal into the FM mixer grid, care must be taken not to move the wiring. If the wiring is displaced so as to affect the inductance of the RF circuits it is difficult to re-establish the RF-Oscillator tracking.

The AM, RF and IF alignment should be done with a VTVM across the avc. The recommended signal value is one which will generate 10 volts of avc. When aligning the "B" band the loop must be plugged in and you need not adjust the RF padder core. The RF padder is very broad and can be aligned only if the converter grid lead is connected to an RF type VTVM as indicator; this will usually involve a signal level greater than is normally available.

| Coupling | Signal | Band Switch | Dial | Adjustment |
|---|---|---|---|---|
| To 7Q7 converter grid through .05 mfd. capacitor. | 456 KC AM | B | 1000 KC | Peak 1st, 2nd and 3rd IF trimmers on top of IF cans. |
| To "A" on antenna ground terminal strip through 200 mfd. and 400 ohms in service. | 1600 KC AM | B | 1600 KC | Peak RF, converter and oscillator trimmers marked "B". |
| | 550 KC AM | B | 550 KC | Peak converter and oscillator padder cores marked "B". Loop must be plugged in. Do not adjust RF. |
| | 4.7 MC AM | C | 4.7 MC | Peak "C" trimmers. |
| | 1.6 MC AM | C | 1.6 MC | Peak "C" cores. |
| | 10 MC AM | D | 10 MC | Peak "D" trimmer |
| | 5 MC AM | D | 5 MC | Peak "D" cores. |
| | 22 MC AM | E | 22 MC | Peak "E" trimmer. |
| | 11.5 MC AM | E | 11.5 MC | Peak "E" cores. |
| To 6BE6 mixer grid direct. | 10.7 MC AM or CW | A | 100 MC | Peak core adjustments for avc (around 3 volts) at 1st, 2nd and primary of 3rd IF. Adjust secondary of 3rd IF for audio null from 30% amplitute modulated 10.7 MC IF signal. |
| To "D" and "D" on doublet terminal strip above "A-G" strip through a pair 150 ohm resistors. | 105 MC FM | A | 105 MC | Peak RF mixer and oscillator trimmers for avc or audio. |

*Read text for use of CW for FM-IF alignment.

**PUSH BUTTONS** — The push buttons are for your convenience in selecting stations without the bother of making the exact tuning adjustments necessary for best reception. There are seven buttons and each button may be set for a station. The station may be at any point on the dial.

It is not recommended that the buttons be used for short wave stations.

To set the push buttons this exact procedure should be followed. A small screw driver will be needed.

1. Turn on the receiver and allow at least three minutes to warm up.
2. Remove the push button by pulling straight out. A hooked instrument will assist in removing the end buttons.
3. Loosen the LOCK SCREW at least one half turn.
4. Using the screw driver with the blade in the screw slot, push the mechanism in firmly. Hold in during step 5. The mechanism may bind at first. Use sufficient force to break loose so that the push button and tuning control are independent.
5. Tune the pointer past the desired station then back to the desired station and make the tuning adjustment as carefully as you know how.
6. Tighten the LOCK SCREW.
7. Check the setting of this push button by tuning away from the station manually, then pushing in firmly. Pushing the button must return the pointer to the position it had when the LOCK SCREW was tightened. If the station is not now tuned in perfectly repeat the steps 2 to 6 carefully.
8. Adjust each of the seven buttons, or as many as you wish to set, exactly as outlined above.

Any button can be set for any pointer position, however, you may find it more desirable to select the button nearest the pointer position so that each successive adjustment moves the pointer in the same direction. That is, the "M" button will be set for a station at the left of the dial, the "W" button will set for a station near the center, etc.

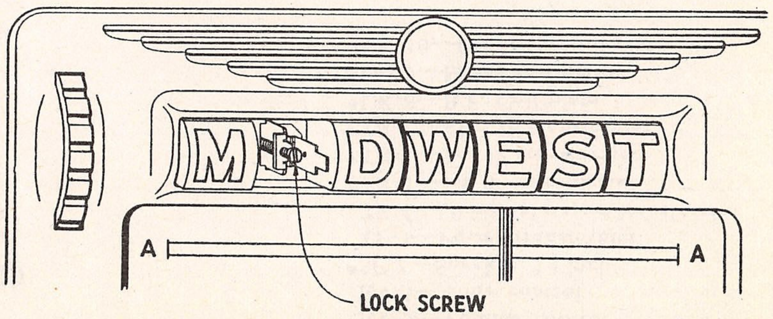
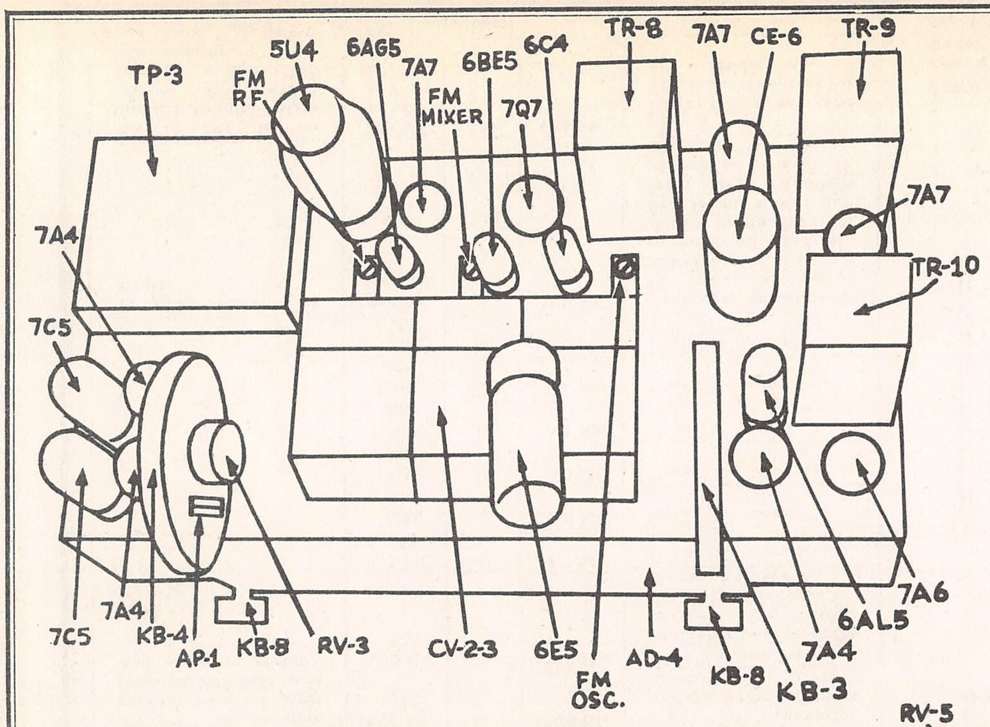
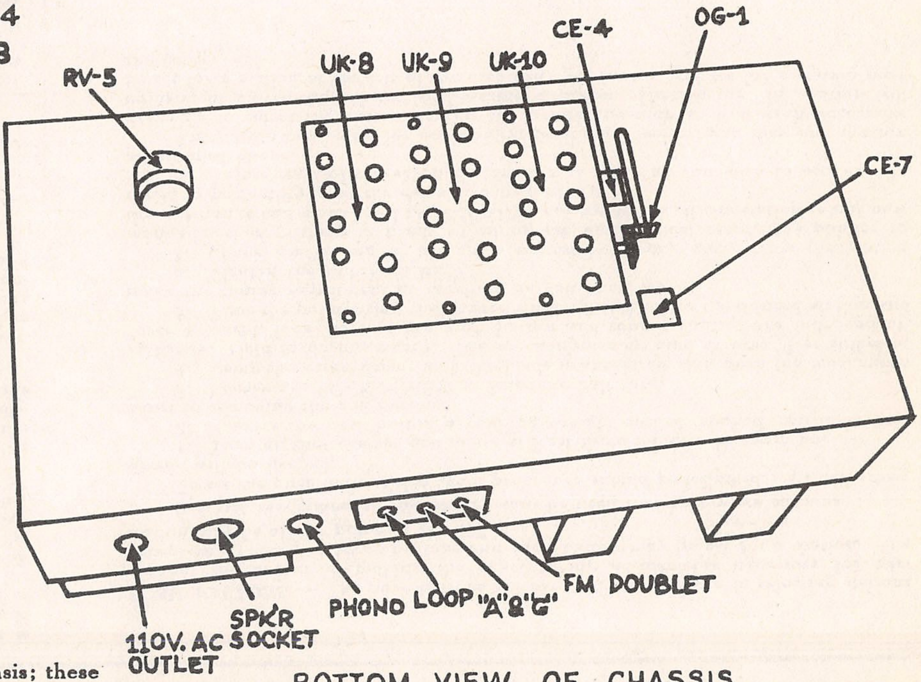


**Figure 4. Push Button Mechanism**

**SERVICE** — Series 16, Model 716, is a straight forward design, containing no trick circuits. Servicing of the coil plates or IF transformers should be avoided, except under special conditions, and rather than attempt to repair these assemblies a replacement should be ordered.


TP-3
FM RF
5U4
6AG5
7A7
FM MIXER
6BE5
7Q7
6C4
TR-8
7A7
CE-6
TR-9
7A7
TR-10
7A4
7C5
7A6
6AL5
7A4
7C5
7A4
KB-4
AP-1
KB-8
RV-3
CV-2-3
6E5
FM OSC.
AD-4
KB-8
KB-3

TOP VIEW OF CHASSIS


RV-5
UK-8
UK-9
UK-10
CE-4
OG-1
CE-7
110V. AC OUTLET
SPKR SOCKET
PHONO
LOOP "A" & "G"
FM DOUBLET

BOTTOM VIEW OF CHASSIS

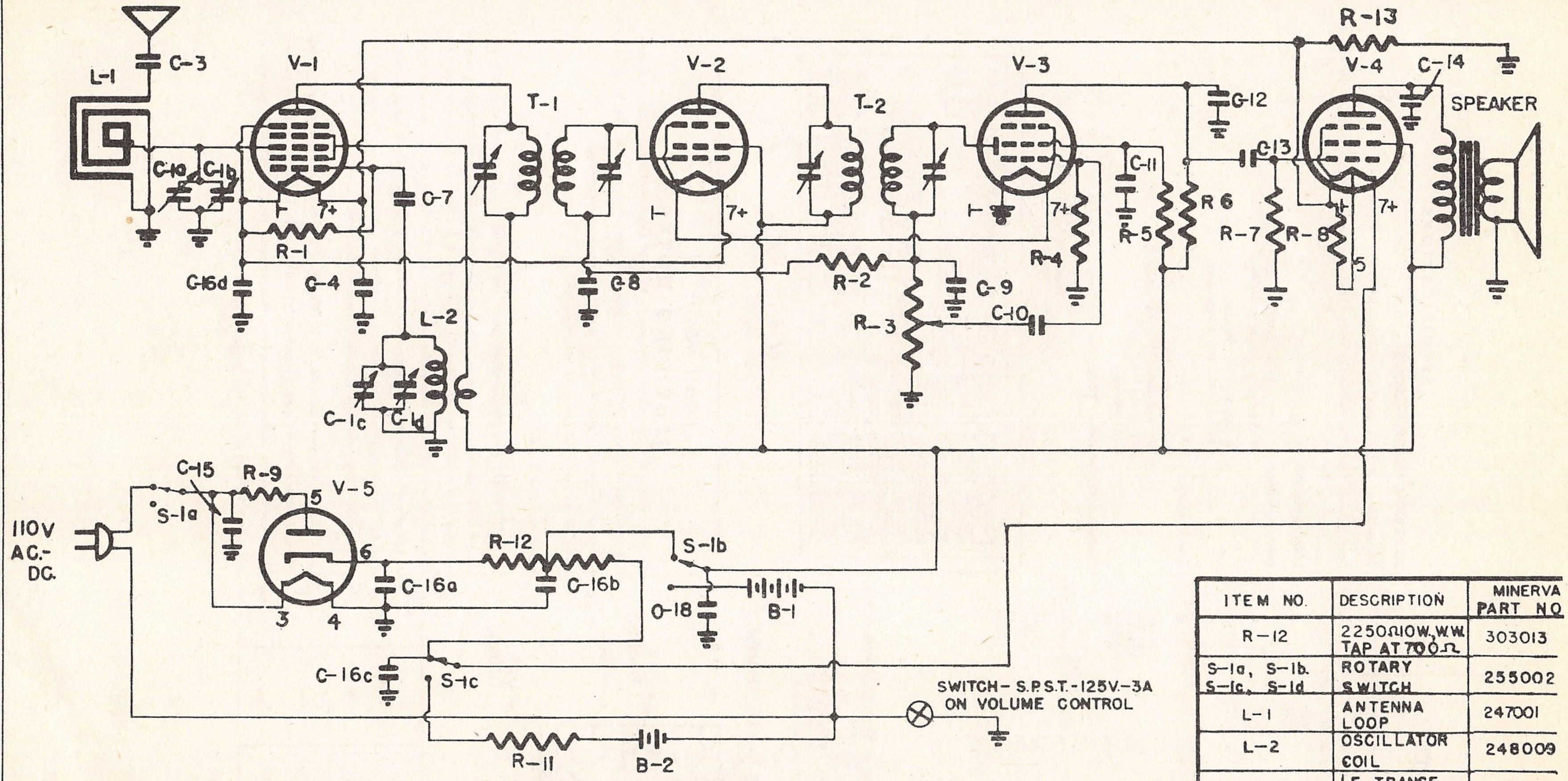
## PARTS LIST

| Part | Description |
|---|---|
| AD-4 | Dial |
| AE-1 | Escutcheon |
| AK-2 | Coil plate cover |
| AP-1 | Wood pulley |
| AP-6 | Pointer |
| AS-1 | Wood pulley mtg. stud |
| CE-6 | Filter condenser 40-40 |
| CE-4 | Cathode by pass 40 mfd. 25v. |
| CE-7 | Electrolytic 8 mfd. 150v. |
| *CV-2-3 | Tuning gang |
| EG-2 | Speaker grommet |
| ES-12 | Tube shield |
| HE-1 | Speaker mtg. eyelet |
| IL-1 | Panel lamp 6-8 volts |
| KB-3 | Tuning knob |
| KB-4 | Volume control knob |
| KB-8 | Tone or Band knob |
| KB-6 | Push buttons, set of 7 |
| OG-1 | Miter gear, pair |
| OS-3 | Dial string spring |
| PC-3 | Loop plug |
| PC-4 | Phonograph plug |
| RV-3 | Volume control |
| RV-5 | Tone control |
| *SP-2 | Speaker, 14 inch |
| TP-3 | Power transformer |
| TP-4 | Universal power transformer |
| *TR-8 | 1st IF transformer |
| *TR-9 | 2nd IF transformer |
| *TR-10 | 3rd IF transformer |
| *UK-8 | R.F. Coil plate |
| *UK-9 | Mixer coil plate |
| *UK-10 | Oscillator coil plate |

**REPLACEMENT PARTS** — Certain parts are available on an exchange basis; these are shown on the parts list with an "*"

# MINERVA CORP. OF AMERICA

## MODEL 729,Portapal


L-1
C-3
C-1a
C-1b
V-1
R-1
C-16d
C-4
C-7
L-2
C-1c
C-1d
T-1
V-2
C-8
T-2
R-2
R-3
C-9
C-10
V-3
R-4
C-11
R-5
R 6
C-12
C-13
R-7
R-8
V-4
R-13
C-14
SPEAKER
7+
5
110V
AC.-
DC.
S-1a
C-15
R-9
V-5
5
6
3
4
C-16a
R-12
C-16b
S-1b
C-18
B-1
C-16c
S-1c
R-11
B-2
SWITCH - S.P.S.T.-125V.-3A
ON VOLUME CONTROL

| ITEM NO. | DESCRIPTION | MINERVA PART NUMBER | ITEM NO. | DESCRIPTION | MINERVA PART NUMBER | ITEM NO | DESCRIPTION | MINERVA PART NUMBER |
|---|---|---|---|---|---|---|---|---|
| C-1a, C-1b<br>C-1c, C-1d | 2 GANG VAR. CAPACITOR | 235003 | C-12 | 200,MMFD. MICA CAPACITOR | 212027 | R-3 | .5,M. CARBON POT. VOLUME | 300014 |
| C-3 | .01 MFD. 200V PAP. TUB. CAP. | 190038 | C-13 | .01,MFD. 200V. PAP. TUB. CAP. | 190038 | R-4 | 10,M 1/2 W. CARBON RES. | 272106 |
| C-4 | .1, MFD. 200V. PAP. TUB. CAP | 190039 | C-14 | .005, MFD. 200V PAP. TUB. CAP | 190042 | R-5 | 3,M. 1/2W. CARBON RES. | 272305 |
| C-7 | 50 MMFD. MICA. CAPACITOR | 212015 | C-15 | .05, MFD. 200V. PAP. TUB. CAP | 190004 | R-6 | 1,M. 1/2 W. CARBON RES. | 272105 |
| C-8 | .05, MFD. 200V PAP. TUB. CAP. | 190007 | C-16a C-16b<br>C-16c, C-16d | 40, MFD. 150V.<br>100, MFD. 25V. | 230005 | R-7 | 470,K 1/2 W. CARBON RES. | 272474 |
| C-9 | 200, MMFD. MIC. CAPACITOR | 212027 | C-18 | .1 MFD. 200V. PAP. TUB. CAP. | 190039 | R-8 | 270 Ω 1/2 W. CARBON RES. | 272271 |
| C-10 | .01, MFD. 200V. PAP. TUB. CAP. | 190038 | R-1 | 100K, 1/2 W. CARBON RES. | 272104 | R-9 | 33 Ω 1/2 W. CARBON RES. | 282330 |
| C-11 | .1 MFD. 200 V. PAP. TUB. CAP. | 190039 | R-2 | 2.2M. 1/2 W. CARBON RES. | 272225 | R-11 | 33 Ω 1/2W. CARBON RES. | 282330 |

| ITEM NO. | DESCRIPTION | MINERVA PART NO. |
|---|---|---|
| R-12 | 2250 Ω 10W., W.W. TAP AT 700 Ω | 303013 |
| S-1a, S-1b.<br>S-1c, S-1d | ROTARY SWITCH | 255002 |
| L-1 | ANTENNA LOOP | 247001 |
| L-2 | OSCILLATOR COIL | 248009 |
| T-1 | I.F TRANSF. INPUT | 305002 |
| T-2 | I.F. TRANSF OUTPUT | 305003 |
| V-1 | 1R5 | 312074 |
| V-2 | 1T4 | 312077 |
| V-3 | 1S5 | 312076 |
| V-4 | 3Q4 | 312072 |
| V-5 | 117Z3 | 312128 |
| B-1 | 45V BATTERY | 372002 |
| B-2 | 4 1/2 VOLT BATTERY. | 372001 |
| R-13 | 1000 Ω 1/2 W. CARBON RES. | 272102 |

# MODEL 729, Portapal MINERVA CORP. OF AMERICA

## VOLTAGE MEASUREMENT

All reading in AC-DC position of power selector switch with 20,000 ohms per meter. Readings taken are referred to ground.

11723

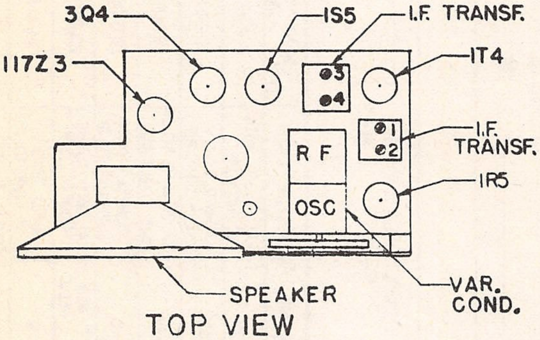
| PIN | AC | DC | RESISTANCE IN OHMS |
|---|---|---|---|
| 1 | 117V | — | 540 |
| 2 | — | 120V | 2000 |
| 3 | 117V | — | 500 |
| 4 | — | — | — |
| 5 | 117V | — | 500 |
| 6 | 120V | — | 2000 |
| 7 | — | — | — |

| 3Q4 | | | 1S5 | | |
|---|---|---|---|---|---|
| PIN | DC | RESISTANCE IN OHMS | PIN | DC | RESISTANCE IN OHMS |
| 1 | 4.8V | 50 | 1 | — | — |
| 2 | 86V | 2000 | 2 | — | — |
| 3 | — | 500,000 | 3 | — | 400,000 |
| 4 | 88V | 1500 | 4 | 19V | 3,000,000 |
| 5 | 6V | 50 | 5 | 7.8V | 1,500,000 |
| 6 | 86V | 2000 | 6 | — | 10,000,000 |
| 7 | 7.6V | 70 | 7 | 1.5V | 260 |

| 1T4 | | | 1R5 | | |
|---|---|---|---|---|---|
| PIN | DC | RESISTANCE IN OHMS | PIN | DC | RESISTANCE IN OHMS |
| 1 | 1.5V | 260 | 1 | 3.3V | 45 |
| 2 | 88V | 1500 | 2 | 88V | 1500 |
| 3 | 88V | 1500 | 3 | 88V | 1500 |
| 4 | — | 2,000,000 | 4 | — | 85 |
| 5 | 1.6V | — | 5 | 1.6V | 45 |
| 6 | — | 2,200,000 | 6 | — | — |
| 7 | 3.3V | 45 | 7 | 2.3V | 50 |

### CORRECTIONS

| 1. Servicing Notes Section: | 2. Voltage Measurements Section: | 3. Schematic Diagram Section: |
|---|---|---|
| Stator large section gang open to read: Stator large section gang closed. | 20,000 ohms per meter to read: 20,000 ohms per volt D. C. 1,000 ohms per volt A. C. meter<br>11723 to read: 117Z3 | No S-ld<br>C 18: .l mfd, 200 volts to read: .l mfd, 400 volts<br>1000 mfd - 6v D. C. Pin # 1 of V2 to ground. |



TOP VIEW

| Generator Connection | Dummy Ant. | Freq. | Adj. Trimmers | Output | Sensitivity uv. |
|---|---|---|---|---|---|
| Stator large section gang open | .I MFD cond. | 455 KC | 1, 2, 3, 4 | Max. | 120 |
| Antenna loop wire | 200 mmf cond. | 1400 KC | 5 & 6 | Max. | 50 |
| Antenna loop wire | 200 mmf | 600 KC | Variable Plates | Max. | 150 |

## SPECIFICATIONS

### ELECTRICAL CHARACTERISTICS

Tuning Range: Standard Broadcast 540-1640 KCS

Power Supply: Direct Current 105-125 volts or alternating current 105-125 volts, 50-60 Cycle or Batteries.

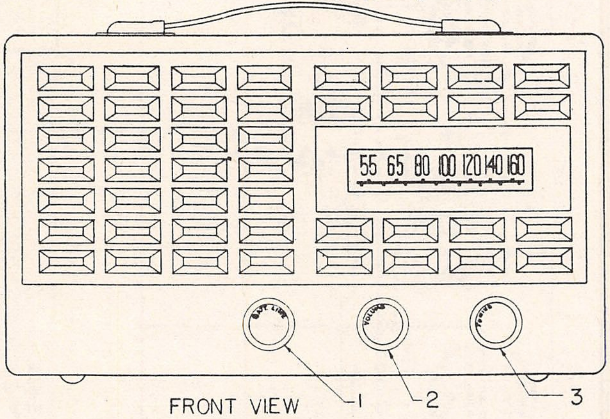
Power Consumption: AC or DC—12 watts

Battery Complement: 2—4½ Volt "A" Batteries
Eveready No. 746 or equivalent.

2—45 Volt "B" Batteries
Eveready No. 482 or equivalent.

Tube Complement:. IR5—Converter
IT4—I. F. Amplifier
IS5—2nd Det.—AVC—1st Audio
3Q4—Power Amplifier
117Z3—Rectifier

**Mechanical Characteristics: Dimensions** — Height: (including feet) 7⅛ inches
Width: 13 inches
Depth: (including knobs) 6¾ inches



FRONT VIEW

## SERVICING NOTES

All specifications and measurements based on 117 Volts, 60 Cycles, and all readings based on a 20,000 ohms per volt meter. All readings are taken with volume control (switch No. 2) in maximum clockwise position. Apply the lowest signallevel from the signal generator.

Output: 50 mw into a 3.2 ohm voice coil impedance.

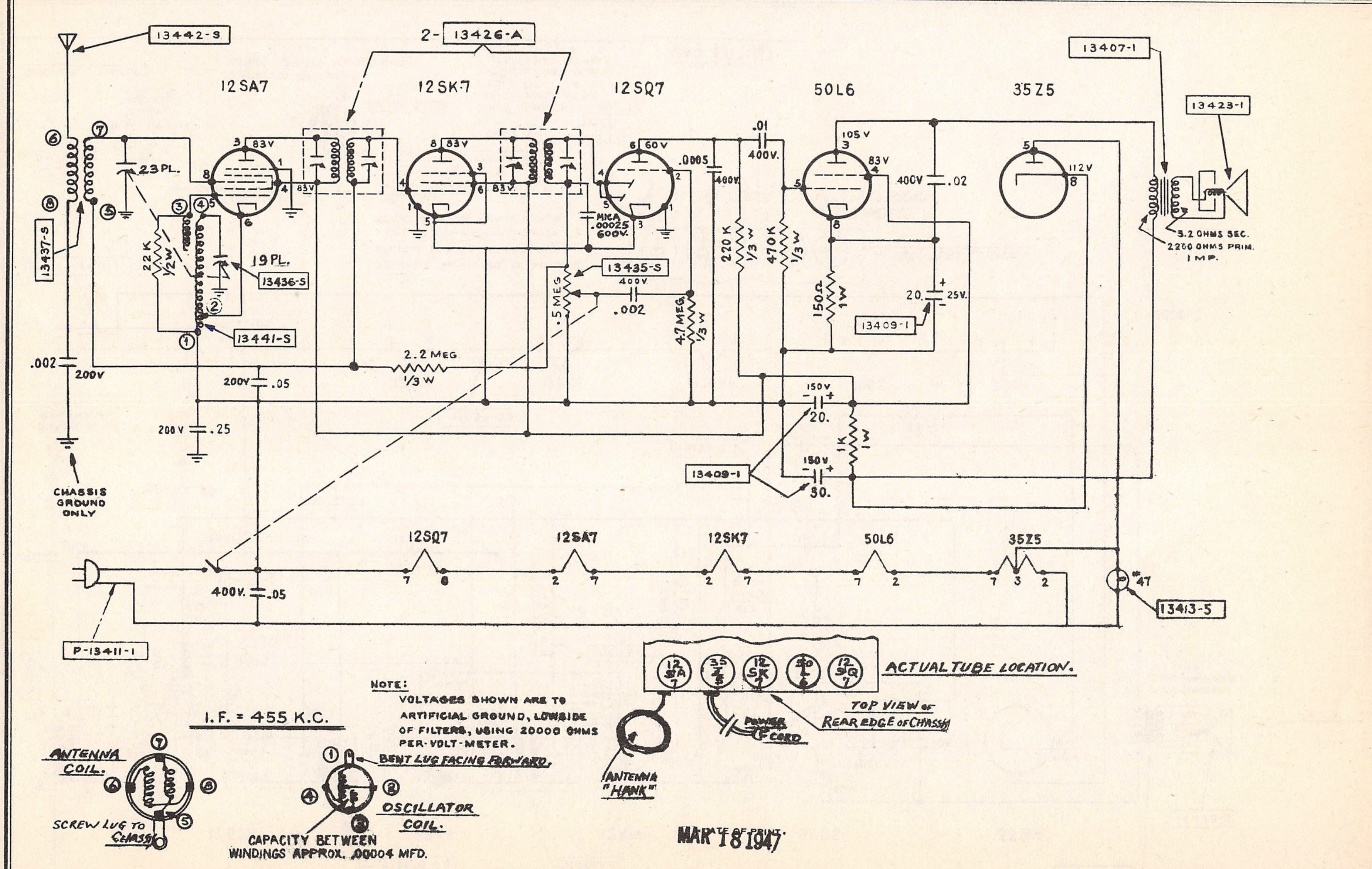
Approximate reading 0.4 Volt.

*I. F. ALIGNMENT*: With signal generator, set a 455 KC, apply signal through a .1 MFD condenser dummy to R.F. grid of convertor (IR5) or the stator of RF section of the variable condenser (condenser must be fully meshed). Peak I.F. trimmers 1, 2, 3, 4 (top view diagram) to give maximum reading on output meter connected across voice coil. (Note: If for any possible reason the signal does not come through indicating the receiver is way out of alignment, apply the signal to the grid of the I.F. Amplifier (IT4) and tune signal in by trimmers 3, 4 of second I.F. Transformer. Peak for maximum and once this stage is tuned, repeat above procedure.)

R.F. Alignment: With signal generator, set at 1400 KC, apply signal through a dummy antenna (200 mmf condenser) to the antenna loop wire. Set dial of receiver to 1400 KC and peak trimmers 5 & 6 to give maximum reading of output meter. Then set signal generator at 600 KC and tune receiver to 600 KC mark on dial. This setting should fall on calibrated point.

# MOLDED INSULATION CO.

**MODEL RS-1**


13442-S
2- 13426-A
13407-1
13423-1
12SA7
12SK7
12SQ7
50L6
35Z5
⑥
⑦
⑧
⑤
13437-S
23PL.
83V
3
8
1
4
6
83V
③
④
5
22 K
1/2W
19PL.
13436-S
②
①
13441-S
.002
200V
200V
.05
200 V
.25
CHASSIS GROUND ONLY
2.2 MEG.
1/3 W
83V
83V
.5 MEG
13435-S
400V.
.002
MICA .00025 600V.
60V
.0005
400V
4.7 MEG.
1/3 W
.01
400V.
220 K
1/3 W
470 K
1/3 W
105 V
83 V
400V
.02
150Ω
1W
20.
25V.
13409-1
150V
20.
1K
1W
150V
30.
13409-1
112V
3.2 OHMS SEC.
2200 OHMS PRIM.
1 MP.
400V.
.05
P-13411-1
#47
13413-5
7
8
2
7
2
7
7
2
7
3
2
12 SA 7
35 Z 5
12 SK 7
50 L 6
12 SQ 7
ACTUAL TUBE LOCATION.
TOP VIEW OF REAR EDGE OF CHASSIS
POWER CORD
ANTENNA "HANK"
ANTENNA COIL.
SCREW LUG TO CHASSIS
BENT LUG FACING FORWARD.
OSCILLATOR COIL.
CAPACITY BETWEEN WINDINGS APPROX. .00004 MFD.

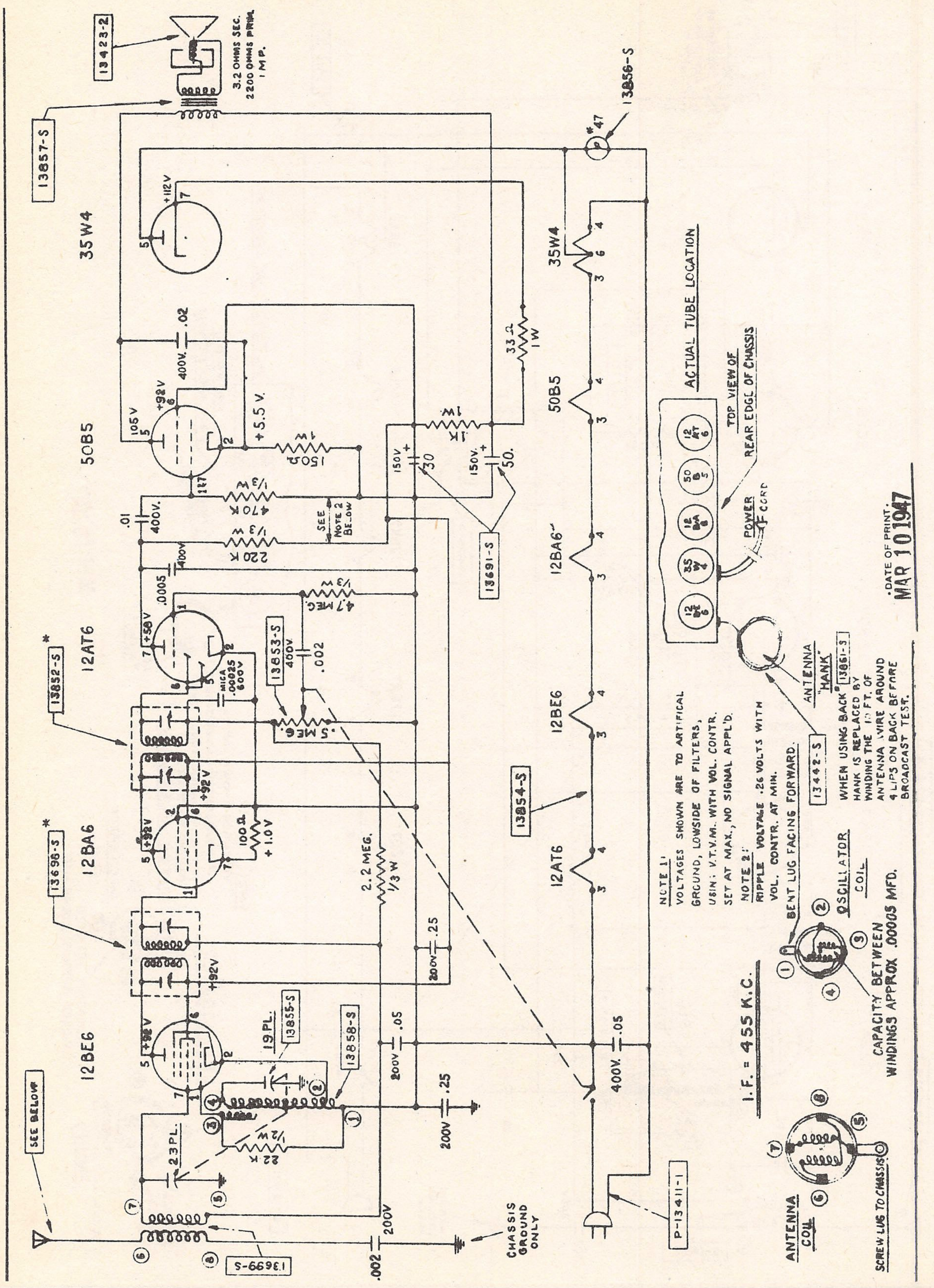
I.F. = 455 K.C.

NOTE:
VOLTAGES SHOWN ARE TO ARTIFICIAL GROUND, LOWSIDE OF FILTERS, USING 20000 OHMS PER-VOLT-METER.

DATE OF PRINT
MAR 18 1947

**MODEL RS-1A**

# MOLDED INSULATION CO.


12BE6
12BA6
12AT6
50B5
35W4
13696-S *
13852-S *
13857-S
13423-2
3.2 OHMS SEC.
2200 OHMS PRIM.
IMP.
13856-S
#47
+112V
33 Ω 1W
.02 400V.
105V
+92V
+5.5 V.
1W 150Ω
1W 1K
150V. 30
150V. 50.
13691-S
.01 400V.
1/3 W 470 K
1/3 W 220 K
SEE NOTE 2 BELOW
.0005 400V
+58V
1/3 W 4.7 MEG.
13853-S
.002 400V
MICA .00025 600V
.5 MEG.
100Ω +1.0V
+92V
2.2 MEG. 1/3 W
.25 200V
+92V
19 PL.
13855-S
13858-S
.05 200V
.25 200V
23 PL.
1/2 W 22 K
SEE BELOW
13699-S
.002 200V
CHASSIS GROUND ONLY
400V. .05
P-13411-1
13854-S
12AT6 12BA6 12BE6 50B5 35W4
3 4
3 6 4
ACTUAL TUBE LOCATION
TOP VIEW OF REAR EDGE OF CHASSIS
12 BE 6
35 W 4
12 BA 6
50 B 5
12 AT 6
POWER CORD
ANTENNA "HANK" 13861-S
13442-S
OSCILLATOR COIL
BENT LUG FACING FORWARD.
ANTENNA COIL
SCREW LUG TO CHASSIS
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

I.F. = 455 K.C.

NOTE 1:
VOLTAGES SHOWN ARE TO ARTIFICAL GROUND, LOWSIDE OF FILTERS, USING V.T.V.M. WITH VOL. CONTR. SET AT MAX., NO SIGNAL APPL'D.

NOTE 2:
RIPPLE VOLTAGE .26 VOLTS WITH VOL. CONTR. AT MIN.

CAPACITY BETWEEN WINDINGS APPROX .00005 MFD.

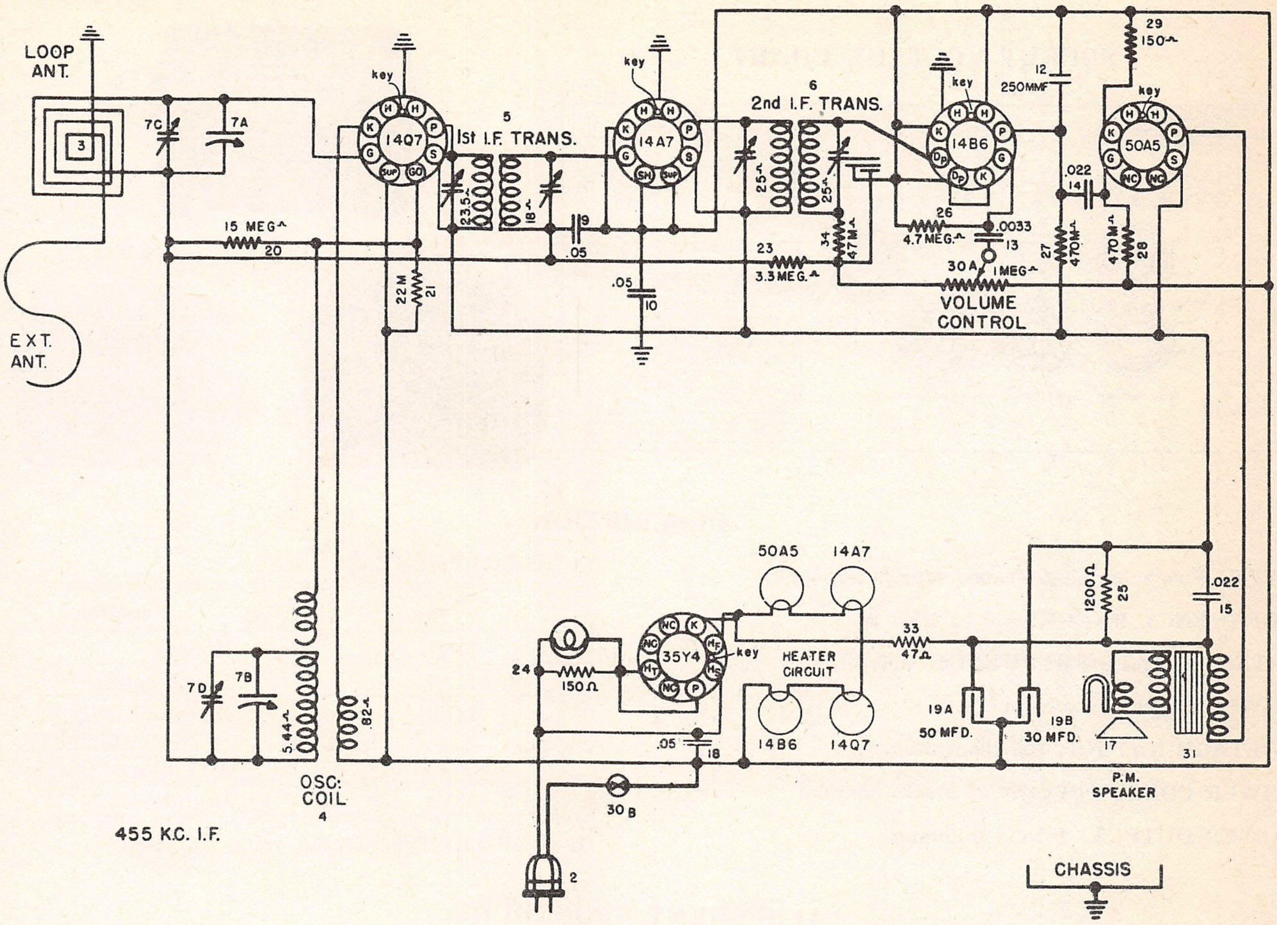
WHEN USING BACK "HANK" 13861-S HANK IS REPLACED BY WINDING THE 17 FT. OF ANTENNA WIRE AROUND 4 LIPS ON BACK BEFORE BROADCAST TEST.

DATE OF PRINT:
MAR 10 1947

# MONITOR EQUIPMENT CORPORATION

**MODELS**
**TA56M, TC56M, TW56M**

August, 1946


LOOP ANT.
3
7C
7A
key
14Q7
5
1st I.F. TRANS.
23.5
18
9
.05
14A7
6
2nd I.F. TRANS.
25
25
14B6
12
250MMF
29
150
50A5
.022
14
15 MEG
20
22M
21
.05
10
23
3.3 MEG.
34
47M
26
4.7 MEG.
.0033
13
30A
1MEG
VOLUME CONTROL
27
470M
470M
28
EXT. ANT.
7D
7B
5.44
.82
OSC. COIL
4
455 K.C. I.F.
24
150
35Y4
50A5
14A7
HEATER CIRCUIT
14B6
14Q7
.05
18
30B
2
33
47
1200
25
.022
15
19A
50 MFD.
19B
30 MFD.
17
31
P.M. SPEAKER
CHASSIS

## SCHEMATIC DIAGRAM

When using direct current it may be necessary to reverse the position of the power plug in the electric outlet for correct polarity. Reversing the position of the power plug when alternating current is used may reduce power hum. UNDER NO CIRCUMSTANCES SHOULD A GROUND BE CONNECTED TO THIS RECEIVER.

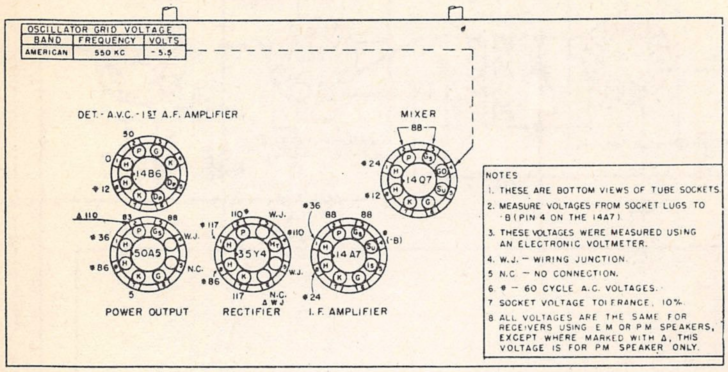
## PARTS LIST

Figures in first column correspond to figures in Schematic Diagram

| ITEM No. | PART No. | DESCRIPTION |
|---|---|---|
| 1 | W-48858 | Bulb (dial), Type 47, 6.3 v., .15 amp. |
| 2 | C-132300-1 | Cable and Plug (power) |
| 3 | AC-135209 | Ant. Loop and Back Assy. (TA56M, TW56M) |
|  | AC-135253 | Ant. Loop and Back Assy. (TC56M) |
| 4 | AW-135195 | Oscillator Coil Assembly |
| 5 | AW-137665 | Transformer (1st I.F.) |
| 6 | AW-137667 | Transformer (2nd I.F.) |
| 7A | B-135202 | Condenser (variable) } Two |
| 7B |  | Condenser (variable) } Section |
| 7C | Part of Item #7A | Condenser (trimmer) |
| 7D | Part of Item #7B | Condenser (trimmer) |
| 9 | 39001-65 | Condenser, .05 mfd., 200 v., paper |
| 10 | 39001-65 | Condenser, .05 mfd., 200 v., paper |
| 12 | 39001-73 | Condenser, 250 mmf., 600 v., paper |
| 13 | 39001-10 | Condenser, 3300 mmf., 600 v., paper |
| 14 | 39001-63 | Condenser, .022 mfd., 200 v., paper |
| 15 | 39001-63 | Condenser, .022 mfd., 200 v., paper |
| 17 | B-136768 | Speaker |
| 18 | 39001-65 | Condenser, .05 mfd., 200 v., paper |
| 19A | B-136770 | Condenser, 50 mfd., 150 v. } Two Section |
| 19B |  | Condenser, 30 mfd., 150 v. } Elect. Filter |
| 20 | 39294-38 | Resistor, 15 megohm, ½ w. |
| 21 | 39294-21 | Resistor, 22,000 ohm, ½ w. |
| 23 | 39294-34 | Resistor, 3.3 megohm, ½ w. |
| 24 | 39294-8 | Resistor, 150 ohm, ½ w. |
| 25 | 39015-26 | Resistor, 1200 ohm, 1 w. |
| 26 | 39294-35 | Resistor, 4.7 megohm, ½ w. |
| 27 | 39294-29 | Resistor, 470,000 ohm, ½ w. |
| 28 | 39294-29 | Resistor, 470,000 ohm, ½ w. |
| 29 | 39294-8 | Resistor, 150 ohm, ½ w. |
| 30A | C-135127 | Control, Volume (1 megohm) } Assy. |
| 30B |  | Switch (power) } |
| 31 | B-135077 | Transformer (output) |
| 33 | W-137367 | Resistor, 47 ohm, 1 w. |
| 34 | Part of Item #6 | Resistor, 47,000 ohm, ½ w. |
|  | W-135371 | Socket (tube) |
|  | 39017-5 | Socket (dial light) |
|  | AB-135135 | Plate Assembly (dial) |
|  | W-135074 | Pulley (idler) |
|  | B-135094 | Pointer (dial) |
|  | B-135075 | Shaft (drive) |
|  | W-134916 | Washer (spring) |
|  | W-51071 | Ring (retaining) |
|  | W-131154-1 | Cotter (external) |
|  | W-51752 | Spring (drive cord) |
|  | W-134055 | Grommet |
|  | W-135164 | Bumper |
|  | W-136630 | Trimount Stud |
|  | R-135163 | Cabinet (TA56M) |
|  | AW-135245 | Cabinet (TW56M) |
|  | D-135235 | Cabinet (TC56M) |
|  | B-135461 | Dial Glass |
|  | W-135391 | Knob (TA56M, TC56M) |
|  | W-135390 | Knob (TW56M) |
|  | W-132124 | Trimount Stud (TA56M, TW56M) |

## MODELS TA56M,TC56M, MONITOR EQUIPMENT CORPORATION TW56M

### SOCKET VOLTAGE CHART

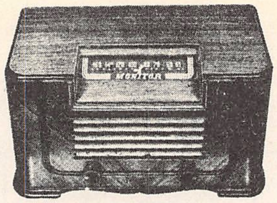

DET.-A.V.C.-1ST A.F. AMPLIFIER
14B6
50
0
✱12
MIXER
88
14Q7
✱24
✱12
Δ110
83
88
✱36
✱86
50A5
W.J.
N.C.
5
POWER OUTPUT
110✱
W.J.
✱117
✱110
35Y4
✱86
W.J.
117
N.C.
Δ W.J
RECTIFIER
✱36
88
88
✱
(-B)
14A7
✱24
I. F. AMPLIFIER

| OSCILLATOR GRID VOLTAGE | | |
|---|---|---|
| BAND | FREQUENCY | VOLTS |
| AMERICAN | 550 KC | -5.5 |

NOTES

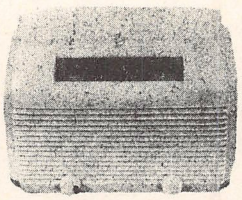
1. THESE ARE BOTTOM VIEWS OF TUBE SOCKETS.
2. MEASURE VOLTAGES FROM SOCKET LUGS TO -B (PIN 4 ON THE 14A7)
3. THESE VOLTAGES WERE MEASURED USING AN ELECTRONIC VOLTMETER.
4. W.J. — WIRING JUNCTION.
5 N.C — NO CONNECTION.
6 ✱ — 60 CYCLE A.C. VOLTAGES.
7 SOCKET VOLTAGE TOLERANCE, 10%.
8 ALL VOLTAGES ARE THE SAME FOR RECEIVERS USING E M OR P M SPEAKERS, EXCEPT WHERE MARKED WITH Δ, THIS VOLTAGE IS FOR PM SPEAKER ONLY.

TC56M



TA56M

TW56M



### DESCRIPTION

**TYPE:** Five-tube, single-band, superheterodyne.

**FREQUENCY RANGE:** 540 to 1600 kc.

**INTERMEDIATE FREQUENCY:** 455 kc.

**POWER SUPPLY:** a.c.—d.c.

**VOLTAGE RATING:** 105-125 volts.

**POWER CONSUMPTION:** 35 watts nominal.

**POWER OUTPUT:** 1 watt minimum.

**TUBE COMPLEMENT:**

| Type | Function |
|---|---|
| 14Q7 | Mixer |
| 14A7 | I.F. Amplifier |
| 14B6 | Detector, AVC,<br>1st A.F. Amplifier |
| 50A5 | A.F. Power Output |
| 35Y4 | Rectifier |

**DIAL BULB:** Type 47, 6.3 volts, .15 amp.

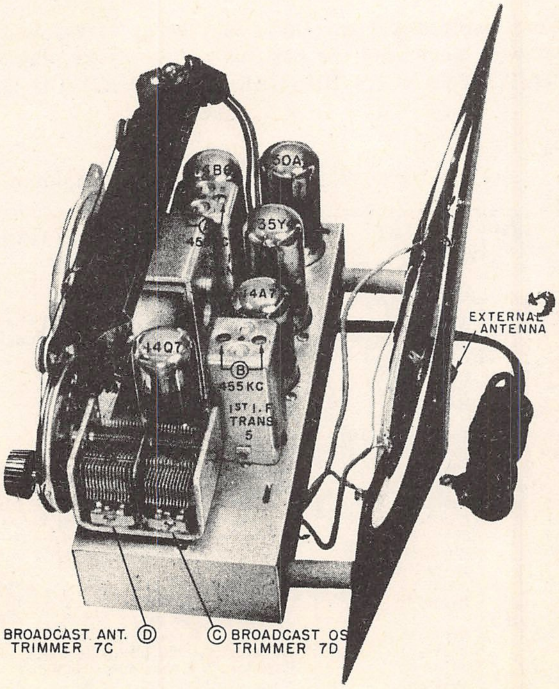
### ALIGNMENT PROCEDURE

1. Turn the tuning condenser to the completely closed position against the stop and set the dial pointer to the reference line at the end of the dial scale.
2. Connect the output meter across the speaker voice coil.
3. The r.f. signal input from the signal generator should be connected to the external antenna lead. Connect the signal generator ground through a 0.1 mfd. condenser to —B (pin 4 on 14A7 tube socket).
4. Turn the volume control on full and adjust the signal generator output to produce approximately mid-scale deflection of the output meter, but maintain signal generator output as low as possible to prevent AVC action in the receiver.

### ALIGNMENT CHART

Alignment adjustment locations are shown in Chassis, Side View at the right.

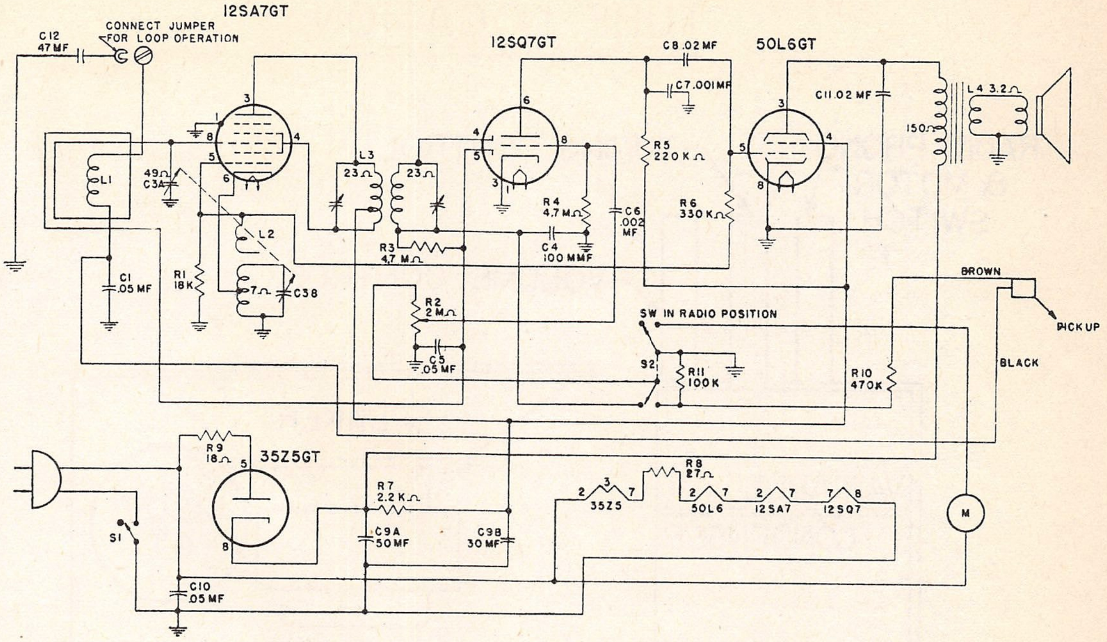
| Alignment sequence | Signal Gen. Output | | | Position of Tuning Dial | Adjust for max. output |
|---|---|---|---|---|---|
| | Frequency in KC | In Series with | To | | |
| 1 | 455 | 200 mmf. | Ant. | 1620 | A & B |
| 2 | 1620 | 200 mmf. | Ant. | 1620 | C |
| 3 | 1400 | 200 mmf. | Ant. | 1400 | D |


14B6
50A
35Y
A
455
14A7
14Q7
B
455 KC
1ST I.F. TRANS.
5
EXTERNAL ANTENNA
BROADCAST ANT. TRIMMER 7C D
C BROADCAST OS TRIMMER 7D

CHASSIS, SIDE VIEW

# MONITOR EQUIPMENT CORPORATION

## MODEL M-403


12SA7GT
C12 47 MF
CONNECT JUMPER FOR LOOP OPERATION
12SQ7GT
C8 .02 MF
C7 .001 MF
50L6GT
C11 .02 MF
L4 3.2Ω
150Ω
L1
49Ω C3A
L3
23Ω
23Ω
R5 220 KΩ
R4 4.7 MΩ
C6 .002 MF
R6 330 KΩ
L2
R3 4.7 MΩ
C4 100 MMF
C1 .05 MF
R1 18K
7Ω
C3B
R2 2 MΩ
C5 .05 MF
BROWN
PICKUP
SW IN RADIO POSITION
S2
R11 100K
R10 470K
BLACK
R9 18Ω
35Z5GT
R8 27Ω
R7 2.2 KΩ
35Z5
50L6
12SA7
12SQ7
M
S1
C9A 50 MF
C9B 30 MF
C10 .05 MF

Tuning range .......... 530 to 1600 kc

Intermediate frequency .......... 455 kc

Power consumption .......... 30 watts

Selectivity .......... 1. A.C.A.—3 to 1. 2. A.C.A.—12.5 to 1

Sensitivity (for 0.5 watt output):
Loop .......... 8000 microvolts per meter average
Antenna .......... 800 microvolts average

Power output (in voice coil):
Undistorted .......... 0.8 watts
Maximum .......... 2.5 watts

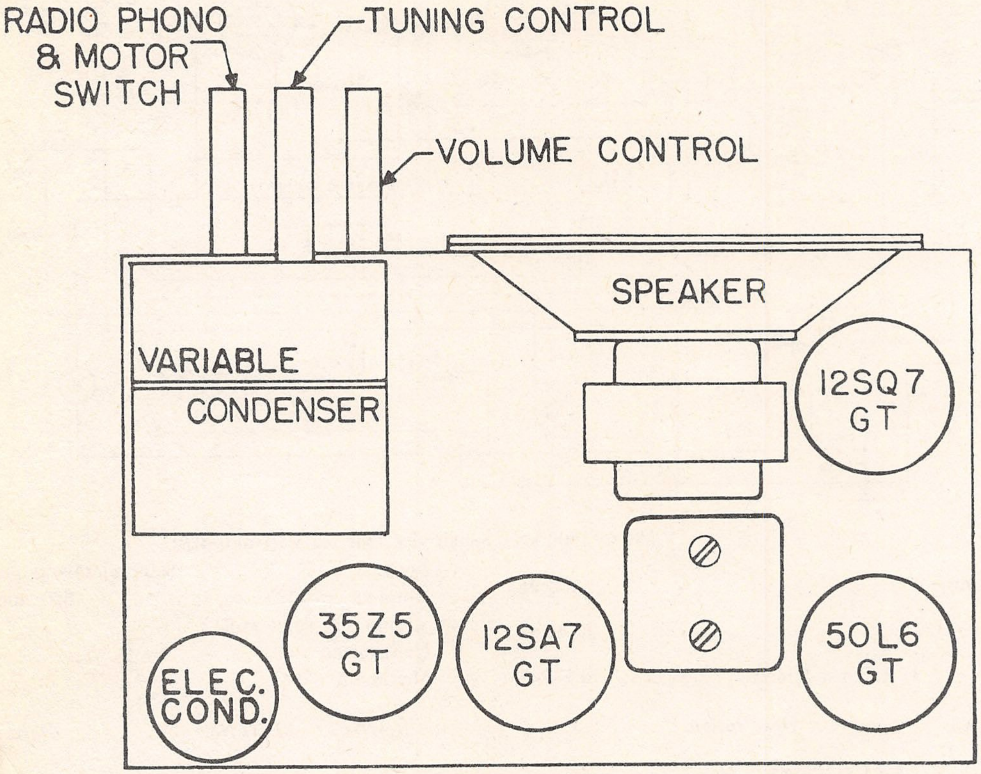
| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| | | **Capacitors** |
| C1-C10 | | Paper, .05 mfd 400 volts |
| C6 | | Paper, .002 mfd 400 volts |
| C8-C11 | | Paper, .02 mfd 400 volts |
| C5 | | Paper, .05 mfd 200 volts |
| C7 | | Paper, .001 mfd 500 volts |
| C4 | | Ceramic 100 mmfd 500 volts |
| C12 | | Ceramic 47 mmfd 500 volts |
| C3 | 1675 | Variable Air—2 gang |
| C9 | 2073 | Electrolytic, 50-30 mfd 150 volts |
| | | **Resistors** |
| R2 | 2480 | Control, volume with switch, 2 meg-ohms |
| R1 | | 18000 ohms, 1/4 watt |
| R3, R4 | | 4.7 meg ohms, 1/4 watt |
| R5, R10 | | 220,000 ohms, 1/4 watt |
| R6 | | 330,000 ohms, 1/4 watt |
| R7 | | 2200 ohms, 2 watts |
| R8 | | 27 ohms, 1/2 watt |
| R9 | | 18 ohms, 1/2 watt |
| R11 | | 100,000 ohms, 1/4 watt |

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| | | **Coils and Transformers** |
| L1 | 28186 | Back cover with loop |
| L2 | 28184 | Oscillator coil |
| L3 | 3376 | I.F. transformer |
| L4 | 1300 | Output transformer |
| | | **Miscellaneous** |
| | | Cord, line 6 ft. |
| | 39160 | Knob, tuning |
| | 39161 | Knob, volume |
| | 5877 | Speaker |
| | T470 | Cabinet, wood |
| | 54314 | Tuning knob washer |
| | | Phono-needle |
| | 346-5 | Walsco back clips |
| | 18110 | Sockets, wafer octal |
| | 3828 | Switch, phono-radio |
| | | Phono motor and 8-inch turntable |
| | | Phono crystal, L-26 |

* The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences in both resistors and capacitors follows:

Pre-standardized value—50,000 ohms, 1/3 watt, 10%
RMA value—47,000 ohms, 1/2 watt, 10%
Pre-standardized value—200 mmf, 500 volts, 20%
RMA value—220 mmf, 500 volts, 20%

# TUBE LOCATION



## ALIGNMENT PROCEDURE

**(Refer to Chassis View)**

- Output meter across 3.2-ohm output load.
- Volume control at maximum.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Connect ground post of signal generator to chassis.

| SIGNAL GENERATOR | | | | |
|---|---|---|---|---|
| *Frequency* | *Dummy Antenna* | *Connection to Radio* | *TUNER SETTING* | *ADJUST FOR MAXIMUM OUTPUT (in order shown)* |
| 455 kc | 0.1 mf | Stator of antenna section of gang | Any | Trimmers on I.F. can |
| 1590 kc | * * | * * | Rotor full open (plates out of mesh) | Oscillator trimmer |
| 1590 kc | * * | * * | Rotor full open (plates out of mesh) | Antenna trimmer |

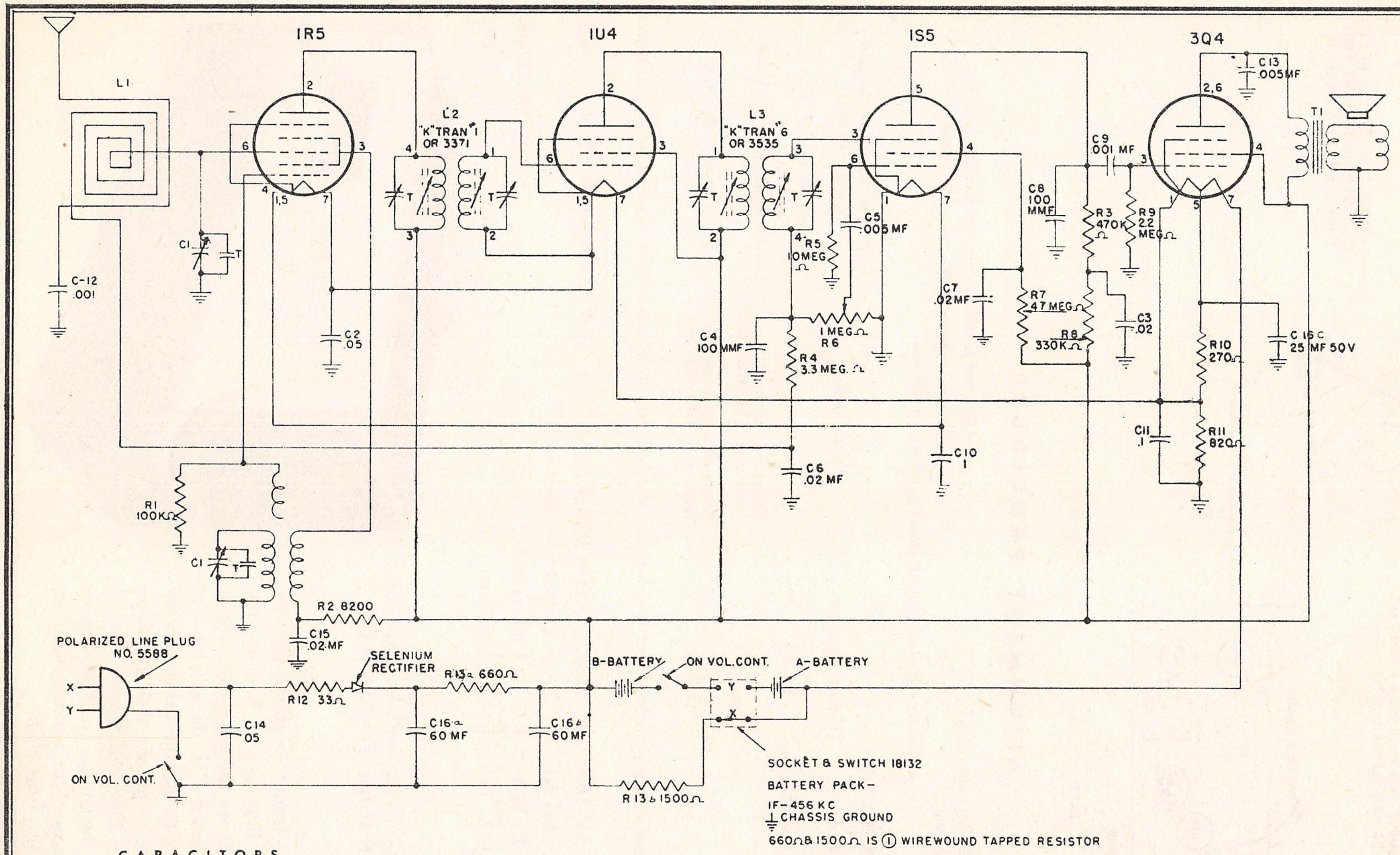
* * Run a wire from output terminal of the generator near the receiver. However, no connection is made between the signal generator and the receiver.

To remove the chassis from the cabinet, proceed as follows: Make sure the line cord is disconnected from the power receptacle. Remove the phonograph turntable and motor by unscrewing the three mounting screws on the phono motor. If the back has not been removed, pull out the four fasteners with which the back is mounted. Pull the volume and tuning knobs off their shafts. Remove the three mounting screws on the bottom of the cabinet. The chassis can then be slipped out of the cabinet.

This receiver is designed to operate without a ground. NO ATTEMPT SHOULD BE MADE TO USE ONE.

# MONITOR EQUIPMENT CORPORATION

## MODEL M-510


1R5
1U4
1S5
3Q4
L1
C-12 .001
C1
T
L2 "K" TRAN 1 OR 3371
L3 "K" TRAN 6 OR 3535
C2 .05
R1 100KΩ
R2 8200
C15 .02 MF
C4 100 MMF
R4 3.3 MEG. Ω
R5 10 MEG Ω
C5 .005 MF
1 MEG Ω R6
C6 .02 MF
C7 .02 MF
C10 1
C8 100 MMF
R7 4.7 MEG Ω
R8 330K Ω
C9 .001 MF
R3 470K Ω
R9 2.2 MEG Ω
C3 .02
C11 .1
R10 270Ω
R11 820Ω
C16c 25 MF 50V
C13 .005 MF
T1
POLARIZED LINE PLUG NO. 5588
X
Y
ON VOL. CONT.
C14 .05
R12 33Ω
SELENIUM RECTIFIER
R13a 660Ω
C16a 60 MF
C16b 60 MF
B-BATTERY
ON VOL. CONT.
A-BATTERY
R13b 1500Ω
SOCKET & SWITCH 18132
BATTERY PACK-
IF-456 KC
CHASSIS GROUND
660Ω & 1500Ω IS ① WIREWOUND TAPPED RESISTOR

### CAPACITORS

| | | |
|---|---|---|
| C1 | 1694 | Variable |
| C2, C14 | | Paper, .05 MFD 200 volts |
| C3 | | Paper, .2 MFD 200 volts |
| C4, C8 | | Mica or ceramic, 100 MMFD |
| C5, C13 | | Paper, .005 MFD 200 volts |
| C6, C7, C15 | | Paper, .02 MFD 200 volts |
| C9, C12 | | Paper, .001 MFD 200 volts |
| C10, C11 | | Paper, .1 MFD 200 volts |
| C16 A.B.C. | 2075 | Electrolytic |

### RESISTORS

| | |
|---|---|
| R1 | 100,000 ohms, ¼ watt |
| R2 | 8200 ohms, ¼ watt |
| R3 | 470,000 ohms, ¼ watt |
| R4 | 3.3 meg ohms, ¼ watt |
| R5 | 10 meg ohms, ¼ watt |
| R6 | Control, volume, DPST Switch, 1 meg ohm |
| R7 | 4.7 meg ohms, ¼ watt |
| R8 | 330,000 ohms, ¼ watt |
| R9 | 2.2 meg ohms, ¼ watt |
| R10 | 270 ohms, ¼ watt |
| R11 | 820 ohms, ¼ watt |
| R12 | 33 ohms, 1 watt |
| R13 | Filter and Filament, dropping |

### COILS AND TRANSFORMERS

| | | |
|---|---|---|
| | 28197 | Oscillator coil |
| L2 | 3371 | Input IF Transformer |
| L3 | 3535 | Output IF Transformer |
| T1 | 1337 | Output transformer |
| L1 | 28190 | Loop |

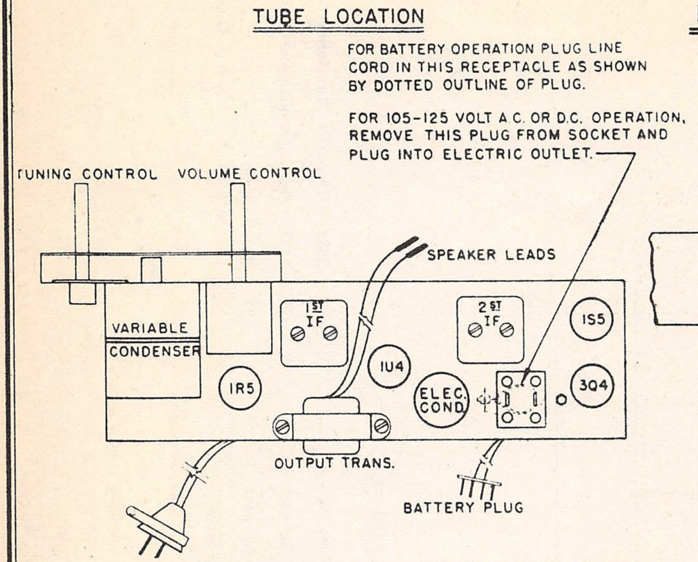
### MISCELLANEOUS

| | |
|---|---|
| 5588 | Cord, Line (Polarized) |
| 39164 | Knobs |
| 5899 | Loud Speaker 4" |
| 472 | Cabinet |
| 18132 | Wafer, Switch—Battery A.C. |

MODEL M-510

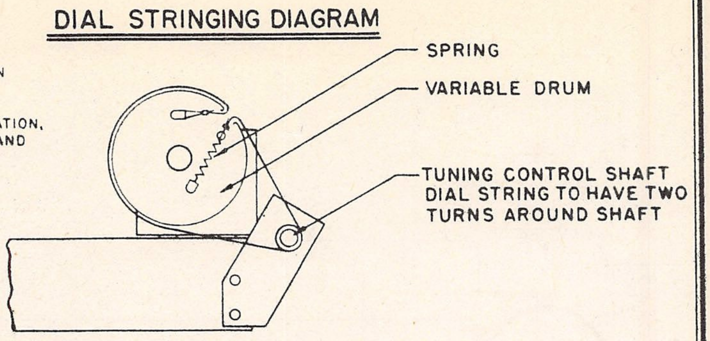
# MONITOR EQUIPMENT CORPORATION

## TUBE LOCATION


FOR BATTERY OPERATION PLUG LINE CORD IN THIS RECEPTACLE AS SHOWN BY DOTTED OUTLINE OF PLUG.

FOR 105-125 VOLT A.C. OR D.C. OPERATION, REMOVE THIS PLUG FROM SOCKET AND PLUG INTO ELECTRIC OUTLET.

## DIAL STRINGING DIAGRAM



DIAL STRING TO HAVE TWO TURNS AROUND SHAFT

## ALIGNMENT PROCEDURE

- Output Meter across 3.2 ohm output load
- Volume control at maximum
- Align for maximum output. Reduce input as needed to keep ouput near 0.05 watts
- Connect ground post of signal generator to chassis

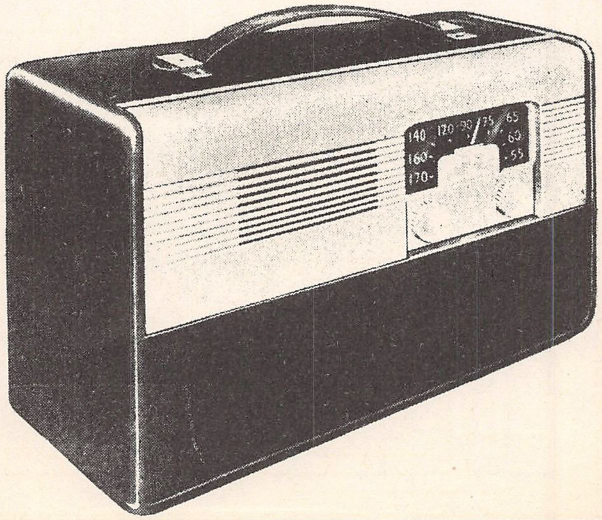
| | SIGNAL GENERATOR | | | |
|---|---|---|---|---|
| *Frequency* | *Connection to Radio* | *Dummy Antenna* | *Tuner Setting* | *Adjust for Maximum Output (in order shown)* |
| 455 KC | Center of antenna section of Gang | 0.2 mf | Any | Trimmers on I.F. Can |
| •1500 KC | * * | * * | Set pointer at second dot from end. On dial pan | Oscillator Trimmer on Gang. |
| 1500 KC | * * | * * | Set pointer at second dot from end. On dial pan | R.F. Trimmer on Gang |

** Run a wire from Output Terminal of the Generator near the Receiver. However, no connection is made between the signal generator and the Receiver.

| | |
|---|---|
| Tuning Range | 540-1600 |
| Intermediate Frequency | 455 KC |
| Power Consumption | 15 Watts |
| Selectivity | A.C.A. 12-1 |

| | |
|---|---|
| Sensitivity (For 0.05 Watt Output) | 300 Microvolts per Meter Average |
| Power Output (in voice coil): | |
| Undistorted | 130 Watts |
| Maximum | 300 Watts |

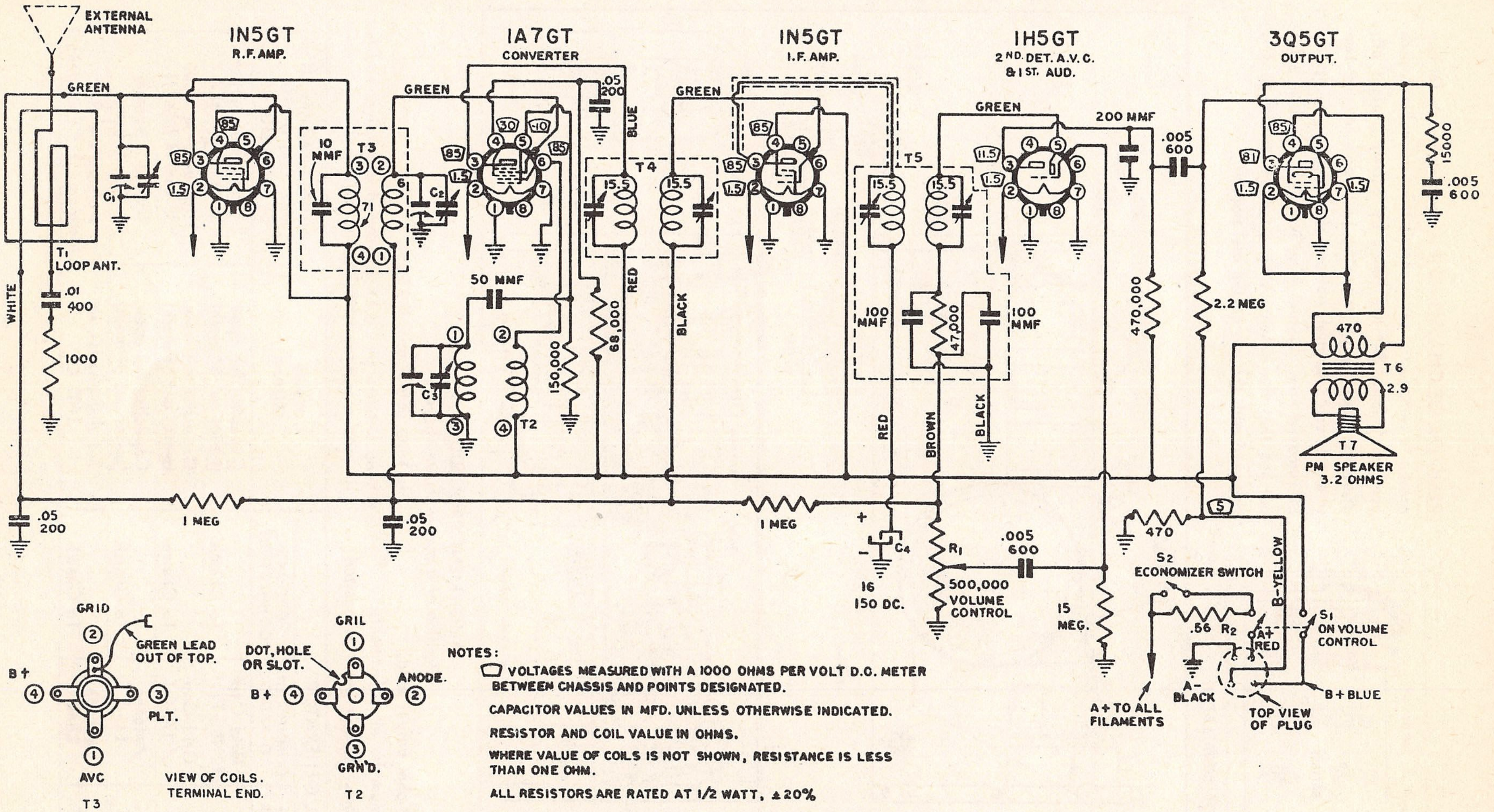
This receiver is designed to operate without a ground. *NO ATTEMPT SHOULD BE MADE TO USE ONE.*



To remove the chassis from the cabinet, proceed as follows:— Make sure the line cord is disconnected from the power receptacle. Remove the back and disconnect the wires to the loop antenna. Pull the volume and tuning knobs off their shafts. Remove the two mounting screws which hold the chassis mounting shelf in place. The chassis with the mounting shelf can now be slipped out of the cabinet. To remove the chassis from the chassis mounting shelf, it is only necessary to remove the three mounting screws on the bottom of the shelf.

MODEL 54KP-1209B

# MONTGOMERY WARD


EXTERNAL ANTENNA
GREEN
WHITE
T1 LOOP ANT.
.01 400
1000
.05 200
C1
IN5GT R.F. AMP.
IA7GT CONVERTER
IN5GT I.F. AMP.
IH5GT 2ND. DET. A.V.C. & 1ST. AUD.
3Q5GT OUTPUT.
10 MMF
T3
C2
C3
50 MMF
T2
150,000
68,000
.05 200
BLUE
RED
BLACK
T4
15.5
T5
100 MMF
47,000
BROWN
1 MEG
C4
16 150 DC.
R1
500,000 VOLUME CONTROL
.005 600
15 MEG.
200 MMF
470,000
2.2 MEG
470
T6
2.9
T7
PM SPEAKER 3.2 OHMS
15000
S2 ECONOMIZER SWITCH
.56 R2
A+ RED
A- BLACK
B-YELLOW
S1 ON VOLUME CONTROL
B+ BLUE
TOP VIEW OF PLUG
A+ TO ALL FILAMENTS
GRID
GREEN LEAD OUT OF TOP.
B+
PLT.
AVC
T3
VIEW OF COILS. TERMINAL END.
DOT, HOLE OR SLOT.
GRIL
ANODE.
GRN'D.
T2

NOTES:

▭ VOLTAGES MEASURED WITH A 1000 OHMS PER VOLT D.C. METER BETWEEN CHASSIS AND POINTS DESIGNATED.

CAPACITOR VALUES IN MFD. UNLESS OTHERWISE INDICATED.

RESISTOR AND COIL VALUE IN OHMS.

WHERE VALUE OF COILS IS NOT SHOWN, RESISTANCE IS LESS THAN ONE OHM.

ALL RESISTORS ARE RATED AT 1/2 WATT, ±20%

NOTE—Resistor - 68,000 Ohm in Screen Circuit of IA7GT Tube, Replaced With 33,000 Ohm.

Voltage at Terminal #4 on IA7GT Tube Increased to 48 (Average).

## ELECTRICAL SPECIFICATIONS

BATTERY USED . . . (Wards 62-57): Battery dimensions, 16 x 6⅝ x 4½". "A" 1½ volts. "B" 90 volts. "A" current 300 M. A., B current 11.5 M. A.

TUNING RANGE . . . 535-1620 KC.

INTERMEDIATE-FREQUENCY . . . 455 KC.

SELECTIVITY . . . Over-all band width 35 KC at 1000 X signal at 1000 KC.

SENSITIVITY . . . 12 Microvolts for 50 Milliwatts output.

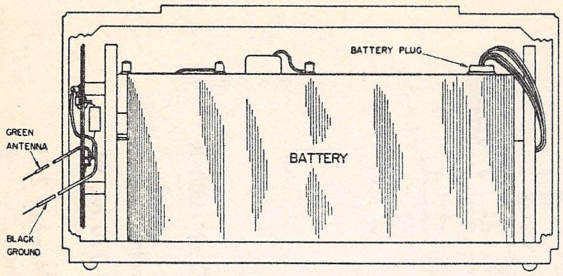
POWER OUTPUT . . . 150 M. W. undistorted 330 M. W. maximum.

LOUD SPEAKER . . . 5 inch diameter P. M. Magnet 2.15 oz. Alnico V. Voice coil 3.2 ohms impedence.

TUBE COMPLEMENT . . . IN5GT (RF), IA7GT (Det.-Osc.), IN5GT (IF), IH5GT (Det.-Audio), 3Q5GT (Pwr.)

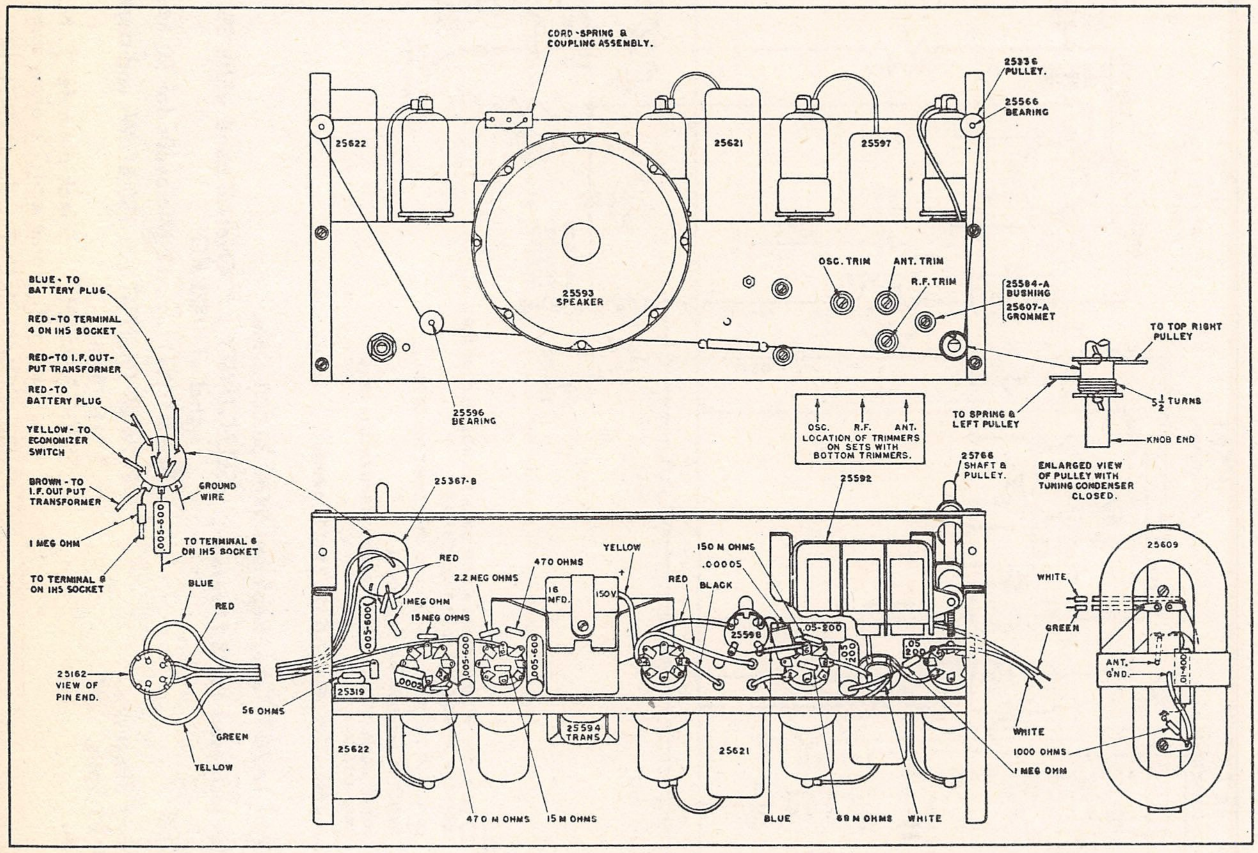
MODEL 54KP-1209B

## MONTGOMERY WARD


BATTERY PLUG
BATTERY
GREEN ANTENNA
BLACK GROUND

BATTERY INSTALLATION

**REMOVAL OF CHASSIS**—If it is found necessary for any reason to remove the radio chassis from the cabinet, proceed as follows: Remove knobs by pulling straight off, disconnect battery by removing plug, and remove two screws inserted through bottom of cabinet. Chassis can be removed now. (Note—After installing chassis in cabinet see that the bakelite strip attached to dial cord is engaged with the pin on the dial pointer.)


CORD-SPRING & COUPLING ASSEMBLY.
25622
25593 SPEAKER
25621
25597
25336 PULLEY.
25566 BEARING
OSC. TRIM
ANT. TRIM
R.F. TRIM
25584-A BUSHING
25607-A GROMMET
25596 BEARING
TO TOP RIGHT PULLEY
5½ TURNS
TO SPRING & LEFT PULLEY
KNOB END
OSC.
R.F.
ANT.
LOCATION OF TRIMMERS ON SETS WITH BOTTOM TRIMMERS.
25766 SHAFT & PULLEY.
ENLARGED VIEW OF PULLEY WITH TUNING CONDENSER CLOSED.
BLUE - TO BATTERY PLUG
RED - TO TERMINAL 4 ON IH5 SOCKET
RED - TO I.F. OUT-PUT TRANSFORMER
RED - TO BATTERY PLUG
YELLOW - TO ECONOMIZER SWITCH
BROWN - TO I.F. OUT PUT TRANSFORMER
GROUND WIRE
I MEG OHM
.005-600
TO TERMINAL 6 ON IH5 SOCKET
TO TERMINAL 8 ON IH5 SOCKET
BLUE
RED
25162 VIEW OF PIN END.
56 OHMS
GREEN
YELLOW
25367-B
RED
IMEG OHM
15MEG OHMS
2.2 MEG OHMS
470 OHMS
16 MFD.
150V.
YELLOW
RED
BLACK
150 M OHMS
.00005
25592
25598
.05-200
.05 200
.0002
25319
25622
25594 TRANS
25621
470 M OHMS
15 M OHMS
BLUE
68 M OHMS
WHITE
25609
WHITE
GREEN
ANT.
GND.
.01-400
WHITE
1000 OHMS
I MEG OHM

### ALIGNMENT PROCEDURE

(Position of trimmers shown above)

- Output meter across 3.2-ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.
- Loop antenna should be connected to receiver and in its proper position when making adjustments.

| SIGNAL GENERATOR | | | | TUNER SETTING | ADJUST TRIMMERS TO MAXIMUM OUTPUT IN ORDER SHOWN |
|---|---|---|---|---|---|
| FREQUENCY | COUPLING CAPACITOR | CONNECTION TO RADIO | GROUND CONNECTION | | |
| 455 KC | .1 | Grid Cap of 1N5GT (I.F.) | To Chassis | Capacitor full open (plates out of mesh) | 2 trimmers on output IF can T5 (25622) |
| 455 KC | .1 | Grid Cap of 1A7GT | To Chassis | Capacitor full open (plates out of mesh) | 2 trimmers on input IF can T4 (25621) |
| 1620 KC | 200 Mmf | Antenna Lead | To Chassis | Capacitor full open (plates out of mesh) | Oscillator trimmer C3 on gang |
| 1400 KC | 200 Mmf | Antenna Lead | To Chassis | Set dial pointer at 1400 KC | Antenna and R. F. trimmers C1, C2 on gang |

MODEL 54KP-1209B
MODEL 64WG-1207A
MODEL 64WG-1804C

## MONTGOMERY WARD

### RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 kc for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm, 5-watt resistor across the secondary winding of the output transformer. A reading of 0.4 volts AC across this resistor will be equivalent to a 50-milliwatt output with the speaker connected.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 kc and 455 kc signals modulated 30% with a 400-cycle audio signal. Variations of plus or minus 25% are usually permissible.

The volume control must be set to maximum.

MODEL 54 KP-1209B

| SIGNAL GENERATOR | | | | INPUT FOR 50 MILLIWATT OUTPUT |
|---|---|---|---|---|
| FREQUENCY | COUPLING CAPACITOR | CONNECTION TO RADIO | GROUND CONNECTION | |
| 1000 KC | 200 Mmf or RMA Dummy Antenna | External Antenna Clip | To Ground Lead | 12 uv |
| 1000 KC | .1 Mfd. | Grid (Top Connection) of R. F. Amp. (1N5) | To Chassis | 20 uv |
| 1000 KC | .1 Mfd. | Grid (Top Connection) of Converter (1A7) | To Chassis | 220 uv |
| 455 KC | .1 Mfd. | Grid (Top Connection) of Converter (1A7) | To Chassis | 125 uv |
| 455 KC | .1 Mfd. | Grid (Top Connection) I. F. Amp. (1N5) | To Chassis | 6000 uv |
| 400 Cycles | .1 Mfd. | Grid (Top Connection) Audio Amp. (1H5) | To Chassis | .1 v. |
| 400 Cycles | .1 Mfd. | Grid (Pin) of Output Amp. (3Q5) | To Chassis | 1.5 v. |

MODEL 74WG-1207B 64WG-1207A & B

| SIGNAL GENERATOR | | | | INPUT FOR 50 MILLIWATT OUTPUT |
|---|---|---|---|---|
| Frequency | Coupling Capacitor | Connection to Receiver | Ground Connection | |
| 1000 kc | 200 mmf or RMA Dummy Antenna | Antenna Lead | Chassis | 10 microvolts |
| 1000 kc | .05 mf | 1R5 Mixer, Pin 6 | Chassis | 30 microvolts |
| 455 kc | .05 mf | 1R5 Mixer, Pin 6 | Chassis | 25 microvolts |
| 455 kc | .05 mf | 1U4 1st I-F, Pin 6 | Chassis | 400 microvolts |
| 455 kc | .05 mf | 1U4 2nd I-F, Pin 6 | Chassis | 3500 microvolts |
| 400 cycles | .05 mf | 1S5 1st A-F, Pin 6 | Chassis | .031 volt |
| 400 cycles | .05 mf | 3Q4 Output, Pin 3 | Chassis | 2.7 volts |

MODEL 64 WG-1804C

| SIGNAL GENERATOR | | | | INPUT FOR 50 MILLIWATT OUTPUT |
|---|---|---|---|---|
| Frequency | Coupling Capacitor | Connection to Receiver | Ground Connection | |
| 1000 kc | 200 mmf or RMA Dummy Antenna | Loop Antenna—External antenna clip | Chassis | 19.5 microvolts |
| 1000 kc | .05 mf. | 12SA7 Mixer—Pin 8 | Point "X" (12SK7 Pin 3) | 150 microvolts |
| 455 kc | .05 mf | 12SA7 Mixer—Pin 8 | Same as above | 100 microvolts |
| 455 kc | .05 mf | 12SF7 I-F—Pin 2 | Same as above | 3500 microvolts |
| 400 cycles | .05 mf | 12SJ7 1st A-F—Pin 4 | Same as above | .042 volt |
| 400 cycles | .05 mf | 35L6GT Output—Pin 5 | Same as above | 1 volt |

## MONTGOMERY WARD
# REPLACEMENT PARTS INFORMATION

**HOW TO ORDER PARTS** — When ordering, specify PART number, schematic diagram reference number when applicable, and CHASSIS MODEL number. The model number appears on a label on the chassis.

## REPLACEMENT PARTS LIST

Use Only Genuine Factory Replacement Parts

| Ref. No. | Part No. | Description | Qty. Used In Set |
|---|---|---|---|
| | | **CAPACITORS** | |
| C1, C2, C3 | 25592 | 3 Gang Tuning Capacitor Including Trimmers | 1 |
| C4 | 25600 | Electrolytic 16 Mfd. 150 V. | 1 |
| | 8661 | .05 Mfd. 200 V. Tubular | 3 |
| | 8583 | .01 Mfd. 400 V. Tubular | 1 |
| | 14061 | .005 Mfd. 600 V. Tubular | 3 |
| | 14370 | 200 Mmf. Mica | 1 |
| | 17091 | 50 Mmf. Mica | 1 |
| | | **RESISTORS** | |
| R1 | 25367 | Control-Volume Including On-Off Switch | 1 |
| | 14365 | 15 Megohm ½ Watt 20% | 1 |
| | 25134 | 2.2 Megohm ½ Watt 20% | 1 |
| | 8766 | 1 Megohm ½ Watt 20% | 2 |
| | 25042 | 470,000 Ohm ½ Watt 20% | 1 |
| | 14616 | 150,000 Ohm ½ Watt 20% | 1 |
| NOTE— | 25040 | 68,000 Ohm ½ Watt 20% | 1 |
| | 17164 | 15,000 Ohm ½ Watt 20% | 1 |
| | 25414 | 1,000 Ohm ½ Watt 20% | 1 |
| | 25085 | 470 Ohm ½ Watt 20% | 1 |
| | 25613 | .56 Ohm ½ Watt 10% (Wire Wound) | 1 |
| | | **TRANSFORMERS AND COILS** | |
| T1 | 25609 | Loop Antenna (Includes Mounting Strips and Terminals) | 1 |
| T2 | 25598 | Coil - Oscillator | 1 |
| T3 | 25597 | Coil - RF (Includes Shield Can and 10 Mmf Condenser) | 1 |
| T4 | 25621 | Transformer - IF Input (Complete in Can) | 1 |
| T5 | 25622 | Transformer - IF Output (Complete in Can - Includes 2 100 Mmf Capacitors Built-In With Trimmers) | 1 |
| T6 | 25594 | Transformer - Speaker (Includes Mounting Clamp) | 1 |

| Ref. No. | Part No. | Description | Qty. Used In Set |
|---|---|---|---|
| | | **SPEAKER** | |
| T7 | 25593 | 5" P. M. Speaker | 1 |
| | | **SWITCHES** | |
| S1 | | Part of Volume Control | |
| S2 | 25319 | S. P. S. T. Slide Switch | 1 |
| | | **DIAL AND TUNING PARTS** | |
| | 25566 | Bearing - Short (For Upper Wood Pulleys) | 2 |
| | 25596 | Bearing - Long (For Lower Wood Pulley) | 1 |
| | 25767 | Cord - Dial (Includes Spring and Pointer Coupling) | 1 |
| | 25336 | Pulley - Wood | 3 |
| | 25809 | Plate - Assembly (Includes Dial Backing Plate with Brackets, Track, and Pointer) | 1 |
| | 25586 | Pointer | 1 |
| | 25581 | Track (For Pointer) | 1 |
| | 25590 | Scale - Dial | 1 |
| | 25766 | Shaft - Tuning (Includes "Spool" Pulley) | 1 |
| | 25774 | Screw - Set 8-32 x ⅛ (Used in Worm Gear of Tuning Condenser) | 1 |
| | 25654 | Screw - Wood #4 x ¼ (Mounting Dial Back Plate) | 4 |
| | | **MISCELLANEOUS** | |
| | 25553 | Back - Chassis (Removable Back Plate) | 1 |
| | 25591 | Cabinet - Wood | 1 |
| | 25603 | Cap - Grid | 4 |
| | 25605 | End - Chassis | 2 |
| | 25696 | Knob - Bakelite | 2 |
| | 25612 | Plug - 4 Prong (For Battery Cable) | 1 |
| | 25620 | Socket - Octal, For Tubes | 5 |
| | 25618 | Screw - 10-32 x ⅞ (For Mounting Chassis) | 2 |

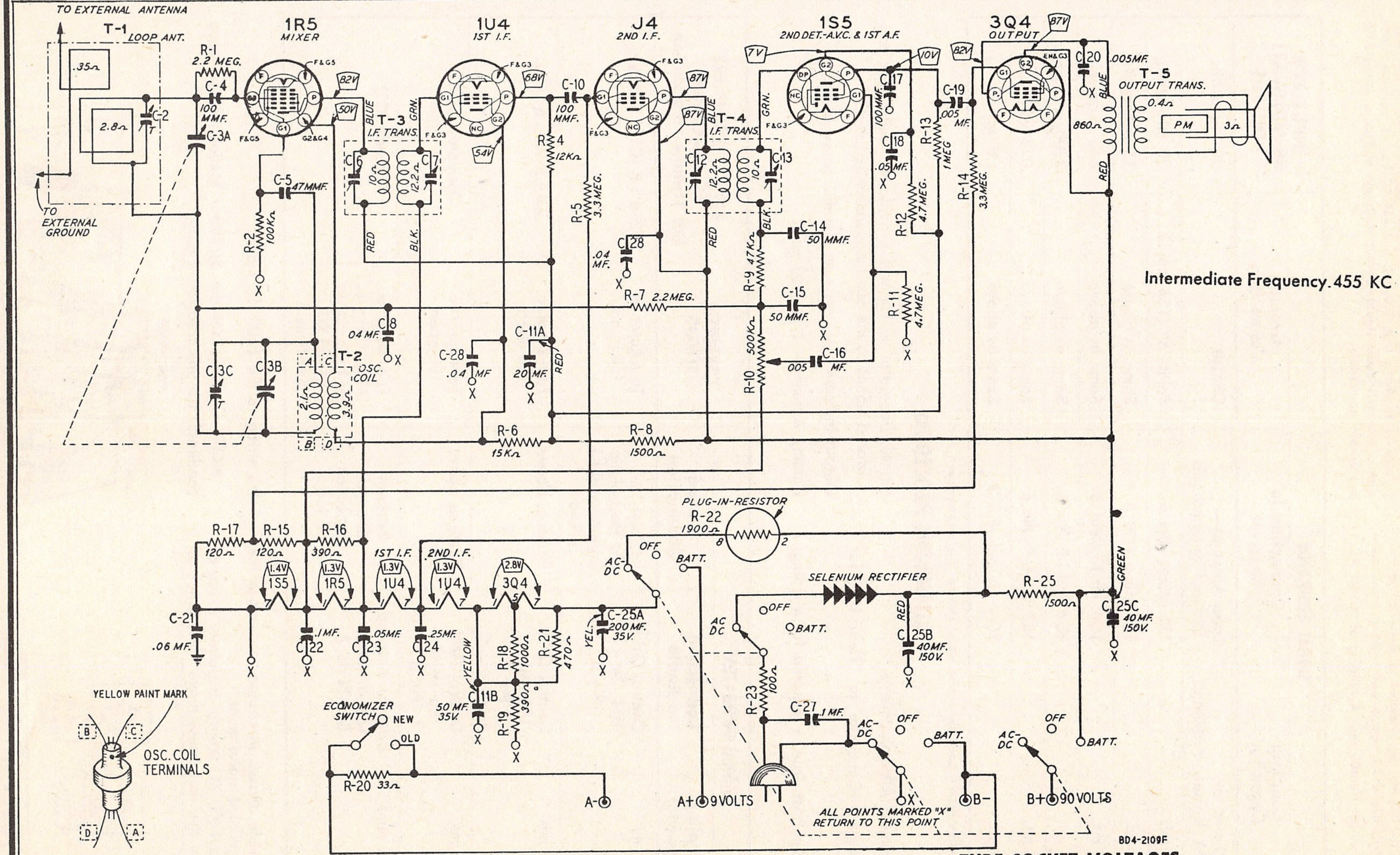
*The values of the resistors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with resistors of pre-standardized values. This receiver will operate equally well with resistors of either group. An illustration of the difference follows:

Pre-standardized value - 50,000 ohms,
RMA value - 47,000 ohms,

NOTE—#25040 resistor replaced with #25144 resistor 33,000 ohm. ½ watt 20%.

# MONTGOMERY WARD

MODELS 64WG-1052B,
74WG-1052B


TO EXTERNAL ANTENNA
T-1 LOOP ANT.
.35Ω
2.8Ω
C-2
TO EXTERNAL GROUND
R-1 2.2 MEG.
C-4 100 MMF.
C-3A
1R5 MIXER
F&G5
82V
50V
G2&G4
C-5 47MMF.
R-2 100KΩ
X
T-3 I.F. TRANS.
BLUE
GRN.
C6
10Ω
12.2Ω
C7
RED
BLK.
1U4 1ST I.F.
68V
54V
C-10 100 MMF.
R-4 12KΩ
R-5 3.3MEG.
J4 2ND I.F.
87V
C28 .04 MF.
R-7 2.2MEG.
C8 .04 MF.
C-28 .04 MF
C-11A 20 MF.
RED
C3C
C3B
T-2 OSC. COIL
2.1Ω
3.9Ω
A C B D
R-6 15KΩ
R-8 1500Ω
T-4 I.F. TRANS.
C12
12.2Ω
10Ω
C13
1S5 2ND DET.-A.V.C. & 1ST A.F.
7V
10V
C17 100MMF.
C18 .05MF.
R-13 1MEG
R-12 4.7MEG.
C-14 50 MMF.
R-9 47KΩ
C-15 50 MMF.
R-10 500KΩ
C-16 .005 MF.
R-11 4.7MEG.
C-19 .005 MF.
R-14 3.3MEG.
3Q4 OUTPUT
82V
87V
C20 .005MF.
T-5 OUTPUT TRANS.
860Ω
0.4Ω
PM
3Ω
Intermediate Frequency 455 KC
PLUG-IN-RESISTOR
R-22 1900Ω
R-17 120Ω
R-15 120Ω
R-16 390Ω
1.4V 1S5
1.3V 1R5
1ST I.F. 1.3V 1U4
2ND I.F. 1.3V 1U4
2.8V 3Q4
C-21 .06 MF.
C22 .1MF.
C23 .05MF.
C24 .25MF.
C11B 50 MF. 35V.
YELLOW
R-18 1000Ω
R-19 390Ω
R-21 470Ω
C-25A 200 MF. 35V.
YEL.
AC-DC
OFF
BATT.
SELENIUM RECTIFIER
R-25 1500Ω
GREEN
C25C 40MF. 150V.
C25B 40MF. 150V.
R-23 100Ω
C-21 .1 MF.
ECONOMIZER SWITCH
NEW
OLD
R-20 33Ω
A-
A+ 9VOLTS
B-
B+ 90VOLTS
ALL POINTS MARKED "X" RETURN TO THIS POINT
YELLOW PAINT MARK
OSC. COIL TERMINALS
BD4-2109F

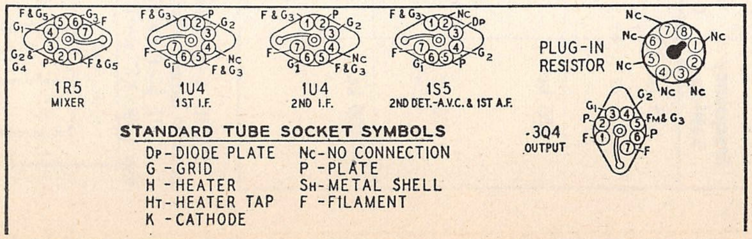
## TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the filaments are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage..........117 volts AC
Volume control..........maximum
Signal input..........none

A variation of ±10% is usually permissible.


1R5 MIXER
1U4 1ST I.F.
1U4 2ND I.F.
1S5 2ND DET.-A.V.C. & 1ST A.F.
PLUG-IN RESISTOR
3Q4 OUTPUT

STANDARD TUBE SOCKET SYMBOLS

Dp - DIODE PLATE
G - GRID
H - HEATER
Ht - HEATER TAP
K - CATHODE
Nc - NO CONNECTION
P - PLATE
Sh - METAL SHELL
F - FILAMENT

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## RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of 50 milliwatts. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm 5 watt resistor across the secondary winding of the output transformer. A reading of .4 volt AC across this resistor will be equivalent to a 50 milliwatt output with the speaker connected. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Output variations of Plus or Minus 25% are usually permissible.

| SIGNAL GENERATOR | | | | INPUT FOR 50 MILLIWATT OUTPUT |
|---|---|---|---|---|
| Frequency | Coupling Capacitor | Connection to Receiver | Ground Connection | |
| 1000 kc | 200 mmf or<br>RMA Dummy Antenna | Loop Antenna—<br>External antenna clip | Chassis | 20 microvolts |
| 1000 kc | .05 mf. | 1R5 Mixer—Pin 6 | Point "X" (1S5 Pin 1) | 30 microvolts |
| *455 kc | .05 mf. | 1R5 Mixer—Pin 6 | Same as above | 15 microvolts |
| 455 kc | .05 mf. | 1U4 1st I-F—Pin 6 | Same as above | 440 microvolts |
| 455 kc | .05 mf. | 1U4 2nd I-F—Pin 6 | Same as above | 2200 microvolts |
| 400 cycles | .05 mf. | 1S5 1st A-F—Pin 6 | Same as above | .022 volt |
| 400 cycles | .05 mf. | 3Q4 Output—Pin 3 | Same as above | 1.8 volts |

*Short out the oscillator section of the gang condenser while making this measurement.

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

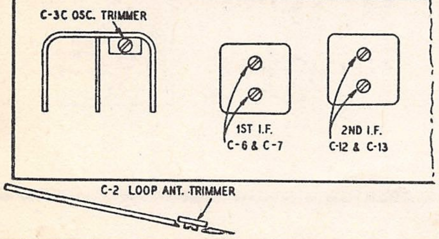
Dummy Antenna—.1 mf., 50 mmf.

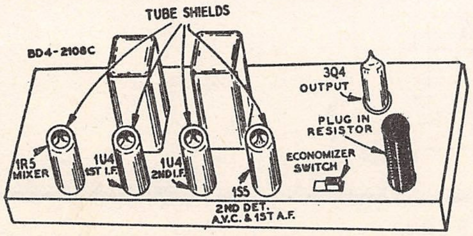
| SIGNAL GENERATOR | | | | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM See Trimmer Illustration |
|---|---|---|---|---|---|
| Frequency Setting | Coupling Capacitor | Connection to Radio | Ground Connection | | |
| 455 kc | .1 mf | Control Grid 1U4—1st I-F Pin 6 | Point "X" At Electrolytic Capacitor Black Lead | Turn Rotor to full open | 2nd I-F (C13) & (C12) |
| 455 kc | .1 mf | Control Grid 1R5—Mixer Pin 6 See Note C | Same as above | Turn Rotor to full open | 1st I-F (C7) & (C6) |
| 1620 kc | .1 mf | Control Grid 1R5—Mixer Pin 6 | Same as above | Turn Rotor to full open | Oscillator (C3C) |
| 1400 kc | 50 mmf | External Antenna Clip on Loop See Note A | External Ground connection on loop | Turn Rotor to Max. Output Set Indicator to 1400 KC See Note B | Antenna (C2) |

NOTE A—Re-assemble chassis in cabinet and close the cabinet back before making adjustment.

NOTE B—Tune in a 1400 KC signal. If pointer is not at the 1400 KC mark on the dial scale, move the pointer on the string to the 1400 KC mark.

NOTE C—Short out the oscillator section of the gang condenser for this adjustment only.





## MODEL 64WG-1052B, 74WG-1052B

**OPERATING VOLTAGES**—Chassis for Models 64WG-1052B and 74WG-1052B are available for operation on the following power supplies:

Power Line..................105-125 Volts AC 50-60 Cycles or 105-125 Volts DC

Battery..........................Wards Battery Pack No. 62-35 {A Section 9 Volts, B Section 90 Volts}

**HOW TO ORDER PARTS** — Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Parts should be ordered from the nearest Wards Retail Store, Catalog Order office or Mail Order House.

## REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | | **CAPACITORS** | |
| C-2 | 17A123 | 1.5 mmf-12 mmf Trimmer | 1 |
| C-3 | 14A186 | Gang Capacitor with Drive Pulley | 1 |
| C-4<br>C-10<br>C-17 | 47X476 | 100 mmf Moulded | 3 |
| C-5 | 47X463 | 47 mmf Moulded | 1 |
| C-6<br>C-7 | | Part of T-3 (1st I-F Transformer) | |
| C-8<br>C-28<br>C-29 | B66403 | .04 mf 200 V Tubular | 3 |
| C-11A<br>C-11B | 45X348 | 20 mf 150 V<br>50 mf 55 V Dry electrolytic | 1 |
| C-12<br>C-13 | | Part of T-4 (2nd I-F Transformer) | |
| C-14<br>C-15 | 47X112 | 50 mmf Dual Mica | 1 |
| C-16<br>C-19 | B66502 | .005 mf 200 V Tubular | 2 |
| C-18<br>C-23 | B66503 | .05 mf 200 V Tubular | 2 |
| C-20 | D66502 | .005 mf 400 V Tubular | 1 |
| C-21 | D66603 | .06 mf 400 V Tubular | 1 |
| C-22 | B66104 | .1 mf 200 V Tubular | 1 |
| C-24 | B66254 | .25 mf 200 V Tubular | 1 |
| C-25A<br>C-25B<br>C-25C | 45X347 | 200 mf 35 V<br>40 mf 150 V<br>40 mf 150 V Dry electrolytic | 1 |
| C-27 | D67104 | .1mf 400 V Tubular | 1 |

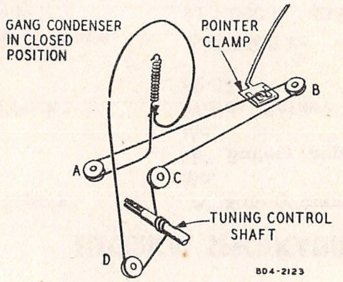
**RESISTORS**

| Ref. No. | Part No. | Ohms | Watts | Qty. Used in Set |
|---|---|---|---|---|
| R-1<br>R-7 | B85225 | 2.2 meg. | 0.5 | 2 |
| R-2 | B85104 | 100 K | 0.5 | 1 |
| R-4 | B84123 | 12 K | 0.5 | 1 |
| R-5<br>R-14 | B85335 | 3.3 meg. | 0.5 | 2 |
| R-6 | B84153 | 15 K | 0.5 | 1 |
| R-8<br>R-25 | B84152 | 1500 | 0.5 | 2 |
| R-9 | B85473 | 47 K | 0.5 | 1 |
| R-10 | 36X307 | 500 K | Volume control | 1 |
| R-11<br>R-12 | B85475 | 4.7 meg. | 0.5 | 2 |
| R-13 | B85105 | 1.0 meg. | 0.5 | 1 |
| R-15<br>R-17 | B84121 | 120 | 0.5 | 2 |
| R-16<br>R-19 | B84391 | 390 | 0.5 | 2 |
| R-18 | B84102 | 1000 | 0.5 | 1 |
| R-20 | B85330 | 33 | 0.5 | 1 |
| R-21 | B84471 | 470 | 0.5 | 1 |
| R-22 | 43X215 | 1900 | Shielded W. W. Resistor (Ballast tube) | 1 |
| R-23 | D84101 | 100 | 2.0 | 1 |

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | | **TRANSFORMERS AND COILS** | |
| T-1 | 9A1843 | "B" Range Loop Antenna | 1 |
| T-2 | 9A1896 | Oscillator Coil Assembly | 1 |
| T-3 | 9A1840 | 1st I F Transformer and Can Assem. | 1 |
| T-4 | 9A1841 | 2nd I-F Transformer and Can Assem. | 1 |
| T-5 | | Output Transformer (See Miscellaneous) | 1 |
| | | **DIAL AND DRIVE ASSEMBLY** | |
| | 26A381 | Dial Scale Mounting Plate Assembly Complete with Idler Pulleys and Bracket for Drive Shaft Less Dial Scale, Brace Bracket, Drive Shaft and Gang Capacitor | 1 |
| | 25X1504 | Dial Brace Bracket | 1 |
| | 58X633 | Dial Scale | 1 |
| | 28X56 | Snap Button (Mtg. Dial Scale & Celluloid Crystal to Dial Bracket) | 6 |
| | 17X65 | Celluloid Crystal | 1 |
| | 15X191 | Pointer for Dial Scale | 1 |
| | 25X832 | Gang Capacitor Mounting Bracket | 1 |
| | 6X21 | Rubber Grommet } Mounting Gang Capacitor | 3 |
| | 57X176 | Mounting Plate } Mounting Gang Capacitor | 1 |
| | 20X329 | Cond. Cushion Stud } Mounting Gang Capacitor | 3 |
| | 28X95 | Drive Cord Tension Spring | 1 |
| | | 30" Drive Cord | 1 |
| | 4X942 | Escutcheon | 1 |
| | 26X489 | Drive Shaft | 1 |
| | 19X192 | "C" Washer for Drive Shaft | 2 |
| | | **MISCELLANEOUS** | |
| | 12A443 | 5¼" P.M. Speaker complete with Output Transformer | 1 |
| | | Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker) | 1 |
| | | Output Transformer (Specify part number and letters stamped on speaker) | 1 |
| | 25A1019 | Selenium Rectifier and Housing Assembly | 1 |
| | 3A303 | Socket-Octal (8 prong) Moulded | 1 |
| | 3A312 | Tube Socket (Miniature) | 5 |
| | 32X221 | Tube Shield | 4 |
| | 2A175 | On-Off Switch (Economizer) | 1 |
| | 2A203 | Changeover Switch (AC-DC, Battery Switch) | 1 |
| | 13X429 | Battery Cable and Plug Assembly | 1 |
| | | Grille Cloth 4¾"x6½" (426W) | 1 |
| | 10A595 | Knob, Switch | 1 |
| | 10A596 | Knob, Tuning | 1 |
| | 10A597 | Knob, Volume | 1 |
| | 13X328 | Line Cord and Plug Assembly | 1 |
| | 11X117 | Shield, Volume Control and Switch (Paper) | 1 |
| | 32X368 | Shield, Volume Control and Switch (Metal) | 1 |

## DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully closed position. Use a new cord 30" long and tie one end to the tension spring. Fasten the other end of the tension spring to the hook on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue around pulley rim ¼ turn clockwise. Pass cord around pulleys A, B, and C as shown in the illustration. Wind three turns clockwise (viewed from rear of chassis) around tuning control shaft. The turns must progress toward rear of chassis. Pass cord around pulley D and continue ¾ turn clockwise around large drive pulley. Pass cord through the slot in the pulley rim then stretch the tension spring and tie free end of cord to it. Cut off any excess string.

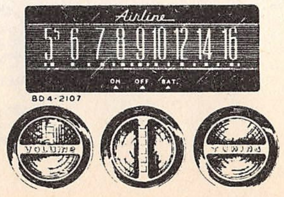


## ELECTRICAL SPECIFICATIONS

Power Supply.................."A" Battery Supply—9 Volts, 50 Ma. "B" Battery Supply—90 Volts, 11 Ma. or 105-125 volts AC, 50-60 cycles, 10 watts or 105-125 volts DC
Battery Pack...................Ward's Battery Pack No. 62-35
Frequency Range...........540-1600 KC
Selectivity........................At 1000 KC, 53 KC wide at 1000 times signal
Sensitivity.........................(for .05 watt output with external antenna) 20 microvolts average
Power Output.................0.3 watt maximum 0.125 watt 10% distortion
Loud Speaker..................5¼" PM dynamic
Voice Coil Impedance....3.2 ohms at 400 cycles

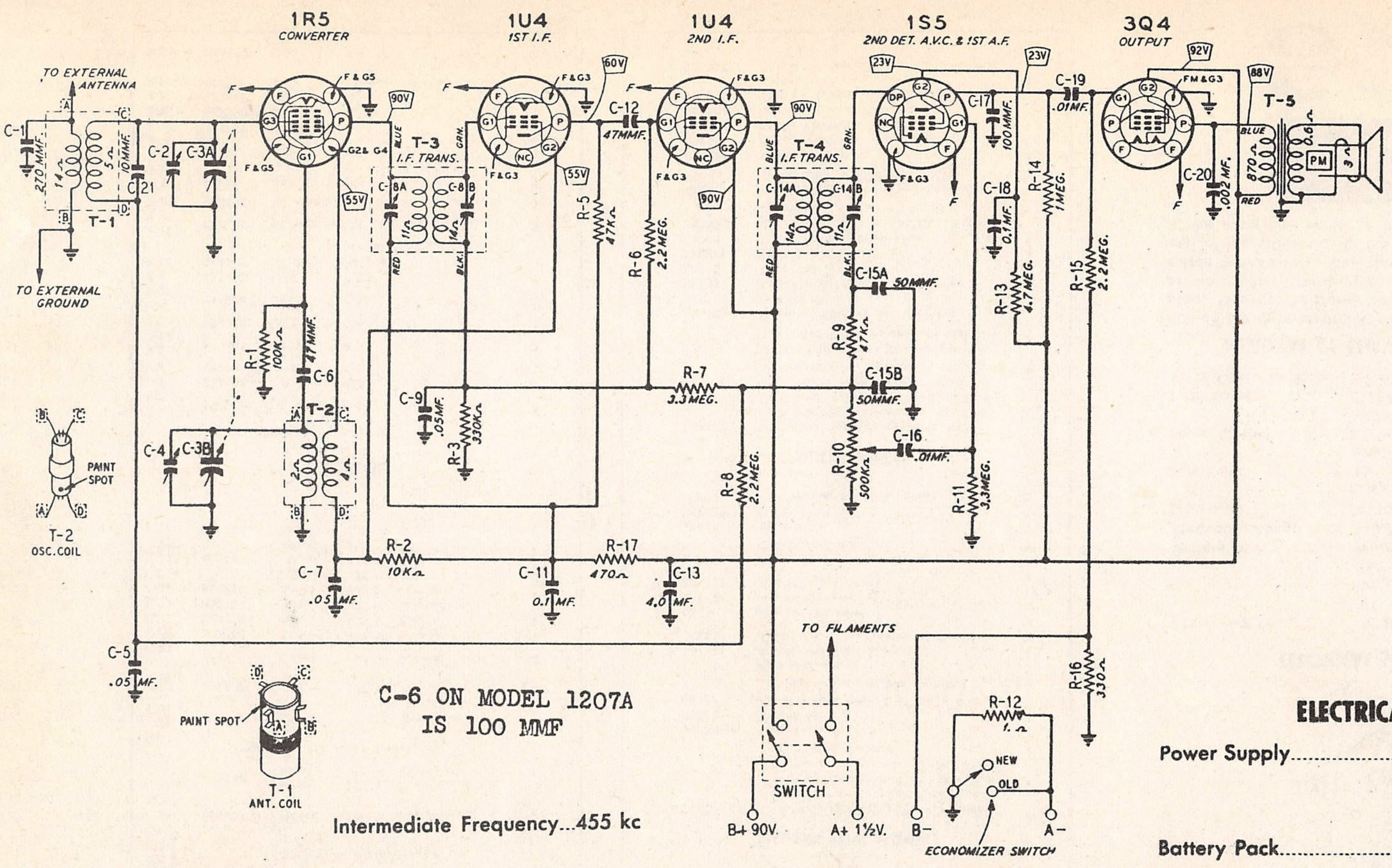
## REMOVAL OF CHASSIS FROM CABINET

Pull off the three control knobs and disconnect the battery plug. Unwrap the power cord from the radio at the top of the cabinet if necessary. Remove the four screws that fasten the chassis to the cabinet (2 on the outside at each end of the cabinet). Tip the chassis slightly forward and at the same time withdraw it from the cabinet.



MODELS 64WG-1207A,
64WG-1207B,
74WG-1207B

# MONTGOMERY WARD


1R5
CONVERTER
1U4
1ST I.F.
1U4
2ND I.F.
1S5
2ND DET. A.V.C. & 1ST A.F.
3Q4
OUTPUT
TO EXTERNAL ANTENNA
TO EXTERNAL GROUND
C-1
270 MMF.
T-1
C-21
10MMF
C-2
C-3A
C-3B
C-4
R-1
100KΩ
C-6
47MMF.
T-2
T-2
OSC. COIL
PAINT SPOT
T-1
ANT. COIL
T-3
I.F. TRANS.
C-8A
C-8B
BLUE
GRN.
RED
BLK.
C-9
.05MF.
R-3
330KΩ
R-2
10KΩ
C-7
.05MF.
C-5
.05MF.
R-5
47KΩ
R-6
2.2MEG.
C-12
47MMF.
R-7
3.3MEG.
R-8
2.2MEG.
C-11
0.1MF.
R-17
470Ω
C-13
4.0MF.
T-4
I.F. TRANS.
C-14A
C-14B
R-9
47KΩ
C-15A
50MMF.
C-15B
50MMF.
R-10
500KΩ
C-16
.01MF.
R-11
3.3MEG.
C-17
100MMF.
C-18
0.1MF.
R-13
4.7MEG.
R-14
1MEG.
C-19
.01MF.
R-15
2.2MEG.
R-16
330Ω
C-20
.002MF.
T-5
870Ω
0.6Ω
3Ω
PM
R-12
1Ω
NEW
OLD
ECONOMIZER SWITCH
SWITCH
TO FILAMENTS
B+ 90V.
A+ 1½V.
B-
A-
F&G5
F&G3
FM&G3
G2& G4
90V
55V
60V
90V
23V
23V
92V
88V

C-6 ON MODEL 1207A
IS 100 MMF

Intermediate Frequency...455 kc

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Power Supply | "A" Battery Supply 1½ volts, 220 Ma.<br>"B" Battery Supply 90 volts, 12 Ma. |
| Battery Pack | Wards Battery Pack 62-51 or 62-57 |
| Frequency Range | 540-1600 kc |
| Selectivity | At 1,000 kc, 40 kc broad at 1,000 times signal |
| Sensitivity | (For .05 watt output and with external antenna) 10 microvolts average |
| Power Output | .23 watts maximum<br>.1 watt 10% distortion |
| Loud Speaker | 5" PM dynamic |
| Voice Coil Impedance | 3.2 ohms at 400 cycles |

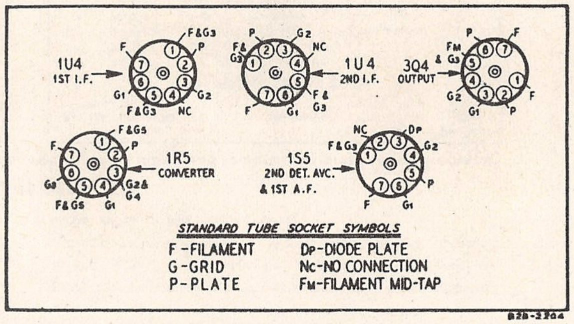
## TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and the chassis.

All readings, except those for the 1S5 tube, were taken with a 1000 ohm-per-volt meter and read on a 500 volt scale. The plate and screen voltages for the 1S5 tube were read with a vacuum tube voltmeter. Conditions of measurement are:

| | |
|---|---|
| Battery voltages under load | B, 90 volts<br>A, 1½ Volts |
| Volume control | maximum |
| Signal input | none |

▲ variation of ±10% is usually permissible.


1U4
1ST I.F.
1U4
2ND I.F.
3Q4 & OUTPUT
1R5
CONVERTER
1S5
2ND DET. AVC.
& 1ST A.F.
F&G3
F&G5
FM & G3
G2& G4
NC
DP
B2B-23Q4

STANDARD TUBE SOCKET SYMBOLS

F-FILAMENT
G-GRID
P-PLATE
DP-DIODE PLATE
NC-NO CONNECTION
FM-FILAMENT MID-TAP

For sensitivity data, see P.16-3

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

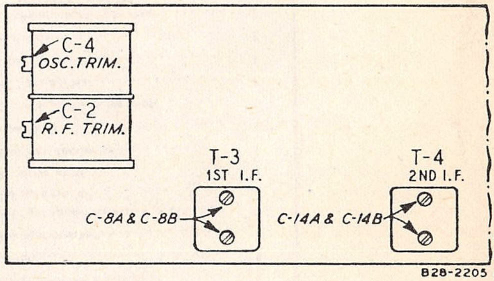
The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

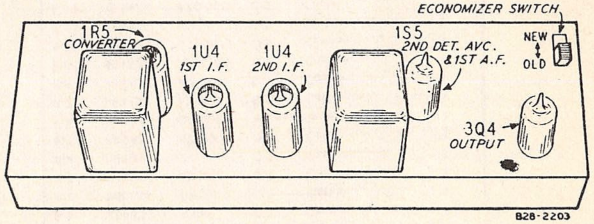
Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antenna—.1 mf., 50 mmf.

| SIGNAL GENERATOR | | | | RECEIVER | |
|---|---|---|---|---|---|
| Frequency Setting | Coupling Capacitor | Connection to Radio | Ground Connection | Condenser Setting | Adjust Trimmers for Maximum Output (See Trimmer Illustration) |
| 455 kc | .1 mf | Control Grid 1R5 Mixer Pin 6 | Chassis | Turn Rotor to full open | 2nd I-F C-14A and C-14B<br>1st I-F C-8A and C-8B |
| 1620 kc | .1 mf | Control Grid 1R5 Mixer Pin 6 | ·Chassis | Turn Rotor to full open | Oscillator C-4 |
| 1400 kc | 50 mmf | External Antenna lead | Chassis | Turn Rotor to Max. Output Set pointer to 1400 kc See note A | Antenna C-2 |

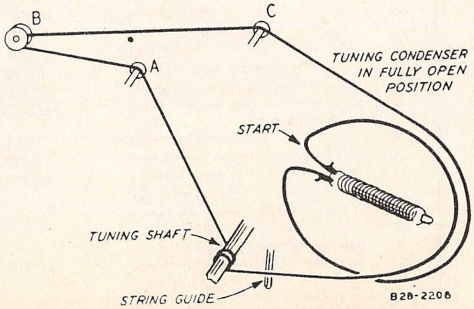

C-4
OSC. TRIM.
C-2
R.F. TRIM.
T-3
1ST I.F.
T-4
2ND I.F.
C-8A & C-8B
C-14A & C-14B
B28-2205

NOTE A—Tune in a 1400 kc signal. If the pointer is not at the 1400 kc mark on the dial, move it along the string to 1400 kc.


ECONOMIZER SWITCH
NEW
OLD
1R5
CONVERTER
1U4
1ST I.F.
1U4
2ND I.F.
1S5
2ND DET. AVC. & 1ST A.F.
3Q4
OUTPUT
B28-2203

## DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position and use a new drive cord 35" long. Tie one end of the new cord to the tension spring and hook the other end of the tension spring over the tab on the large drive pulley. Pass the cord through the opening in the drive pulley rim and continue ¾ turn clockwise around the pulley rim. Pass the cord in front of the string guide, under the tuning shaft and wind 2¾ turns around the shaft with the turns progressing toward the chassis. Run the cord up and over the idler stud A, around pulley B, over idler stud C and then wind ½ turn clockwise around the large drive pulley. Pass the cord through the opening in the pulley rim, stretch the tension spring and tie the free end of the cord to it. Rotate the tuning shaft several times in order to take up any slack in the drive cord. If the installation is satisfactory cut off any excess string and attach the dial pointer.


B
A
C
TUNING CONDENSER IN FULLY OPEN POSITION
START
TUNING SHAFT
STRING GUIDE
B28-2208

MODELS 64WG-1207A,
64WG-1207B,
74WG-1207B
MODEL 64WG-1804C

# MONTGOMERY WARD

**OPERATING VOLTAGES**—Chassis for Model 64WG-1207A are available for operation on the following power supply:
Battery........ Wards Battery Pack No. 62-51 or 62-57 { A Section 1½ Volts, B Section 90 Volts

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | | **CAPACITORS** | |
| C-1 | 47X445 | 270 mmf Molded .............. | 1 |
| C-2<br>C-4 | | Part of C-3 (Gang Capacitor) | |
| C-3 | 26A431 | Gang Capacitor and Pulley Assembly | 1 |
| C-5<br>C-7<br>C-9 | B66503 | .05 mf 200 V Tubular .............. | 3 |
| C-6<br>C-17 | 47X476 | 100 mmf Molded .............. | 2 |
| C-8A<br>C-8B | | Part of T-3 1st I-F Transformer | |
| C-11<br>C-18 | B66104 | 0.1 mf 200 V Tubular .............. | 2 |
| C-12 | 47X463 | 47 mmf Molded .............. | 1 |
| C-13 | 45X250 | 4.0 mf 100 V Dry Electrolytic.... | 1 |
| C-14A<br>C-14B | | Part of T-4 2nd I-F Transformer | |
| C-15A<br>C-15B | 47X112 | 50 mmf Dual Mica.......... | 1 |
| C-16<br>C-19 | B66103 | .01 mf 200 V Tubular .............. | 2 |
| C-20 | B66202 | .002 mf 200 V Tubular .............. | 1 |
| C-21 | 47X111 | 10 mmf Molded .............. | 1 |
| | | **TRANSFORMERS AND COILS** | |
| T-1 | 9A1800 | Antenna Coil Assembly..................... | 1 |
| T-2 | 9A1853 | Oscillator Coil Assembly..................... | 1 |
| T-3 | 9A1801 | 1st I-F Transformer and Can Assembly | 1 |
| T-4 | 9A1802 | 2nd I-F Transformer and Can Assembly | 1 |
| T-5 | 51X128 | Output Transformer .............................. | 1 |

### RESISTORS

| Ref. No. | Part No. | Ohms | Watts | Material | Qty. Used in Set |
|---|---|---|---|---|---|
| R-1 | B85104 | 100k | 0.5 | Carbon .............. | 1 |
| R-2 | B84103 | 10k | 0.5 | Carbon .............. | 1 |
| R-3 | B85334 | 330k | 0.5 | Carbon .............. | 1 |
| R-5 | B84473 | 47k | 0.5 | Carbon .............. | 1 |
| R-6<br>R-8 | B84225 | 2.2 meg. | 0.5 | Carbon .............. | 2 |
| R-7 | B84335 | 3.3 meg. | 0.5 | Carbon .............. | 1 |
| R-9 | B85473 | 47k | 0.5 | Carbon .............. | 1 |
| R-10 | 36X355 | 500k | Volume Control & Switch | | 1 |
| R-11 | B85335 | 3.3 meg. | 0.5 | Carbon .............. | 1 |
| R-12 | 43X95 | 1.0 | 0.5 | (5½" Resist. Wire) | 1 |
| R-13 | B85475 | 4.7 meg. | 0.5 | Carbon .............. | 1 |
| R-14 | B85105 | 1.0 meg. | 0.5 | Carbon .............. | 1 |
| R-15 | B85225 | 2.2 meg. | 0.5 | Carbon .............. | 1 |
| R-16 | B84331 | 330 | 0.5 | Carbon .............. | 1 |
| R-17 | B85471 | 470 | 0.5 | Carbon .............. | 1 |

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | | **MISCELLANEOUS** | |
| | 12A443 | 5" P.M. Speaker with Mtg. Bracket.... | 1 |
| | | Cone and Voice Coil Assembly (Specify part no. and letters stamped on speaker) | |
| | 26A432 | Dial Bracket Assembly Complete with Dial, Bracket, Clamps, Pulleys and Crystal | 1 |
| | 28X95 | Drive Cord Tension Spring.................. | 1 |
| | | 35" Drive Cord .............................. | 1 |
| | 15X224 | Pointer .............................. | 1 |
| | 26X483 | Drive Shaft .............................. | 1 |
| | 6X19 | Rubber Grommet } Mtg. Gang Cond. | 3 |
| | 20X329 | Cond. Cushion Stud } Mtg. Gang Cond. | 3 |
| | 2A175 | On-Off Switch (Economizer)............... | 1 |
| | 3A312 | Miniature Tube Socket.................. | 5 |
| | 32X221 | Tube Shield .............................. | 3 |
| | 13X555 | Battery Cable Assembly..................... | 1 |
| | 10A530 | Knob (Volume) .............................. | 1 |
| | 10A531 | Knob (Tuning) .............................. | 1 |

**OPERATING VOLTAGES**—Chassis for Model 64WG-1804C are available for operation on the following power supplies: 105-125 volts AC, 50-60 cycles or 105-125 volts DC.

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | | **CAPACITORS** | |
| C-1 | D67102 | .001 mf 400 V Tubular............. | 1 |
| C-3A<br>C-3B | 26A402 | Gang condenser and pulley assembly | 1 |
| C-4<br>C-12 | 47X476 | 100 mmf Molded........ | 2 |
| C-5 | 47X446 | 47 mmf Molded........ | 1 |
| C-6 | | Part of C-3 | |
| C-7<br>C-8 | | Part of T-3, 1st I-F Transformer | |
| C-9 | B66503 | .05 mf 200 V Tubular........ | 1 |
| C-10<br>C-11 | | Part of T-4, 2nd I-F Transformer | |
| C-13 | 47X463 | 47 mmf Molded........ | 1 |
| C-14 | B67403 | .04 mf 200 V Tubular........ | 1 |
| C-15 | B67602 | .006 mf 200 V Tubular........ | 1 |
| C-16 | B66104 | .1 mf 200 V Tubular........ | 1 |
| C-17 | 47X467 | 470 mmf Molded........ | 1 |
| C-18<br>C-21 | B66103 | .01 mf 200 V Tubular........ | 2 |
| C-19 | B67253 | .025 mf 200 V Tubular........ | 1 |
| C-20A<br>C-20B<br>C-20C | 45X344 | 20 mf 25 V<br>50 mf 150 V<br>50 mf 150 V Dry electrolytic condenser.... | 1 |
| C-22 | B67204 | 0.2 mf 200 V Tubular........ | 1 |
| C-23 | D67104 | .1 mf 400 V Tubular........ | 1 |
| C-24 | 17A123 | 1.5-12 mmf Trimmer........ | 1 |
| C-28 | B67503 | .05 mf 200 V Tubular....... | 1 |

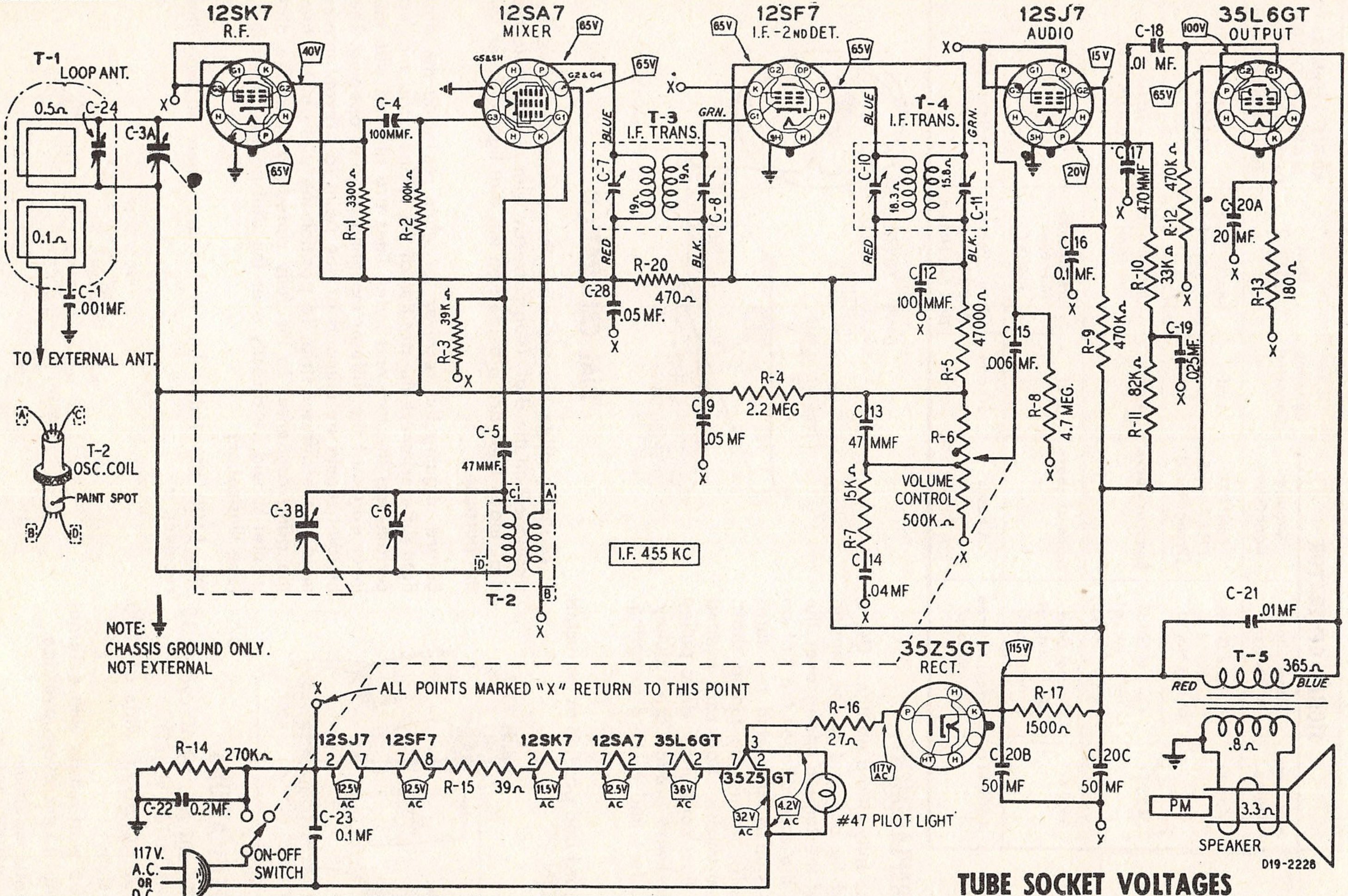
| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | | **TRANSFORMERS AND COILS** | |
| T-1 | 26A445 | "B" Range loop antenna assembly... | 1 |
| T-2 | 9A1805 | Oscillator coil assembly............ | 1 |
| T-3 | 9A1775 | 1st I-F Transformer and can assembly | 1 |
| T-4 | 9A1776 | 2nd I-F Transformer and can assembly | 1 |
| T-5 | 51X116 | Output transformer................ | 1 |

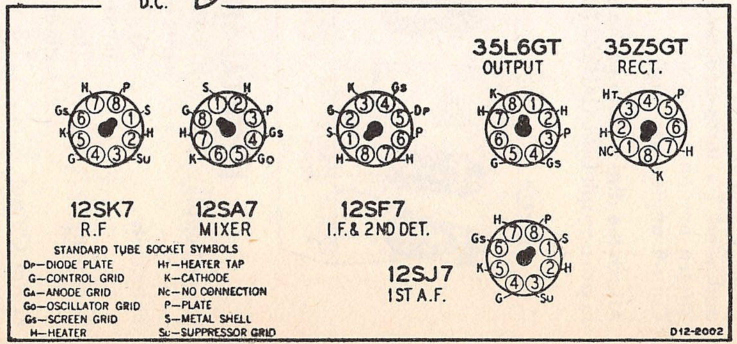
### RESISTORS

| Ref. No. | Part No. | Ohms | Watts | | Qty. Used in Set |
|---|---|---|---|---|---|
| R-1 | B84332 | 3300 | 0.5 | Carbon........ | 1 |
| R-2 | B85104 | 100,000 | 0.5 | Carbon........ | 1 |
| R-3 | B84393 | 39,000 | 0.5 | Carbon........ | 1 |
| R-4 | B85225 | 2.2 meg | 0.5 | Carbon........ | 1 |
| R-5 | B85473 | 47,000 | 0.5 | Carbon........ | 1 |
| R-6 | 36X347 | 500,000 | Volume control and switch | | 1 |
| R-7 | B84153 | 15,000 | 0.5 | Carbon........ | 1 |
| R-8 | B85475 | 4.7 meg. | 0.5 | Carbon........ | 1 |
| R-9 | B84474 | 470,000 | 0.5 | Carbon........ | 1 |
| R-10 | B84333 | 33,000 | 0.5 | Carbon........ | 1 |
| R-11 | B84823 | 82,000 | 0.5 | Carbon........ | 1 |
| R-12 | B85474 | 470,000 | 0.5 | Carbon........ | 1 |
| R-13 | B83181 | 180 | 0.5 | Carbon........ | 1 |
| R-14 | B84274 | 270,000 | 0.5 | Carbon........ | 1 |
| R-15 | D84390 | 39 | 2.0 | Carbon........ | 1 |
| R-16 | B84270 | 27 | 0.5 | Carbon........ | 1 |
| R-17 | C84152 | 1500 | 1.0 | Carbon........ | 1 |
| R-20 | B85471 | 470 | 0.5 | Carbon....... | 1 |

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | | **DIAL AND DRIVE ASSEMBLY** | |
| | 6X21 | Rubber grommet } Gang cond mtg.... | 3 |
| | 20X329 | Cond. cushion stud } Gang cond mtg.... | 3 |
| | 58X667 | Dial .............................. | 1 |
| | 25X1461 | Dial bracket .................... | 1 |
| | 26A446 | Pointer bracket assembly.......... | 1 |
| | 15X217 | Pointer........................... | 1 |
| | 25X1398 | Pilot light bracket................ | 1 |
| | 7A192 | Pilot light socket assembly......... | 1 |
| | | Pilot light No. 47................ | 1 |
| | | 42" drive cord.......... ........ | 1 |
| | 28X95 | Drive cord tension spring........... | 1 |
| | 26X464 | Drive shaft ................... | 1 |
| | 19X192 | "C" washer for drive shaft........ | 2 |
| | 41X81 | Dial light diffuser................. | 1 |
| | 25X1385 | Holder, light diffuser............. | 1 |
| | 4X884 | Escutcheon .................... | 1 |
| | 25X1460 | Escutcheon mounting bracket........ | 2 |
| | | **MISCELLANEOUS** | |
| | 12A431 | 4" x 6" speaker with mounting bracket | 1 |
| | | Cone and voice coil assembly (specify part number and letters stamped on speaker)........... | 1 |
| | 3A303 | Tube socket—octal (8 prong) molded | 5 |
| | 3A421 | Tube socket with shield........... | 1 |
| | 10A297 | Knob (walnut) on-off switch, volume control and tuning.............. | 2 |

## MONTGOMERY WARD


12SK7
R.F.
12SA7
MIXER
12SF7
I.F.-2ND DET.
12SJ7
AUDIO
35L6GT
OUTPUT
35Z5GT
RECT.
T-1
LOOP ANT.
0.5Ω
0.1Ω
C-24
C-3A
C-1
.001MF.
TO EXTERNAL ANT.
40V
65V
C-4
100MMF.
R-1 3300Ω
R-2 100KΩ
R-3 39KΩ
C-5
47MMF.
C-3B
C-6
T-2
T-2
OSC.COIL
PAINT SPOT
A
B
C
D
65V
T-3
I.F. TRANS.
BLUE
RED
GRN.
BLK.
C-7
C-8
19Ω
19Ω
R-20
470Ω
C-28
.05MF.
R-4
2.2 MEG
C-9
.05 MF
T-4
I.F. TRANS.
C-10
C-11
18.3Ω
15.8Ω
C-12
100MMF.
R-5
47000Ω
C-13
47MMF
R-6
VOLUME CONTROL
500KΩ
R-7
15KΩ
C-14
.04MF
I.F. 455 KC
C-15
.006MF.
R-8
4.7 MEG.
15V
20V
C-16
0.1MF.
C-17
470MMF
R-9
470KΩ
R-10
33KΩ
R-11
82KΩ
R-12
470KΩ
C-19
.025MF
C-18
.01 MF.
100V
65V
C-20A
20MF.
R-13
180Ω
C-21
.01MF
T-5
365Ω
RED
BLUE
.8Ω
3.3Ω
PM
SPEAKER
D19-2228
NOTE:
CHASSIS GROUND ONLY.
NOT EXTERNAL
ALL POINTS MARKED "X" RETURN TO THIS POINT
115V
R-16
27Ω
117V AC
R-17
1500Ω
C-20B
50MF
C-20C
50MF
Y
R-14
270KΩ
C-22
0.2MF.
C-23
0.1MF
117V.
A.C.
OR
D.C.
ON-OFF
SWITCH
12SJ7
12SF7
12SK7
12SA7
35L6GT
35Z5GT
12.5V AC
12.5V AC
11.5V AC
12.5V AC
36V AC
32V AC
4.2V AC
R-15
39Ω
#47 PILOT LIGHT
X


12SK7
R.F
12SA7
MIXER
12SF7
I.F.& 2ND DET.
12SJ7
1ST A.F.
35L6GT
OUTPUT
35Z5GT
RECT.
STANDARD TUBE SOCKET SYMBOLS
DP—DIODE PLATE
G—CONTROL GRID
GA—ANODE GRID
GO—OSCILLATOR GRID
GS—SCREEN GRID
H—HEATER
HT—HEATER TAP
K—CATHODE
NC—NO CONNECTION
P—PLATE
S—METAL SHELL
SU—SUPPRESSOR GRID
D12-2002

### TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages except those for the heater and dial lamp are between the socket terminal and "X" point.

The readings were taken with a 1000 ohm-per-volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage..........117 volts AC
Volume control..........maximum
Signal input..........none

A variation of ±10% is usually permissible.

For sensitivities, see P.16-3
For parts list, see P.16-10

# MONTGOMERY WARD
## ALIGNMENT PROCEDURE

Check dial pointer position, see Dial Calibration paragraph.

Volume Control—Maximum All Adjustments.

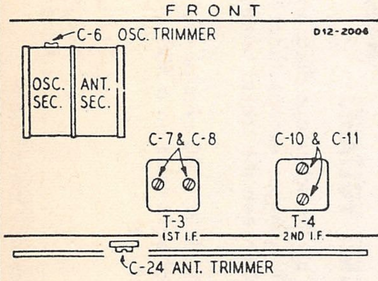
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.


FRONT
C-6 OSC. TRIMMER
D12-2006
OSC. SEC.
ANT. SEC.
C-7 & C-8
C-10 & C-11
T-3 1ST I.F.
T-4 2ND I.F.
C-24 ANT. TRIMMER

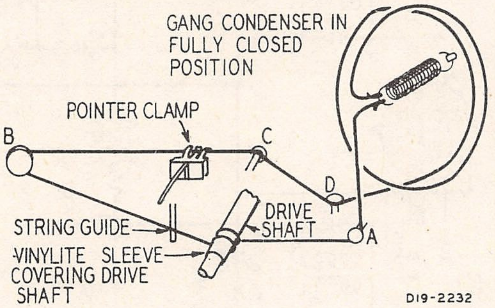
| SIGNAL GENERATOR | | | | | |
|---|---|---|---|---|---|
| Frequency Setting | Connection to Receiver | Ground Connection | Coupling Capacitor | DIAL SETTING | ADJUST TRIMMERS TO MAXIMUM OUTPUT IN ORDER SHOWN (See Trimmer Illustration) |
| 455 kc | Control Grid 12SF7—I-F (Prong No. 2) | Point "X" 12SK7—R-F (Prong No. 3) | .1 mf | Turn Rotor to full open | 2nd I-F (C10) & (C11) |
| 455 kc | Control Grid 12SA7—1st Det. (Prong No. 8) | Same as above | .1 mf | Turn Rotor to full open | 1st I-F (C7) & (C8) |
| 1620 kc | Control Grid 12SA7—1st Det. (Prong No. 8) | Same as above | .1 mf | Turn Rotor to fully open position | Oscillator (C6) |
| 1400 kc | External Antenna Clip on Loop | Chassis | 50 mmf | Turn Rotor to 1400 kc Index Line. See Note A | Antenna (C24) |

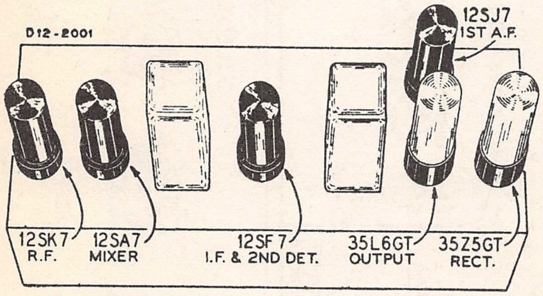
NOTE A:—Index line is on dial light diffuser strip. See DIAL CALIBRATION paragraph.

## DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully closed position. Use a new drive cord 42" long and tie one end to the tension spring. Hook the other end of the tension spring over the tab on the drive pulley. Pass the cord through the slot on the drive pulley rim, around stud A and wind two turns clockwise (from front of chassis) around the tuning shaft. Turns must progress away from chassis. Pass cord around pulley B and studs C and D. Pass cord under drive pulley and wind 1¾ turns counterclockwise around drive pulley. Stretch tension spring and tie free end of cord to spring. Cut off any excess cord.

Attach the dial pointer to the cord and position as instructed in paragraph DIAL CALIBRATION.


GANG CONDENSER IN FULLY CLOSED POSITION
POINTER CLAMP
B
C
D
A
STRING GUIDE
DRIVE SHAFT
VINYLITE SLEEVE COVERING DRIVE SHAFT
D19-2232


D12-2001
12SJ7 1ST A.F.
12SK7 R.F.
12SA7 MIXER
12SF7 I.F. & 2ND DET.
35L6GT OUTPUT
35Z5GT RECT.

## ELECTRICAL SPECIFICATIONS

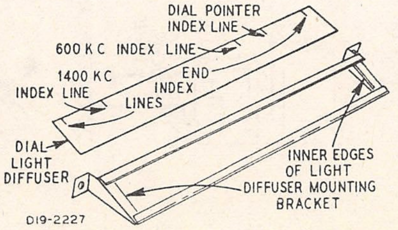
| | |
|---|---|
| Power Supply | 105-125 volts AC, 50-60 cycles, 35 watts or 105-125 volts DC |
| Selectivity | At 1000 KC, 50 KC wide at 1000 times signal |
| Sensitivity | (for .05 watt output with external antenna) 15 microvolts average |
| Power Output | 1.3 watts maximum<br>.75 watt 10% distortion |
| Loud Speaker | 4"x 6" PM dynamic |
| Voice Coil Impedance | 3.2 ohms at 400 cycles |

## DIAL CALIBRATION

In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two end index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped at one point to prevent movement of the diffuser strip. To position the dial pointer, turn the gang condenser to the fully closed position. The dial pointer should be directly over the dial pointer index line. (See illustration)

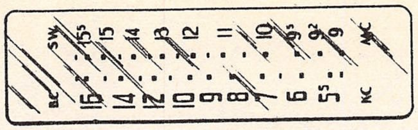
The 1400 KC index line is for use when aligning the receiver.

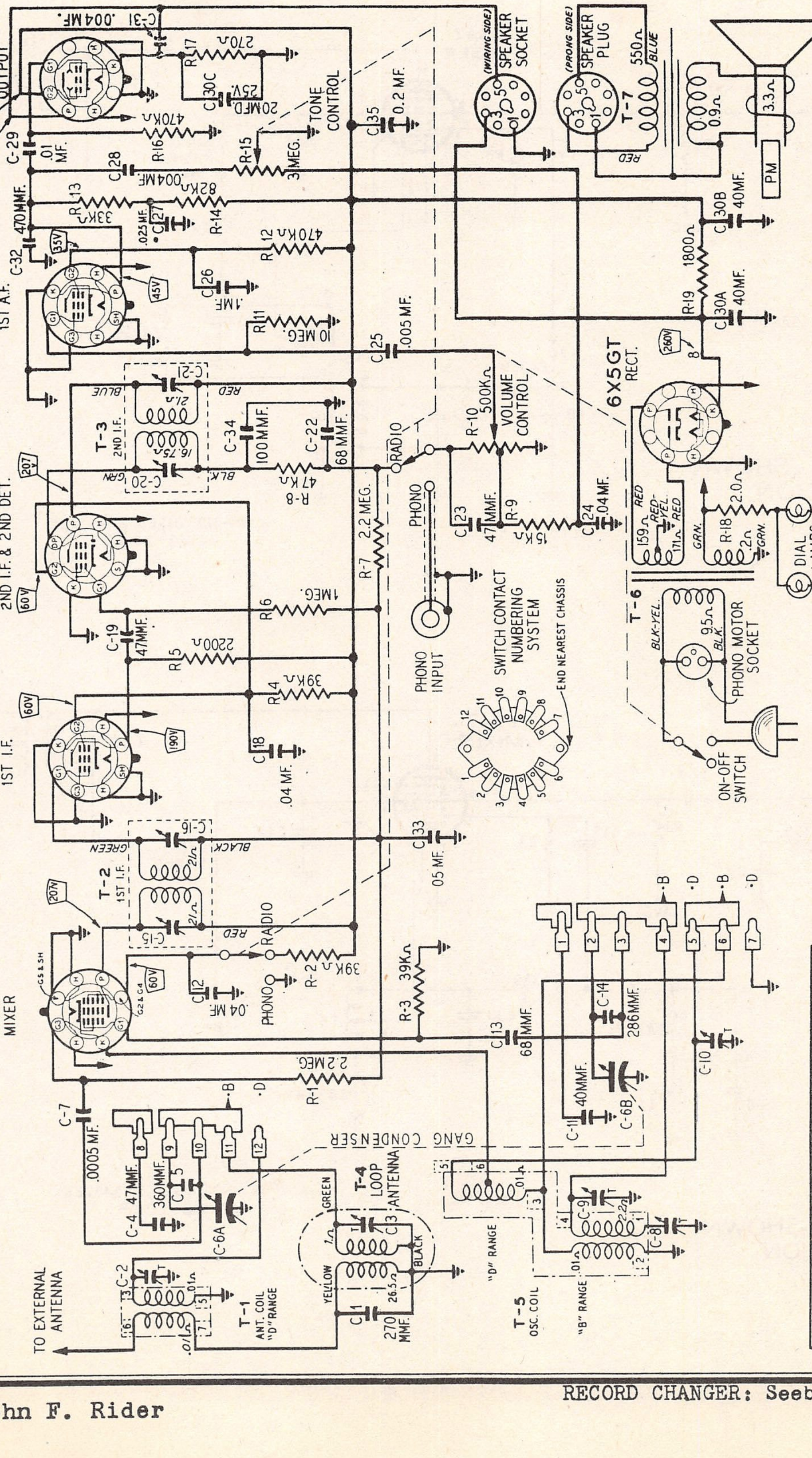

DIAL POINTER INDEX LINE
600 KC INDEX LINE
1400 KC INDEX LINE
END INDEX LINES
DIAL LIGHT DIFFUSER
INNER EDGES OF LIGHT DIFFUSER MOUNTING BRACKET
D19-2227

# MONTGOMERY WARD

MODELS 64WG-2010A, 64WG-2010B, 74WG-2010B

TUNING
BC SW
TONE
VOLUME


SW
15½
15
14
13
12
11
10
9½
9.2
9
MC
BC
16
14
12
10
9
8
7
6
5½
5
KC
A76-2148


6SA7
MIXER
6SK7
1ST I.F.
6SF7
2ND I.F. & 2ND DET.
6SJ7
1ST A.F.
6V6GT
OUTPUT
6X5GT
RECT.
T-1
ANT. COIL "D" RANGE
TO EXTERNAL ANTENNA
T-2
1ST I.F.
T-3
2ND I.F.
T-4
LOOP ANTENNA
T-5
OSC. COIL
"D" RANGE
"B" RANGE
T-6
T-7
GANG CONDENSER
C-1 270 MMF.
C-4 47MMF.
C-5 360MMF.
C-7 .0005 MF.
C-12 .04 MF
C-13 68 MMF.
C-14 286MMF.
C-11 40MMF.
C-18 .04 MF.
C-19 47MMF.
C-23 47MMF.
C-24 .04MF.
C-25 .005 MF.
C-26 .1MF.
C-27 .025MF.
C-28 .004MF.
C-29 .01 MF.
C-30A 40MF.
C-30B 40MF.
C-30C 20MFD. 25V.
C-31 .004MF.
C-32 470MMF.
C-33 .05 MF.
C-34 100MMF.
C-22 68MMF.
C-35 0.2 MF.
R-1 2.2MEG.
R-2 39K
R-3 39K
R-4 39K
R-5 2200
R-6 1MEG.
R-7 2.2 MEG.
R-8 47K
R-9 15K
R-10 500K VOLUME CONTROL
R-11 10 MEG.
R-12 470K
R-13 33K
R-14 82K
R-15 3 MEG. TONE CONTROL
R-16 470K
R-17 270
R-18 2
R-19 1800
RADIO
PHONO
PHONO INPUT
SWITCH CONTACT NUMBERING SYSTEM
END NEAREST CHASSIS
ON-OFF SWITCH
PHONO MOTOR SOCKET
DIAL LAMPS #47
SPEAKER SOCKET (WIRING SIDE)
SPEAKER PLUG (PRONG SIDE)
550
BLUE
RED
PM
3.3
0.9
159
111
95
GRN.
BLK-YEL.
BLK.
60V
90V
207V
207
45V
35V
242V
210V
260V
A76-2101 E

Intermediate Frequency..455 KC

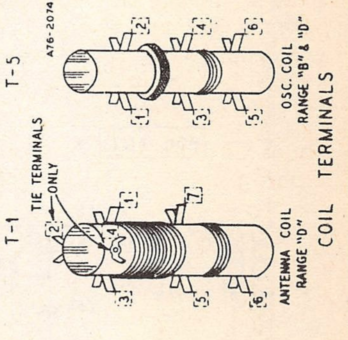
## TUBE SOCKET VOLTAGES

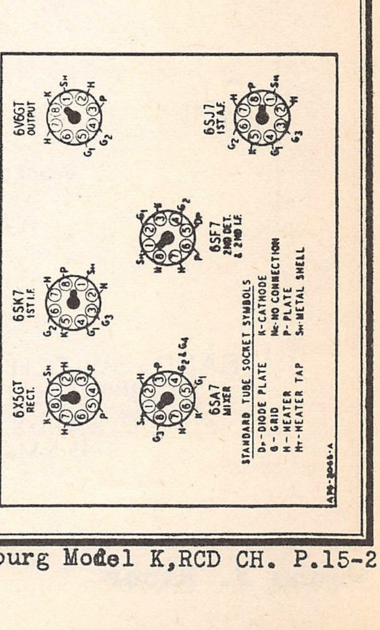
Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground.

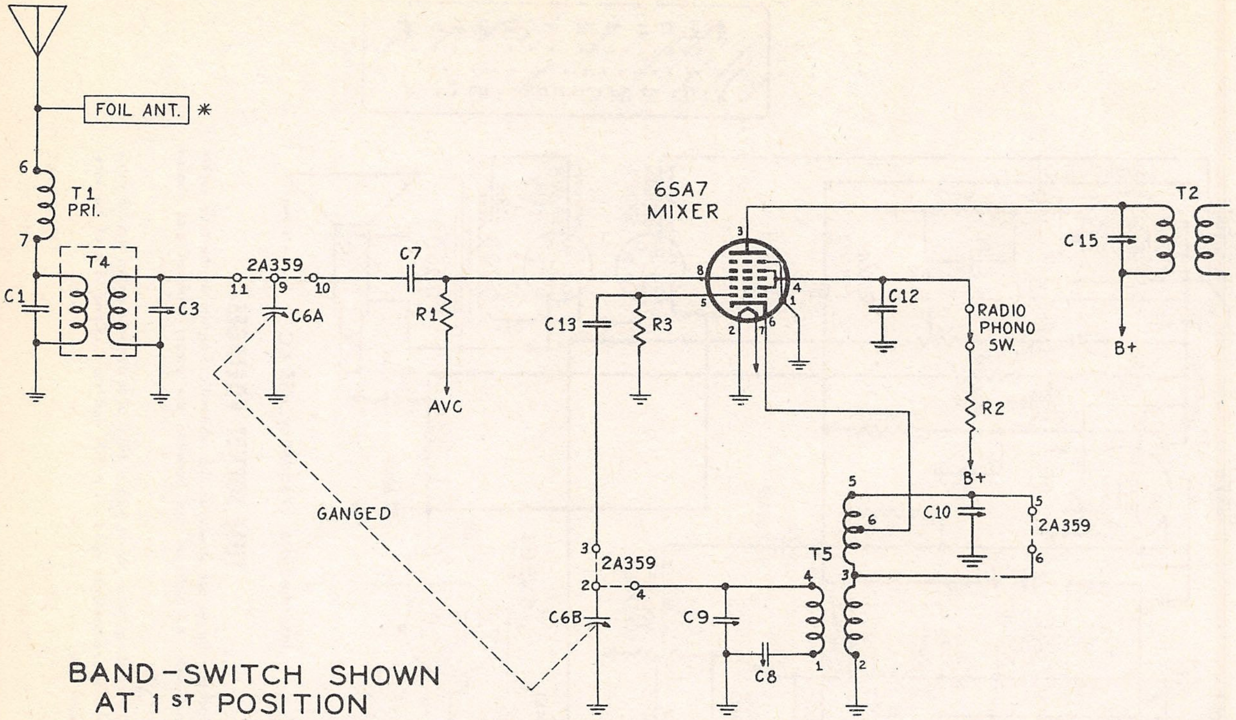
The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale. Conditions of measurement are:

Line voltage .......... 117 volts AC
Volume control .......... maximum
Signal input .......... none

A variation of ±10% is usually permissible.

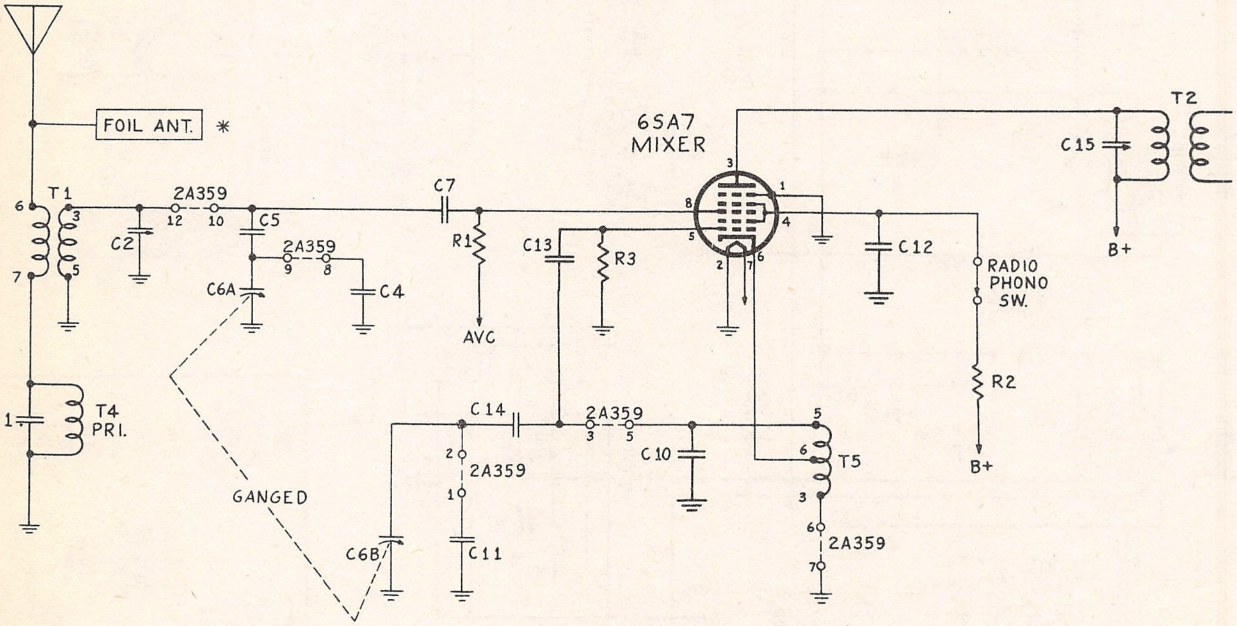

T-1
TIE TERMINALS ONLY
ANTENNA COIL RANGE "D"
T-5
OSC. COIL RANGE "B" & "D"
COIL TERMINALS
A76-2074A


6V6GT OUTPUT
6SJ7 1ST A.F.
6SK7 1ST I.F.
6SF7 2ND I.F. & 2ND DET.
6X5GT RECT.
6SA7 MIXER
STANDARD TUBE SOCKET SYMBOLS
D-DIODE PLATE
G-GRID
H-HEATER
HT-HEATER TAP
K-CATHODE
NC-NO CONNECTION
P-PLATE
SH-METAL SHELL


FOIL ANT. *
6
T1
PRI.
7
T4
C1
C3
2A359
11
9
10
C6A
C7
R1
AVC
GANGED
6SA7
MIXER
3
8
5
4
1
2
7
6
C13
R3
C12
RADIO
PHONO
SW.
R2
B+
C15
T2
B+
5
6
C10
5
2A359
6
3
2A359
2
4
T5
4
3
C6B
C9
C8
1
2

BAND-SWITCH SHOWN
AT 1ST POSITION
B RANGE
540-1600 KC.

*- NOT USED IN MODEL
74WG-2010B


FOIL ANT. *
T1
6
3
7
5
C2
2A359
12
10
C5
2A359
9
8
C4
C6A
C1
T4
PRI.
GANGED
C7
R1
AVC
C13
R3
6SA7
MIXER
3
8
5
1
4
2
7
6
C12
RADIO
PHONO
SW.
R2
B+
C15
T2
B+
C14
2A359
3
5
2
2A359
1
C10
C11
C6B
5
6
T5
3
6
2A359
7

*- NOT USED IN MODEL
74WG-2010B

BAND-SWITCH SHOWN
AT 2ND POSITION
D RANGE
9-15.5 MC.

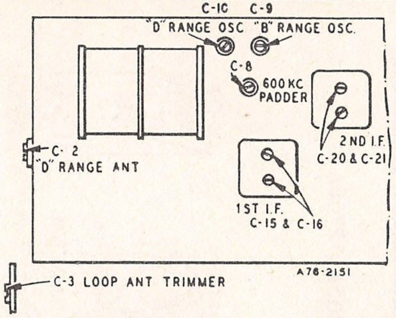
# MONTGOMERY WARD

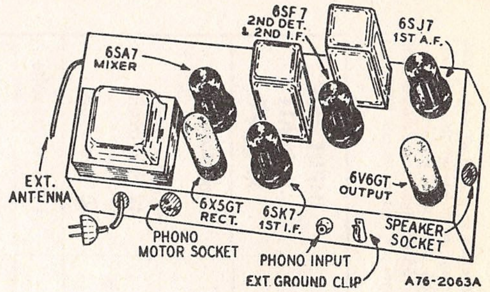
MODELS 64WG-2010A,
64WG-2010B,
74WG-2010B

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.





After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, re-set pointer at the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

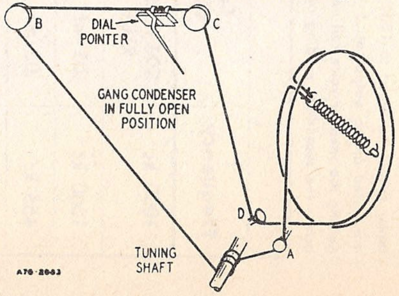
| | SIGNAL GENERATOR | | Dummy Antenna | Band Switch Setting | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM |
|---|---|---|---|---|---|---|
| | Frequency Setting | Connection at Radio | | | | |
| I-F | 455 kc | 6SA7, Pin 8 | .1 mf | B Range | Turn Rotor to Full Open | 2nd I-F (C-20) & (C-21)<br>1st I-F (C-15) & (C-16) |
| RANGE B | 1620 kc | Antenna Lead | 100 mmf | B Range | Turn Rotor to Full Open | Oscillator Range B (C9) |
| | 1400 kc | Antenna Lead | 100 mmf | B Range | Tune Rotor to Max. Output. Set Indicator to 1400 KC. See Note A | Antenna Range B (C3) |
| | 600 kc | Antenna Lead | 100 mmf | B Range | Tune Rotor to Max. Output | 600 kc (C8)<br>Rock Rotor—See Note B |
| Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement in output. | | | | | | |
| RANGE D | 15.6 mc | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C10) |
| | 14 mc | Antenna Lead | 400 Ohm | D Range | Tune Rotor to Max. Output | Antenna Range D (C2)<br>Rock Rotor—See Note B |
| LOOP RANGE B | Reassemble chassis in cabinet.<br>1400 kc | Antenna Lead | 100 mmf | B Range | Tune Rotor to Max. Output | Antenna Range B (C3) |

## 50 CYCLE OPERATION

Should it be desired to use the radio and record player on a 50 cycle power supply, it will be necessary to slip a 50 cycle conversion spring over the motor drive shaft on the record player. This conversion spring is listed in the parts list; however, alternate motor sources have been used for the changer and it will be necessary to check the motor assembly number stamped on the motor mounting plate and then order the conversion spring listed in the parts list under that motor.

## DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new drive cord 46" long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue one and one-half turns counterclockwise around the drive pulley. Then pass the cord around idler stud A and wind three and one-half turns clockwise around the tuning shaft (turns must progress away from chassis). Pass cord around pulleys B and C and around idler stud D. Wrap cord counterclockwise around drive pulley, stretch the tension spring and tie free end of the cord to spring. Cut off any excess string.



## ELECTRICAL SPECIFICATIONS

Power Supply.................105-125 volts AC, 60 cycles, 40 watts. (60 watts phono operating)
Frequency Range...........B range—540-1600 KC
D range—9 to 15.5 MC
Selectivity..........................40 KC broad at 1000 times signal, 1000 KC
Sensitivity..........................(for .5 watt output) with external antenna
B range—9 microvolts average
D range—20 microvolts average
Power Output.....................4 watts maximum
2.3 watts, 10% distortion
Loud Speaker.....................6" PM dynamic
Voice Coil Impedance....3.2 ohms at 400 cycles

MODELS 64WG-2010A,
64WG-2010B, 74WG-2010B
MODELS 74WG-2505A,
74WG-2705A

# MONTGOMERY WARD

## RECEIVER STAGE SENSITIVITIES

MODEL 74WG-2010B 64WG-2010A & B

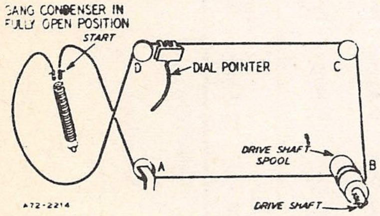
The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output with the speaker connected. The volume control must be set to maximum. The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

| SIGNAL GENERATOR | | | | INPUT FOR .5 WATT OUTPUT |
|---|---|---|---|---|
| Frequency | Coupling Capacitor | Connection to Receiver | Ground Connection | |
| 1000 kc | 200 mmf or RMA Dummy Antenna | External antenna lead | Chassis | 9 microvolts |
| 1000 kc | .05 mf | 6SA7 Mixer, Pin 8 | Same as above | 42 microvolts |
| 455 kc | .05 mf | 6SA7 Mixer, Pin 8 | Same as above | 40 microvolts |
| 455 kc | .05 mf | 6SK7 1st I-F, Pin 4 | Same as above | 1075 microvolts |
| 455 kc | .05 mf | 6SF7 2nd I-F, Pin 2 | Same as above | 3900 microvolts |
| 400 cycles | .05 mf | 6SJ7 1st A-F, Pin 4 | Same as above | .08 volt |
| 400 cycles | .05 mf | 6V6GT Output, Pin 5 | Same as above | 3.75 volts |

## DRIVE CORD REPLACEMENT

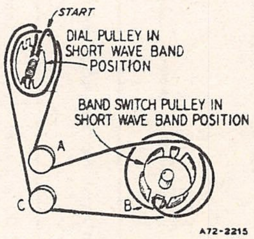
### DIAL POINTER CORD

Use a new 10X60 drive cord assembly or a new length of cord 50 inches long for the installation. Install the cord as shown in the illustration winding two turns counterclockwise around the drive shaft spool with the turns progressing towards the front end of the drive shaft. After completing the installation rotate the drive shaft a few turns to take up the slack in the cord.

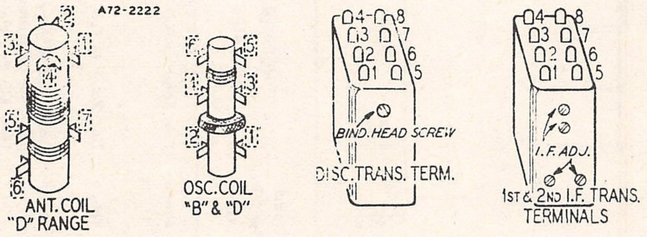

GANG CONDENSER IN FULLY OPEN POSITION
START
DIAL POINTER
D
C
A
B
DRIVE SHAFT SPOOL
DRIVE SHAFT
A72-2214

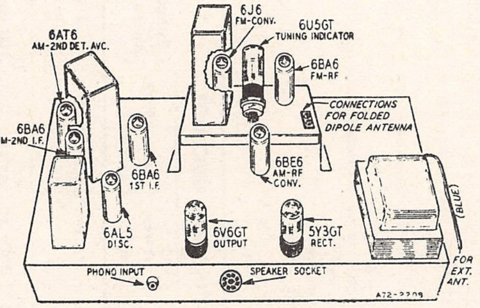
### DIAL ROTATION CORD

Use a new 10X61 drive cord assembly or a new length of cord 21 inches long for the installation. Both the dial pulley and the band switch pulley must be turned to the short wave band positions as shown in the illustration. Install the new cord exactly as shown then change the position of the band switch several times and note the movement of the dial.


START
DIAL PULLEY IN SHORT WAVE BAND POSITION
BAND SWITCH PULLEY IN SHORT WAVE BAND POSITION
A
B
C
A72-2215

MODEL 74WG-2505A, 2705A


A72-2222
1
2
3
4
5
6
ANT. COIL "D" RANGE
OSC. COIL "B" & "D"
4 8
3 7
2 6
1 5
BIND. HEAD SCREW
DISC. TRANS. TERM.
I.F. ADJ.
1ST & 2ND I.F. TRANS. TERMINALS


6J6
FM-CONV.
6U5GT
TUNING INDICATOR
6AT6
AM-2ND DET. AVC.
6BA6
FM-RF
CONNECTIONS FOR FOLDED DIPOLE ANTENNA
6BA6
FM-2ND I.F.
6BA6
1ST I.F.
6BE6
AM-RF CONV.
(BLUE)
6AL5
DISC.
6V6GT
OUTPUT
5Y3GT
RECT.
FOR EXT. ANT.
PHONO INPUT
SPEAKER SOCKET
A72-2209

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Power Supply | 105-125 volts AC 50-60 cycles, 80 watts |
| Frequency Ranges | Broadcast 540-1600 KC<br>Frequency Modulation 88-108 MC<br>Short Wave 9—15.5 MC |
| Selectivity | AM—40 KC broad at 1000 times signal, measured at 1000 KC<br>I.F. FM—225 KC broad at 2 times down<br>I.F. FM—700 KC broad at 200 times down |
| AM Sensitivity | (For .5 watt output with external antenna)<br>Broadcast, 12 microvolts average<br>Short Wave, 20 microvolts average |
| FM Sensitivity | (For .5 watt output)<br>25 microvolts average |
| Power Output | 5.2 watts maximum<br>3.5 watts 10% distortion |
| Loud Speaker | 10″ Electro Dynamic |
| Voice Coil Impedance | 3.2 ohms 400 cycles |

# MONTGOMERY WARD

MODELS 64WG-2010A,
64WG-2010B,74WG-2010B
MODEL 74BR-1812A

MODEL 74WG-2010B 64WG-2010A & B

## REPLACEMENT PARTS INFORMATION

**OPERATING VOLTAGES**—Chassis for Model 74WG-2010B are available for operation on the following power supply:

105-125 volts AC, 60 cycles

**HOW TO ORDER PARTS**—Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Repair parts should be ordered from your nearest Wards Retail Store, Catalog Order office or Mail Order House.

### REPLACEMENT PARTS LIST

**Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance**

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | | **CAPACITORS** | |
| C-1 | 47X445 | 270 mmf Moulded | 1 |
| C-2 | 17A164 | 5-50 mmf Trimmer | 1 |
| C-3 | 17A123 | 1.5-12 mmf. Trimmer | 1 |
| C-4 | 47X473 | 47 mmf Silvered Mica | 1 |
| C-5 | 47X474 | 360 mmf Silvered Mica | 1 |
| C-6A<br>C6-B | 14A178 | Gang Condenser with Drive Pulley | 1 |
| C-7 | B66501 | .0005 mf 200 V Tubular | 1 |
| C-8 | 17A155 | 350-430 mmf Trimmer | 1 |
| C-9<br>C-10 | 17A109 | 2.5-35 mmf Dual Trimmer | 1 |
| C-11 | 47X472 | 40 mmf Silvered Mica | 1 |
| C-12<br>C-18 | D66403 | .04 mf 400 V Tubular | 2 |
| C-13 | 47X466 | 68 mmf Moulded | 1 |
| C-14 | 47X481 | 286 mmf Silvered Mica | 1 |
| C-15<br>C-16 | | Part of T-2 (1st I-F Coil Assembly) | |
| C-19<br>C-23 | 47X463 | 47 mmf Moulded | 2 |
| C-20<br>C-21 | | Part of T-3 (2nd I-F Coil Assembly) | |
| C-22 | 47X471 | 68 mmf Moulded | 1 |
| C-24 | D64403 | .04 mf 400 V Tubular | 1 |
| C-25 | D66502 | .005 mf 400 V Tubular | 1 |
| C-26 | D67104 | .10 mf 400 V Tubular | 1 |
| C-27 | D64253 | .025 mf 400 V Tubular | 1 |
| C-28 | D66402 | .004 mf 400 V Tubular | 1 |
| C-29 | D66103 | .01 mf 400 V Tubular | 1 |
| C-30A<br>C-30B<br>C-30C | 45X346 | 40 mf 450 V<br>40 mf 450 V<br>20 mf 25 V<br>3 Section Electrolytic | 1 |
| C-31 | F66402 | .004 mf 600 V Tubular | 1 |
| C-32 | 47X505 | 470 mmf Moulded | 1 |
| C-33 | B66503 | .05 mf 200 V Tubular | 1 |
| C-34 | 47X476 | 100 mmf Moulded | 1 |
| C-35 | D67204 | .2 mf 400V Tubular | 1 |
| | | **RESISTORS** | |
| | | OHMS WATTS | |
| R-1<br>R-7 | B85225 | 2.2 meg. 0.5 Carbon | 2 |
| R-2<br>R-4 | C84393 | 39 K 1.0 Carbon | 2 |
| R-3 | B84393 | 39 K 0.5 Carbon | 1 |
| R-5 | B84222 | 2200 0.5 Carbon | 1 |
| R-6 | B85105 | 1 meg. 0.5 Carbon | 1 |
| R-8 | B85473 | 47 K 0.5 Carbon | 1 |
| R-9 | B84153 | 15 K 0.5 Carbon | 1 |
| R-10 | 36X358 | 500 K Volume Control and Line Switch | 1 |
| R-11 | B85106 | 10 meg. 0.5 Carbon | 1 |
| R-12<br>R-16 | B85474 | 470 K 0.5 Carbon | 2 |
| R-13 | B84333 | 33 K 0.5 Carbon | 1 |
| R-14 | B84823 | 82 K 0.5 Carbon | 1 |
| R-15 | *40X276 | 3.0 meg. Tone Control and Radio Phono Switch | 1 |
| R-17 | C84271 | 270 1.0 Carbon | 1 |
| R-18 | 43X213 | 2.0 0.5 Wire Wound | 1 |
| R-19 | D84182 | 1800 2.0 Carbon | 1 |

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | | **TRANSFORMERS AND COILS** | |
| T-1 | 9A1812 | "D" Range Antenna Coil Assembly | 1 |
| T-2 | 9A1814 | 1st I-F Coil Assembly | 1 |
| T-3 | 9A1815 | 2nd I-F Coil Assembly | 1 |
| T-4 | 9A1816 | "B" Range Loop Antenna | 1 |
| T-5 | 9A1813 | "B" Range and "D" Range Oscillator Coil Assembly | 1 |
| T-6 | 53X282 | 117 Volt, 60 Cycle, Standard Power Transformer | 1 |
| T-7 | | Output Transformer (See Miscellaneous) | |
| | | **DIAL AND DRIVE ASSEMBLY** | |
| | 26A423 | Dial Mtg. Plate Assembly Complete with Dial, Background, Diffusers and Spacers | 1 |
| | 6X21 | Rubber Grommet } Mtg Gang Cond. | 3 |
| | 20X329 | Cond. Cushion Stud } Mtg Gang Cond. | 3 |
| | 26X485 | Drive Shaft | 1 |
| | 19X192 | "C" Washer (For Drive Shaft) | 2 |
| | 15X150 | Pointer | 1 |
| | 28X113 | Drive Cord Tension Spring | 1 |
| | | 46" Drive Cord | 1 |
| | 7A202 | Pilot Light Socket Assembly | 1 |
| | | No. 47 Pilot Light Bulb | 2 |
| | | **MISCELLANEOUS** | |
| | ‡12A442 | 6" P.M. Speaker Complete with Output Transformer | 1 |
| | | Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker) | 1 |
| | | Output Transformer (Specify part number and letters stamped on speaker) | 1 |
| | 3A303 | Tube Socket—Octal (8 prong) Moulded | 7 |
| | 3A304 | Phono Motor Socket | 1 |
| | 3A305 | Phono Socket—Single Pin Tip | 1 |
| | 2A359 | Band Change Switch | 1 |
| | 13X328 | Line Cord and Plug Assembly | 1 |
| | 10A578 | Knob (Tuning) | 1 |
| | 10A579 | Knob (Off-On, Volume) | 1 |
| | 10A580 | Knob (SW-BC) | 1 |
| | 10A581 | Knob (Tone-R.P.) | 1 |
| | | **TYPE S-28A119 RECORD CHANGER PARTS** | |
| | S-K228231 | Motor, 60 cycle, 117 V | |
| | S-K228229 | 50 Cycle Conversion Spring | |
| | Shure P-93 | Crystal Pickup Cartridge | |
| | S-K228250 | Motor, 60 cycle, 117 V | |
| | S-K228249 | 50 Cycle Conversion Spring | |

**SUBSTITUTE PARTS**

The following parts are used in some receivers only. Check part number on old part before ordering and order part originally used in receiver.

| | |
|---|---|
| *40X281 | Tone Control (Substitute for 40X276) |
| *25X1539 | Radio-Phono Switch Lever (When 40X281 is used) |
| *2A161 | D.P.D.T. Switch (When 40X281 is used) |
| ‡12A459 | 6" P.M. Speaker Complete with Output Transformer |

USES SEEBURG MODEL "K" RECORD CHANGER

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MODEL 74BR-1812A

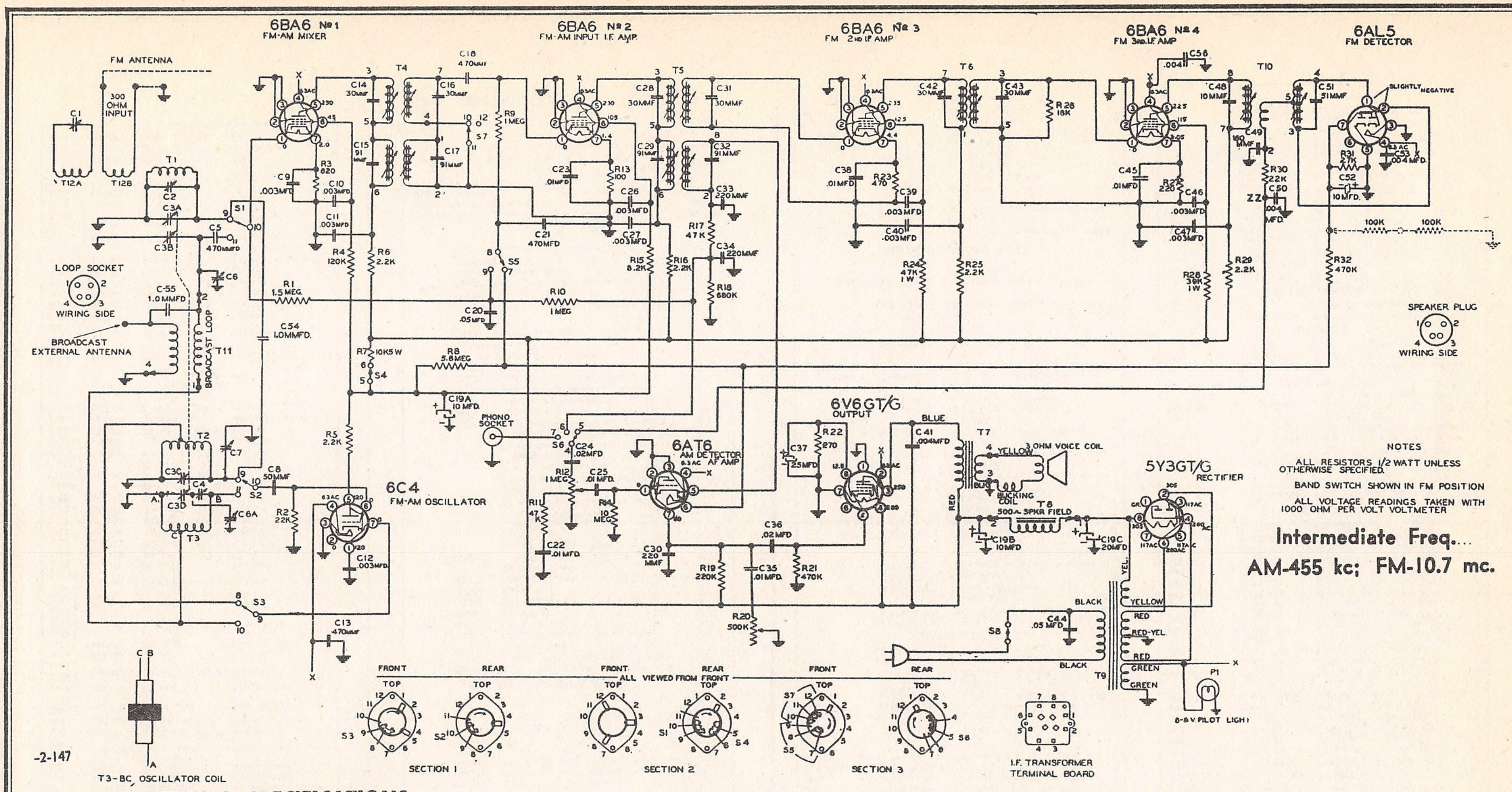
**HOW TO ORDER PARTS**—When ordering, specify *PART* number, schematic diagram reference number when applicable, and *CHASSIS MODEL* number. The model number appears on a label on the chassis.

### REPLACEMENT PARTS LIST

**Use Only Genuine Factory Replacement Parts**

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | | **R. F. TUNER PARTS** | |
| | | **CONDENSERS** | |
| C3A-B-C-D | B-8A-11275 | Two gang split stator variable | 1 |
| C2 | A-8E-12079 | Trimmer cond. FM antenna | 1 |
| C1 | A-8E-11506 | Trimmer cond. I.F. trap | 1 |
| C7 | A-8E-11279 | Trimmer cond. FM osc. trimmer | 1 |
| C6, C6A | A-8E-12557 | Trimmer cond. B.C. antenna and oscillator | 1 |
| C4 | A-8E-12177 | Padder cond.—B.C. Band | 1 |
| C8 | C-8G-11484 | 50 mmf, ±10%, ceramic | 1 |
| C55 | C-18G-12408 | 1.0 mmf,±.2 mmf, ceramic | 1 |
| C-9-10-11-12 | C-8G-11486 | 3000 mmf, ±20%, ceramic | 4 |
| C5-13 | C-8F3-12 | 470 mmf, 500 volts, ±20% mica | 2 |
| | | **RESISTORS** | |
| R3 | C-9B1-61 | 820 ohms, ½ watt, 10% | 1 |
| R12 | A-10B-11263 | Volume control (1 megohm) | 1 |
| R20, S8 | A-11A-11262 | Tone control (500M ohms) and switch | 1 |
| R5, R6 | C-9B1-15 | 2200 ohms, ½ watt, 20% | 2 |
| R1 | C-9B1-32 | 1.5 megohms, ½ watt, 20% | 1 |
| R2 | C-9B1-78 | 22K megohms, ½ watt, 10% | 1 |
| | | **MISCELLANEOUS** | |
| | A-15C-11491 | 7-prong miniature tube socket | 1 |
| | A-15A-11276 | Miniature tube socket, ceramic with base | 1 |
| | A-2H-12337 | Socket shield base | 1 |
| | A-2H-11494 | Tube shield | 2 |
| | 200-12862 | Spur gear assembly—consists of two gears, two springs and bushing | 1 |
| | A-49A-11673 | Spring for above assembly | 2 |
| S1-2-3-4-5-6-7 | B-20A-11261 | Band switch and phono-radio switch | 1 |
| | A-2G-11197 | Pointer | 1 |
| | B-2C-11188 | Dial plate assembly with tape guide, bushing, shaft and pinion gears | 1 |
| | A-3J-11182 | Pinion gear—inner side of plate | 1 |
| | A-3J-11183 | Pinion gear—outer side of plate | 1 |
| | A-3A-11181 | Shaft—for pinion gears | 1 |
| | B-2J-11190 | Rack tape—with teeth and bracket | 1 |
| | 32F4-10830 | B. H. M. S. 4-40 x ⅛ screw to fasten pointer to bracket | 1 |
| | A-6A-11768 | Diffuser | 1 |
| | B-2M-10383 | Cinch button | 1 |
| | | **COILS** | |
| T2 | A-13D-11282 | 88-108 mc oscillator coil | 1 |
| T1 | A-13E-11283 | 88-108 mc antenna coil secondary | 1 |
| T12A, T12B | A-13E-11284 | 88-108 mc antenna coil primary with trap | 1 |
| | | **MAIN CHASSIS PARTS** | |
| C52 | A-8C-11495 | Electrolytic condenser 10 mfd x 150 volts | 1 |
| C37 | A-8C-11496 | Electrolytic condenser, 25 mfd x 25 volts | 1 |
| C19A, B, C | A-8C-10272 | Electrolytic condenser, 10 mfd x 10 mfd x 20 mfd | 1 |
| C24, C36 | C-8D-10774 | .02 mfd x 400 v., 20%, tubular | 2 |
| C20 | C-8D-10770 | .05 mfd x 200 v., 20%, tubular | 1 |
| C22 | C-8D-11738 | .01 mfd x 200 v., 20%, tubular | 1 |
| C25, 35 | C-8D-10761 | .01 mfd x 400 v., 20%, tubular | 2 |
| C41, 50, 53, 56 | C-8D-10788 | .004 mfd x 600 v., 20%, tubular | 4 |
| C49 | C-8F3-116 | 180 mmfd x 500 v., 10%, mica | 1 |
| C23, 38, 45 | C-8F9-20 | 10K mmfd x 300 v., 20%, mica | 3 |

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| C21, 18 | C-8F3-12 | 470 mmfd x 500 v., 20%, mica | 2 |
| C30, 33, 34 | C-8F3-10 | 220 mmfd x 500 v., 20%, mica | 3 |
| C44 | C-8J-11388 | .05 mfd x 600 v., 20%, molded case paper | 1 |
| C26-27-39 40-46-47 | C-8G-12449 | 3000 mmfd, 20%, ceramic-insulated | 6 |
| C14, 16, 28, 31,42, 43 | C-8G-12159 | 30 mmfd, 500 volts, 5%, ceramic | 6 |
| C48 | C-8G-11789 | 10 mmfd, 10%, ceramic | 1 |
| C51 | C-8G-11891 | 51 mmfd, 5%, ceramic | 1 |
| C15-17 | C-8G-12160 | 91 mmfd, 5%, ceramic | 2 |
| C29-32 | C-8F5-224 | 91 mmfd, 5%, silver mica | 2 |
| | | **RESISTORS** | |
| R4 | C-9B1-87 | 120K ohms, ½ watt, 10% | 1 |
| R15 | C-9B1-73 | 8200 ohms, ½ watt, 10% | 1 |
| R26 | C-9B1-77 | 18K ohms, ½ watt, 10% | 1 |
| R18 | C-9B1-96 | 680K ohms, ½ watt, 10% | 1 |
| R24 | C-9B2-82 | 47K ohms, 1 watt, 10% | 1 |
| R28 | C-9B2-81 | 39K ohms, 1 watt, 10% | 1 |
| R7 | B-9C-11489 | 10K ohms, 5 watts, 10%, wire-wound | 1 |
| R30 | C-9B1-78 | 22K ohms, ½ watt, 10% | 1 |
| R21 | C-9B1-29 | 470K ohms, ½ watt, 20% | 1 |
| R22 | C-9B1-55 | 270 ohms, ½ watt, 10% | 1 |
| R16, 25, 29 | C-9B1-15 | 2200 ohms, ½ watt, 20% | 3 |
| R8 | C-9B1-107 | 5.6 megohms, ½ watt, 10% | 1 |
| R9, 10 | C-9B1-31 | 1 megohm, ½ watt, 20% | 2 |
| R13 | C-9B1-50 | 100 ohms, ½ watt, 10% | 1 |
| R11, R17 | C-9B1-23 | 47K ohms, ½ watt, 20% | 2 |
| R19 | C-9B1-27 | 220K ohms, ½ watt, 20% | 1 |
| R14 | C-9B1-37 | 10 megohms, ½ watt, 20% | 1 |
| R27 | C-9B1-54 | 220 ohms, ½ watt, 10% | 1 |
| R32 | C-9B1-94 | 470K ohms, ½ watt, 10% | 1 |
| R31 | C-9B1-79 | 27K ohms, ½ watt, 10% | 1 |
| R23 | C-9B1-58 | 470 ohms, ½ watt, 10% | 1 |
| | | **COILS** | |
| T3 | A-13D-11285 | B.C. oscillator coil | 1 |
| T4 | C-203-11743 | Input I.F. coil combination assembly. 455 kc and 10.7 mc | 1 |
| T5 | C-203-11746 | 2nd I.F. coil combination assembly. 455 kc and 10.7 mc | 1 |
| T6 | C-203-11744 | 3rd I.F. coil assembly 10.7 mc | 1 |
| T10 | C-203-11745 | Ratio detector I.F. coil assembly 10.7 mc | 1 |
| T11, C55 | C-13E-12287 | Loop antenna assembly with 1.0 mmfd cond. C-8G-12408 | 1 |
| | | **TRANSFORMERS** | |
| T7 | B-12C-11253 | Output transformer for speaker | 1 |
| T9 | B-12A-11259 | Power transformer—105-125 volts AC, 60 cycles primary | 1 |
| | | **SPEAKER** | |
| T8 | C-18B-12404 | Electrodynamic speaker, 6 x 9 in., less output transformer | 1 |
| | | **MISCELLANEOUS** | |
| | B-6D-11993 | Dial scale | 1 |
| | B-5B-10376-37 | Knob, "Volume" | 1 |
| | B-5B-11672-37 | Knob, "Bandswitch" | 1 |
| | B-5B-10377-37 | Knob, "Tuning" | 1 |
| | B-5B-10378-37 | Knob, "Tone" | 1 |
| | B-47A-11889 | Pilot lite assembly | 1 |
| P1 | A-46A-11739 | Pilot lite bulb, 6-8 volt, T-44 | 1 |
| | A-2D-11883 | Reflector | 1 |
| | A-15B-11538 | Speaker socket | 1 |
| | A-19B-12170 | Socket for tone arm lead | 1 |
| | A-19B-11272 | Antenna socket | 1 |
| | A-15B-10440 | 8-prong, octal tube socket | 2 |
| | A-15C-10717 | 7-prong, miniature tube socket | 5 |
| | A-2H-10718 | Shield base | 5 |
| | A-2H-10974 | Shield can | 5 |
| | B-14M-11045-1 | A.C. line cord | 1 |
| | A-23A-10344 | Line cord lock | 1 |


6BA6 No 1
FM-AM MIXER
6BA6 No 2
FM-AM INPUT I.F. AMP
6BA6 No 3
FM 2nd I.F. AMP
6BA6 No 4
FM 3rd I.F. AMP
6AL5
FM DETECTOR
6C4
FM-AM OSCILLATOR
6AT6
AM DETECTOR 6.3AC AF AMP
6V6GT/G
OUTPUT
5Y3GT/G
RECTIFIER
FM ANTENNA
300 OHM INPUT
LOOP SOCKET
WIRING SIDE
BROADCAST EXTERNAL ANTENNA
BROADCAST LOOP
PHONO SOCKET
SPEAKER PLUG
WIRING SIDE
3 OHM VOICE COIL
BUCKING COIL
500Ω SPKR FIELD
6-8 V. PILOT LIGHT
SECTION 1
SECTION 2
SECTION 3
ALL VIEWED FROM FRONT
FRONT
REAR
TOP
I.F. TRANSFORMER TERMINAL BOARD
T3-BC OSCILLATOR COIL

NOTES

ALL RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED.

BAND SWITCH SHOWN IN FM POSITION

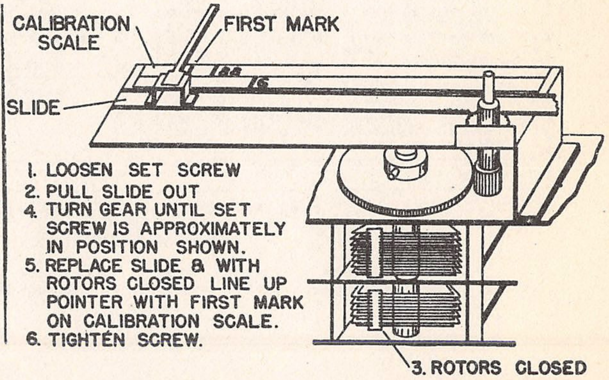
ALL VOLTAGE READINGS TAKEN WITH 1000 OHM PER VOLT VOLTMETER

**Intermediate Freq.... AM-455 kc; FM-10.7 mc.**

-2-147

## ELECTRICAL SPECIFICATIONS

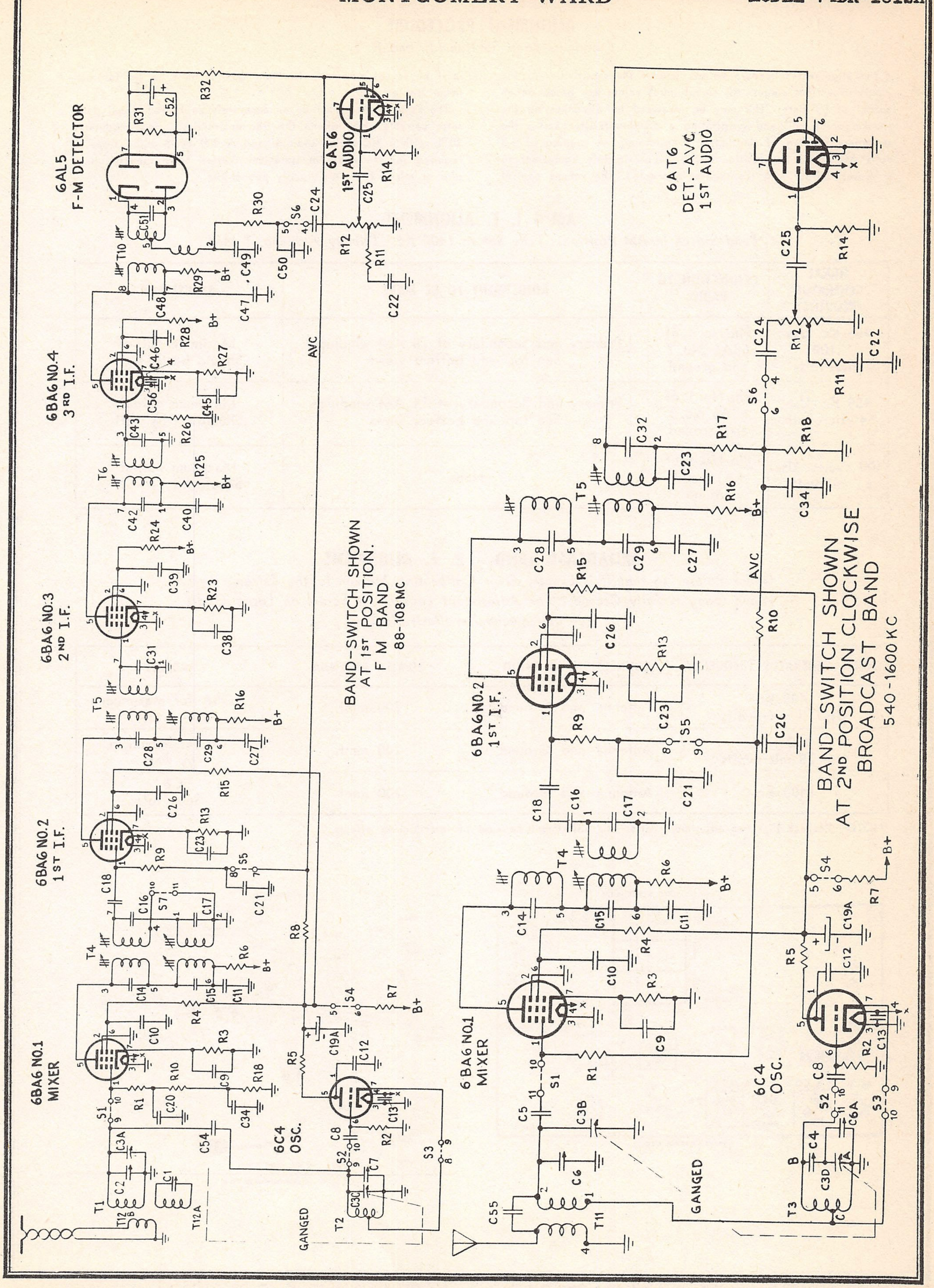
| | |
|---|---|
| Power Supply | 105 to 125 volts, AC, 50-60-cycles; 85 watts. |
| Frequency Ranges | Broadcast Band—540 to 1600 kc.<br>FM band—88 to 108 mc. |
| Selectivity | AM-50 kc. broad at 1000 times signal, measured at 1000 kc.<br>I.F. FM-180 kc. broad at 2 times down.<br>I.F. FM-290 kc. broad at 10 times down. |
| AM Sensitivity | (For .5 watt output with external antenna)—20 microvolts average |
| FM Sensitivity | (For .5 watt output)—15 microvolts average. |
| Power Output | 3.5 watts 10% distortion. 7 watts maximum. |
| Loud Speaker | 6"x 9" oval electrodynamic. Voice coil impedance 3.2 ohms, 400 cycles. |


CALIBRATION SCALE
FIRST MARK
SLIDE
3. ROTORS CLOSED

1. LOOSEN SET SCREW
2. PULL SLIDE OUT
4. TURN GEAR UNTIL SET SCREW IS APPROXIMATELY IN POSITION SHOWN.
5. REPLACE SLIDE & WITH ROTORS CLOSED LINE UP POINTER WITH FIRST MARK ON CALIBRATION SCALE.
6. TIGHTEN SCREW.

## MONTGOMERY WARD

MODEL 74BR-1812A


6AL5
F-M DETECTOR
6AT6
1ST AUDIO
6BA6 NO.4
3RD I.F.
6BA6 NO.3
2ND I.F.
6BA6 NO.2
1ST I.F.
6BA6 NO.1
MIXER
6C4
OSC.
AVC
GANGED
T1
T12
T12A
T2
T4
T5
T6
T10
B+
BAND-SWITCH SHOWN
AT 1ST POSITION.
F M BAND
88-108 MC
6AT6
DET.-AVC
1ST AUDIO
6BA6 NO.2
1ST I.F.
6BA6 NO.1
MIXER
6C4
OSC.
T3
T11
GANGED
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
BROADCAST BAND
540-1600 KC

©John F. Rider

# ALIGNMENT PROCEDURE

*Broadcast Band Section I.F. and R. F.*

The alignment procedure below includes the sensitivities at the inputs of various stages. All signal input values are based on an output of ½ watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2-ohm resistor across the secondary winding of the output transformer. A reading of 1.3 volts AC across this resistor will be approximately equivalent to a ½-watt output with the speaker connected. The volume control must be set at maximum. The tone control must be set for maximum treble.

The signal source must be an accurately calibrated signal generator capable of supplying the frequencies designated, modulated 30% with a 400-cycles audio signal. A 400 cycle audio signal is required for the audio measurement. Variations in sensitivities of plus or minus 25% are usually permissible.

## AM - I. F. ALIGNMENT

*Band Switch in AM Position. Tune Set to 1400 Kc. Dummy Antenna .1 Mfd.*

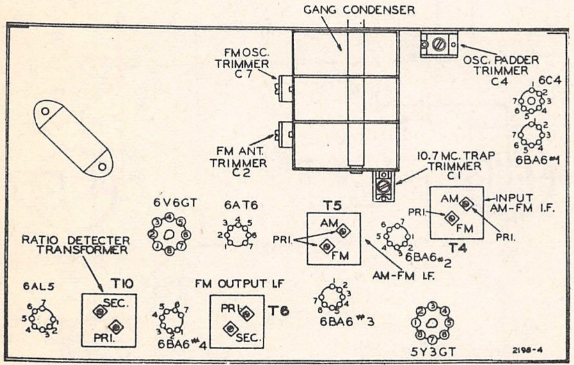
| SIGNAL GENERATOR FREQUENCY | CONNECTION TO RADIO | ADJUSTMENT TO BE MADE | ADJUST FOR |
|---|---|---|---|
| 455 Kc. Use 2100 microvolts | Pin No. 1 of 6BA6 No. 2 and ground | Primary and Secondary of T5 AM windings. See top and bottom views | Maximum output Should be ½ watt |
| 455 Kc. Use 64 microvolts | Pin No. 1 of 6BA6 No. 1 and ground | Primary and Secondary of T4 AM windings. See top and bottom views | Maximum output Should be ½ watt |
| 400 cycles. Use 63 millivolts | Pin No. 1 of 6AT6 and ground | None | Maximum output Should be ½ watt |

## BROADCAST BAND - R. F. ALIGNMENT

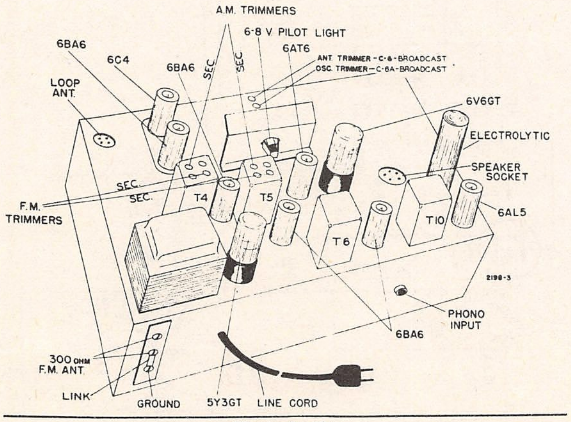
*Check Pointer so that it is Exactly Over Calibration Marker to the Extreme Left When Gang is Fully Closed. For Adjustment Loosen Set Screw on Large Gear. (see dial mechanism illustration.)*

| SIGNAL GENERATOR FREQUENCY | CONNECTION TO RADIO | DUMMY ANTENNA | ADJUST |
|---|---|---|---|
| 1400 Kc. Use 15 microvolts | Antenna and Ground | 200 mmf. | C6A for maximum ½ watt |
| 600 Kc. Use 25 microvolts | Antenna and Ground | 200 mmf. | C4 for maximum ½ watt |
| 1400 Kc. | Antenna and Ground | 200 mmf | C6 See Note |

NOTE: Recheck first two adjustments after this adjustment because of inter-locking effects.


GANG CONDENSER
FM OSC. TRIMMER C7
OSC. PADDER TRIMMER C4
6C4
FM ANT. TRIMMER C2
10.7 MC. TRAP TRIMMER C1
6BA6 #1
6V6GT
6AT6
T5
AM
PRI.
FM
INPUT AM-FM I.F.
PRI.
T4
6BA6 #2
AM-FM I.F.
RATIO DETECTER TRANSFORMER
6AL5
T10
SEC.
PRI.
FM OUTPUT I.F
PRI.
T6
SEC.
6BA6 #4
6BA6 #3
5Y3GT
2198-4

Chassis—bottom view


A.M. TRIMMERS
6-8 V. PILOT LIGHT
6BA6
6C4
6AT6
6BA6
SEC
SEC
ANT. TRIMMER - C-6 - BROADCAST
OSC. TRIMMER - C-6A - BROADCAST
LOOP ANT.
6V6GT
ELECTROLYTIC
SPEAKER SOCKET
SEC.
SEC.
F.M. TRIMMERS
T4
T5
T6
T10
6AL5
2198-3
PHONO INPUT
6BA6
300 OHM F.M. ANT
LINK
GROUND
5Y3GT
LINE CORD

Chassis—top view

## ALIGNMENT PROCEDURE

*FM Band Section. I.F. and R.F.*

### IMPORTANT

No alignment of the FM section of this radio should be attempted unless you are positive that the circuits are in need of adjustment and you have the necessary equipment.

All components used in this radio are extremely stable and the tuned circuits should require no adjustment over long periods of time.

### NOTE

The following alignment is based on the use of the new Simpson vacuum tube voltmeter which has a "floating ground". In other words, the meter, when used as a vacuum tube voltmeter, can have both the positive and negative sides connected to points above ground and still give true readings.

A standard AM signal generator is required.

## FM - I. F. ALIGNMENT

*Band Switch in FM Position. Dummy Antenna .1 Mfd.*

| SIGNAL GENERATOR FREQUENCY | CONNECTION TO RADIO | VACUUM TUBE VOLT METER CONNECTION TO RADIO | ADJUSTMENT TO BE MADE | ADJUST FOR |
|---|---|---|---|---|
| 10.7 Mc. Use about .1 volt | Pin No. 1 of 6BA6 no. 4 and ground | Pin no. 7 of 6AL5 and ground | Primary of T10 | Resonance should be about 3 volts |
| 10.7 Mc. Use about .1 volt | Pin No. 1 of 6BA6 no. 4 and ground | See note "A" | Secondary of T10 | Zero. Use zero center scale. See note "B" |
| 10.7 Mc. Use about 4000 microvolts | Pin No. 1 of 6BA6 no. 3 and ground | Pin no. 7 of 6AL5 and ground | Primary and Secondary of T6 | Resonance should be about 3 volts |
| 10.7 Mc. Use about 150 microvolts | Pin No. 1 of 6BA6 no. 2 and ground | Pin no. 7 of 6AL5 and ground | Primary and Secondary of 10.7 mc. windings of T5. See top and bottom views | Resonance should be about 3 volts |
| 10.7 Mc. Use 3000 microvolts | FM Antenna input and ground | Pin no. 7 of 6AL5 and ground | Primary and Secondary of 10.7 mc. windings of T4. See top and bottom views | Resonance should be about 3 volts See Note "C" |
| 10.7 Mc. | FM Antenna input and ground | Pin no. 7 of 6AL5 and ground | C1 | Minimum reponse. This is a trap circuit |

NOTES ON FM—I.F. ALIGNMENT:

NOTE "A" Connect two resistors, 100K OHMS each, from Pin No. 7 of 6AL5 to ground. These resistors must be matched within 5%. Connect as shown in dotted lines on schematic diagram. Connect vacuum tube voltmeter between the mid point of the resistors and point zz.

NOTE "B" If T10 has been tampered with, it is possible that no crossover point will be found at first. Careful adjustment of both primary and secondary is necessary.

GENERAL: Input signals should be adjusted to give approximately 3 volts. The ratio detector is operating at a reasonable level at this point and will give the truest indication of correct alignment with the procedure specified.

NOTE "C" The input microvolts specified is based on the trap circuits being adjusted.

## FM - R. F. ALIGNMENT

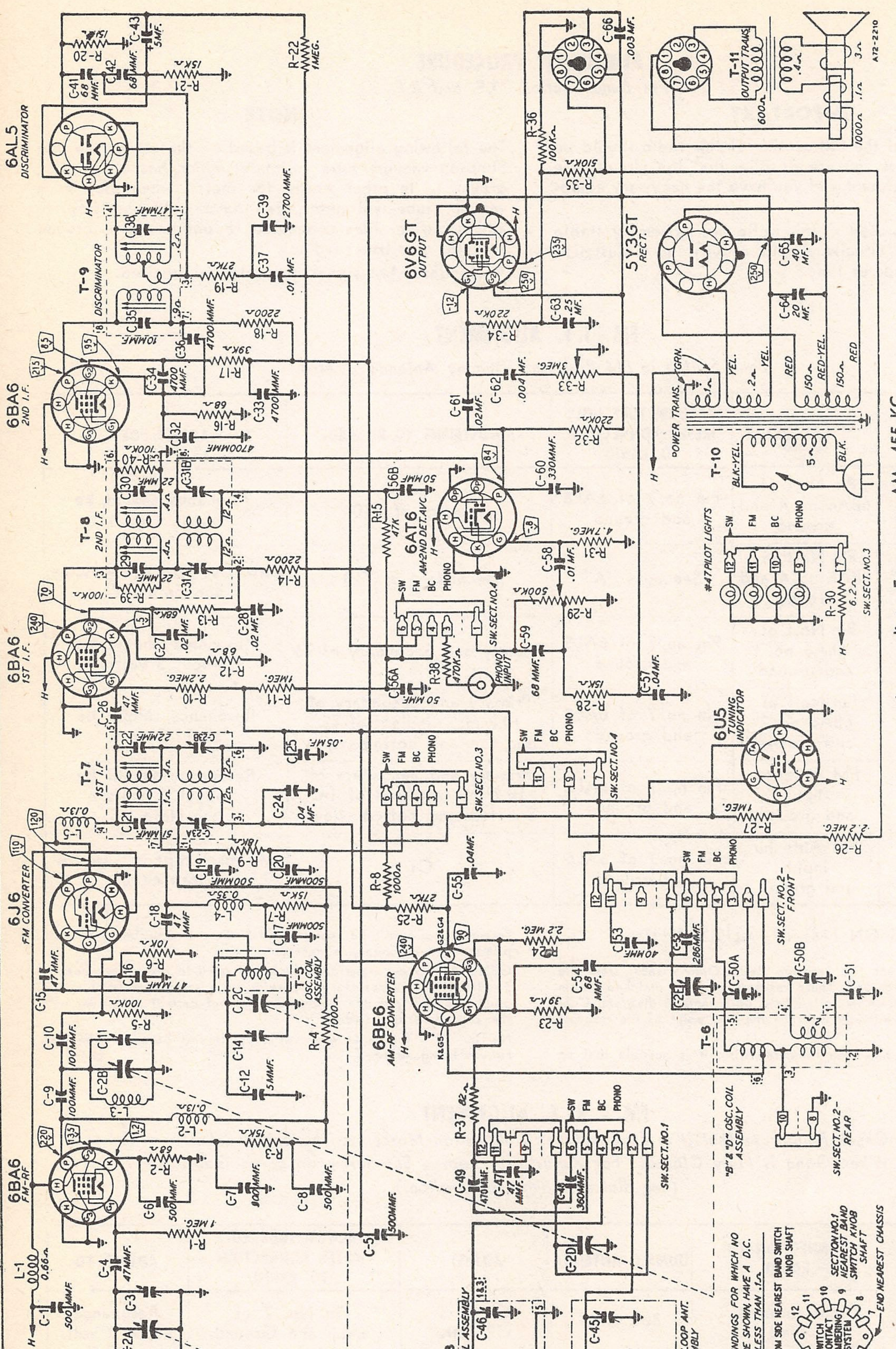
*Check Pointer so that it is Exactly Over Calibration Marker to the Extreme Left When Gang is Fully Closed. For Adjustment Loosen Set Screw on Large Gear. (see dial mechanism illustration.)*

| SIGNAL GENERATOR FREQUENCY | CONNECTION TO RADIO | DUMMY ANTENNA | ADJUST | VACUUM TUBE VOLT METER CONNECTION TO RADIO | ADJUST TO |
|---|---|---|---|---|---|
| 100 Mc. Use about 15 microvolts | FM Antenna lead | 300 ohms | C7 Osc.<br>C2 Ant. | Pin No. 7 of 6AL5 and Ground | Resonance about 3 volts |

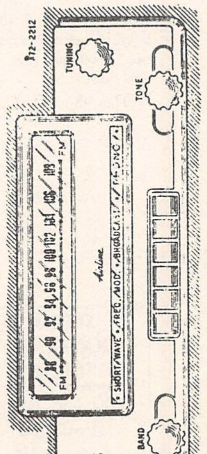
NOTE: If a signal generator with the above fundamental frequency is not available, it is sometimes possible to use harmonics. Use extreme care in picking harmonics. An alternate procedure is to use a local station carrier of known frequency to align the FM Band and to use the vacuum tube volt meter as above for resonance indication. A weak carrier, however will not produce 3 volts.

MODELS 74WG-2505A,
74WG-2705A

# MONTGOMERY WARD


6BA6 FM-RF
6J6 FM CONVERTER
6BA6 1ST I.F.
6BA6 2ND I.F.
6AL5 DISCRIMINATOR
6BE6 AM-RF CONVERTER
6AT6 AM 2ND DET. AVC
6V6GT OUTPUT
5Y3GT RECT.
6U5 TUNING INDICATOR
T-1 DI-POLE ANTENNA
T-2
T-3 "D" ANT. COIL ASSEMBLY
T-4 "B" RANGE LOOP ANT. ASSEMBLY
T-5 OSC. COIL ASSEMBLY
T-6 "B" & "D" OSC. COIL ASSEMBLY
T-7 1ST I.F.
T-8 2ND I.F.
T-9 DISCRIMINATOR
T-10
T-11 OUTPUT TRANS.
POWER TRANS.
#47 PILOT LIGHTS
PHONO INPUT
TO EXT. ANT.
SW. SECT. NO.1
SW. SECT. NO.2 - FRONT
SW. SECT. NO.2 - REAR
SW. SECT. NO.3
SW. SECT. NO.4
SW FM BC PHONO
YEL. RED RED-YEL. GRN. BLK. BLK-YEL.
A72-2210
NOTE COIL WINDINGS FOR WHICH NO RESISTANCES ARE SHOWN, HAVE A D.C. RESISTANCE OF LESS THAN .1Ω.
SWITCH VIEWED FROM SIDE NEAREST BAND SWITCH KNOB SHAFT
SWITCH CONTACT NUMBERING SYSTEM
SECTION NO.1 NEAREST BAND SWITCH KNOB SHAFT
END NEAREST CHASSIS

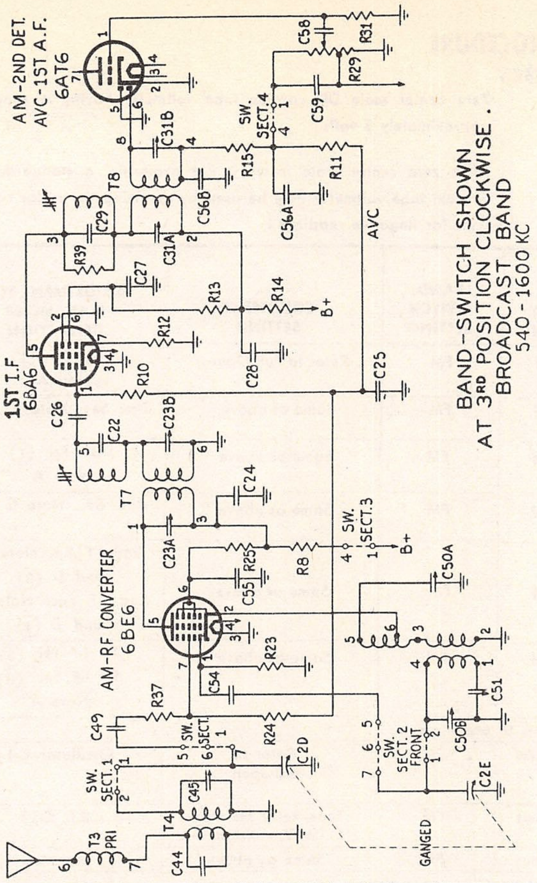
Intermediate Frequency..AM—455 KC
FM—10.7 MC


A72-2212
TUNING
TONE
VOLUME
BAND
Airline
SHORT WAVE • FREQ. MOD. • BROADCAST • PHONO
FM 88 90 92 94 96 98 100 102 104 106 108

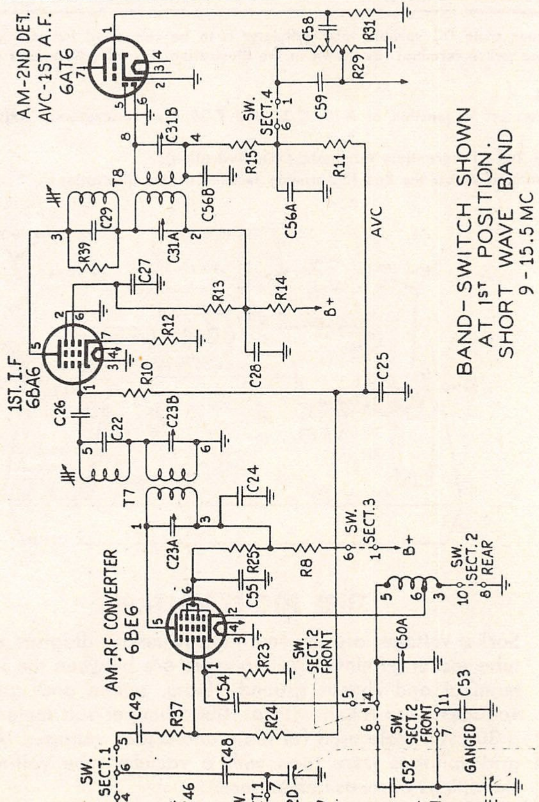
RECORD CHANGER for MODEL 74WG-2705A: Seeburg Model L. P.15-18

# MONTGOMERY WARD

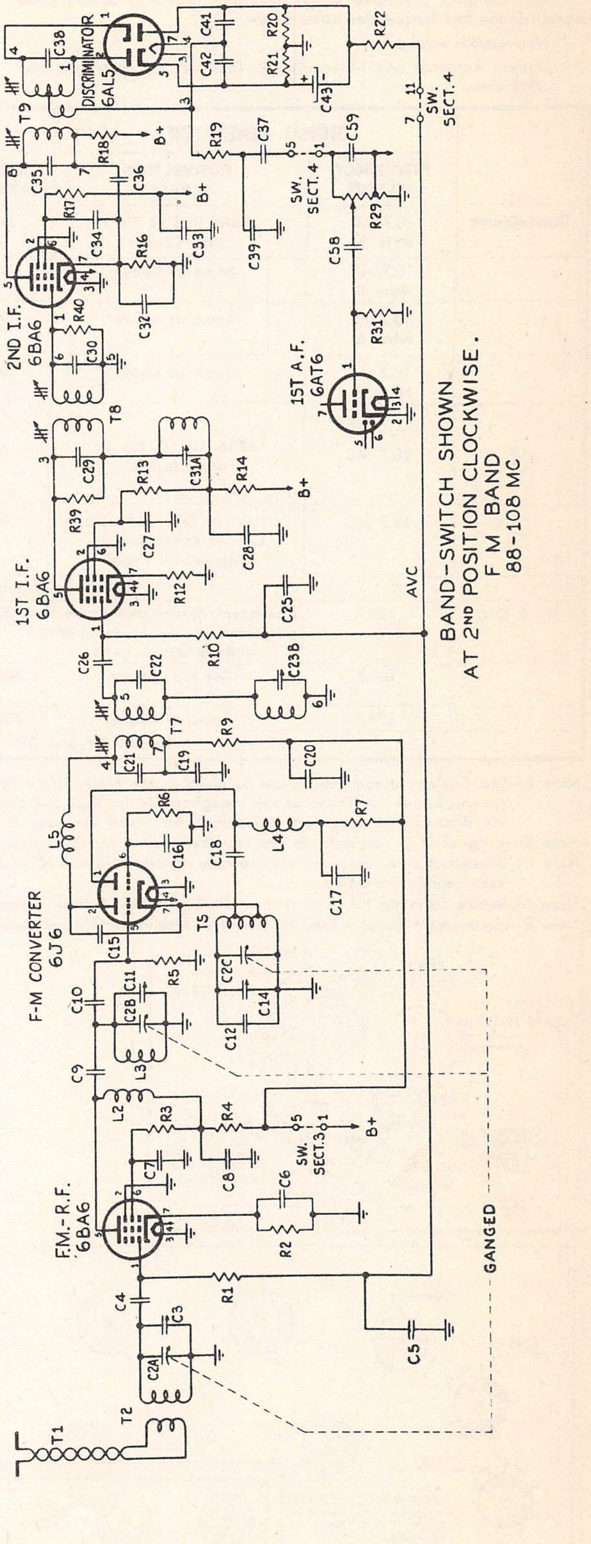
## MODELS 74WG-2505A, 74WG-2705A


AM-2ND DET. AVC-1ST A.F. 6AT6
1ST I.F 6BA6
AM-RF CONVERTER 6BE6
T3 PRI
T4
T7
T8
SW. SECT.1
SW. SECT.2 FRONT
SW. SECT.3
SW. SECT.4
GANGED
AVC
B+

BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE. BROADCAST BAND 540-1600 KC


AM-2ND DET. AVC-1ST A.F. 6AT6
1ST. I.F 6BA6
AM-RF CONVERTER 6BE6
T3
T4 PRI.
T7
T8
SW. SECT.1
SW. SECT.2 FRONT
SW. SECT.2 REAR
SW. SECT.3
SW. SECT.4
GANGED
AVC
B+

BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND 9-15.5 MC


DISCRIMINATOR 6AL5
2ND I.F. 6BA6
1ST I.F. 6BA6
1ST A.F. 6AT6
F-M CONVERTER 6J6
F.M.-R.F. 6BA6
T1
T2
T5
T7
T8
T9
SW. SECT.3
SW. SECT.4
GANGED
AVC
B+

BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. F M BAND 88-108 MC

MODELS 74WG-2505A,
74WG-2705A

# MONTGOMERY WARD

## ALIGNMENT PROCEDURE
### FM STAGES

Allow chassis and signal generator to warm up for several minutes. The following equipment is required for aligning:

An accurately calibrated signal generator providing unmodulated signals at the test frequencies listed below.

Non-metallic screwdriver.

Dummy Antennas and I-F Loading Resistor—.01 mf, 300 ohms and 5000 ohms.

Zero center scale DC vacuum tube voltmeter having a range of approximately 3 volts.

(If a zero center scale meter is not available, a standard scale vacuum tube voltmeter may be used by reversing the meter connections for negative readings.)

| | SIGNAL GENERATOR | | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER SETTING | ADJUSTMENT FOR MAX. METER DEFLECTION |
|---|---|---|---|---|---|---|
| | FREQUENCY SETTING | CONNECTION AT RADIO | | | | |
| Discriminator | 10.7 MC<br>Note B | 6BA6 2nd I-F Pin 1 and Chassis | .01 mf | FM | Rotor to Full Open | Disc. Pri. ①<br>Note A |
| | 10.7 MC<br>Note B | Same as above | .01 mf | FM | Same as above | Disc Sec. Note C ② |
| | 10.7 MC<br>Note B | Same as above | .01 mf | FM | Same as above | Disc. Pri. ①<br>Note A |
| | 10.7 MC<br>Note B | Same as above | .01 mf | FM | Same as above | Disc. Sec. Note C ② |
| I-F | 10.7 MC | 6BA6 1st I-F, Pin 1 and Chassis | .01 mf | FM | Same as above | 2nd I-F Pri. Note A and D ③<br>2nd I-F Sec. Note A and E ④ |
| | 10.7 MC | Connect to the FM-RF Gang Condenser terminal on underside of chassis | .01 mf | FM | Same as above | 1st I-F Pri. ⑤<br>1st I-F Sec. ⑥<br>Note A |
| Recheck I-F Adjustments in order given | | | | | | |
| R-F & Osc. | 108.4 | Disconnect dipole and connect generator to dipole terminals with resistor in series | 300 ohms | FM | Rotor to full open | Oscillator C-14 |
| | 104.5 | Same as above | 300 ohms | FM | Tune Rotor for Max. AVC voltage | R.F. C-11 |
| | 104.5 | Same as above | 300 ohms | FM | Same as above | Ant. C-3 |
| Recheck R-F and Osc. Adjustments in order given | | | | | | |

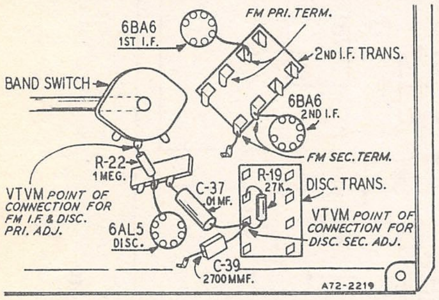
Note A—Test Equipment connections are as given in the table. The zero center scale DC vacuum tube voltmeter is to be connected between chassis ground and the AVC line at the 1 megohm resistor R-22 and the band switch terminal (as shown in the illustration) for all adjustments except the discriminator secondary adjustment, for which see Note C.

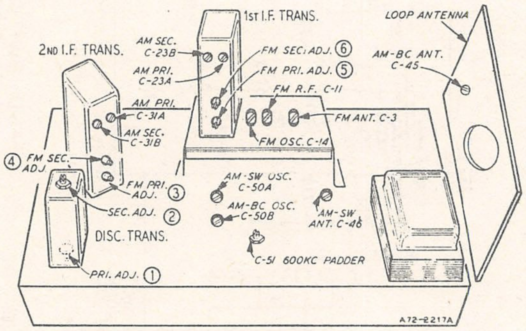
Note B—A signal of .1 volt must be fed into the receiver for this adjustment.

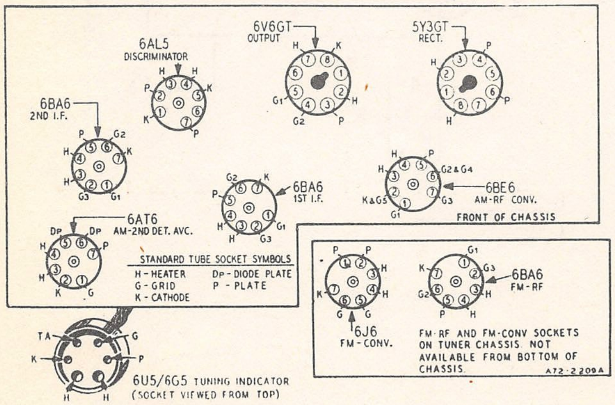
Note C—Disconnect zero center DC vacuum tube voltmeter from AVC and reconnect to junction of R-19, C-37 and C-39 (See illustration). Adjust for zero voltage indication.

Note D—Before adjusting Pri. core connect 5000 ohm load resistor across the 2nd I.F. secondary terminals, (See illustration).

Note E—Disconnect 5000 ohm load resistor from secondary terminals and reconnect across the 2nd I.F. primary terminals, (See illustration).


6BA6
1ST I.F.
FM PRI. TERM.
2ND I.F. TRANS.
BAND SWITCH
6BA6
2ND I.F.
FM SEC. TERM.
R-22
1 MEG.
R-19
27K
DISC. TRANS.
C-37
.01 MF.
VTVM POINT OF CONNECTION FOR FM I.F. & DISC. PRI. ADJ.
VTVM POINT OF CONNECTION FOR DISC. SEC. ADJ.
6AL5
DISC.
C-39
2700 MMF.
A72-2219


1st I.F. TRANS.
LOOP ANTENNA
2ND I.F. TRANS.
AM SEC. C-23B
AM PRI. C-23A
FM SEC. ADJ. ⑥
FM PRI. ADJ. ⑤
AM-BC ANT. C-45
FM R.F. C-11
AM PRI. C-31A
AM SEC. C-31B
FM ANT. C-3
FM OSC. C-14
④ FM SEC. ADJ.
FM PRI. ADJ. ③
SEC. ADJ. ②
AM-SW OSC. C-50A
AM-BC OSC. C-50B
AM-SW ANT. C-46
DISC. TRANS.
C-51 600KC PADDER
PRI. ADJ. ①
A72-2217A


6AL5
DISCRIMINATOR
6V6GT
OUTPUT
5Y3GT
RECT.
6BA6
2ND I.F.
6BA6
1ST I.F.
6BE6
AM-RF CONV.
FRONT OF CHASSIS
6AT6
AM-2ND DET. AVC.
STANDARD TUBE SOCKET SYMBOLS
H - HEATER
G - GRID
K - CATHODE
DP - DIODE PLATE
P - PLATE
6J6
FM-CONV.
6BA6
FM-RF
FM-RF AND FM-CONV SOCKETS ON TUNER CHASSIS NOT AVAILABLE FROM BOTTOM OF CHASSIS
A72-2209A
6U5/6G5 TUNING INDICATOR
(SOCKET VIEWED FROM TOP)
TA
G
K
P
H

## TUBE SOCKET VOLTAGES

Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground. Plate, screen and cathode voltages were taken with a 1000 ohm-per-volt meter with a 300 volt scale used for plate and screen voltages. Audio grid voltages were read with a vacuum tube volt-meter. Conditions of measurement are:

Line voltage..............................117 Volts AC
Signal Input......................................None

A variation of ±10% is usually permissible.

# RECEIVER STAGE SENSITIVITIES
## AM AND AUDIO STAGES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output.

The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations in sensitivity of Plus or Minus 25% are usually permissible.

| SIGNAL GENERATOR | | | | |
|---|---|---|---|---|
| FREQUENCY | COUPLING CAPACITOR | CONNECTION TO RECEIVER | GROUND CONNECTION | INPUT FOR .5 WATT OUTPUT |
| 1000 KC | 200 mmf or RMA Dummy Antenna | External Antenna Lead | Chassis | 25 Microvolts |
| 1000 KC | .05 mf | 6BE6 Converter Pin 7 | Chassis | 60 Microvolts |
| 455 KC | .05 mf | 6BE6 Converter Pin 7 | Chassis | 58 Microvolts |
| 455 KC | .05 mf | 6BA6 1st I-F Pin 1 | Chassis | 2400 Microvolts |
| 400 cycles | .05 mf | 6AT6 1st A-F Pin 1 | Chassis | .05 Volt |
| 400 cycles | .05 mf | 6V6GT Output Pin 5 | Chassis | 2.8 Volts |

## FM STAGES

The table below lists the sensitivity for the FM stages of the receiver. The receiver must be tuned to 98 MC for all readings. Measurements are based on a .5 watt output the same as for the AM and Audio stage measurements.

The signal source must be an accurately calibrated signal generator capable of supplying a 98 MC signal modulated by a 400 cycle audio signal. For these measurements the generator must be adjusted for a 22.5 KC deviation. This will correspond to 30% AM modulation.

| SIGNAL GENERATOR | | | | |
|---|---|---|---|---|
| FREQUENCY | COUPLING TO RECEIVER | CONNECTION TO RECEIVER | GROUND CONNECTION | INPUT FOR .5 WATT OUTPUT |
| 98 MC | 300 ohms | External Antenna Terminal | External Ant. Terminal | 30 microvolts |
| 10.7 MC | .01 mf | 6BA6 1st I-F Pin 1 | Chassis | 1200 microvolts |
| 10.7 MC | .01 mf | 6BA6 2nd I-F Pin 1 | Chassis | 37,000 microvolts |

# ALIGNMENT PROCEDURE
## AM BROADCAST AND SHORT WAVE BAND

*Volume Control*—Maximum all Adjustments. Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead. Allow Chassis and Signal Generator to "Heat Up" for several minutes.
The following equipment is required for aligning: An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf, 200 mmf, and 400 ohms.

| | SIGNAL GENERATOR | | | | | |
|---|---|---|---|---|---|---|
| | FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM |
| I-F | 455 kc | 6BE6 Pin 7 | .1 mf | Broadcast | Rotor Fully Open | 2nd I-F C-31B & C-31A<br>1st I-F C-23B & C-23A |
| Broadcast | 1620 kc | External ant. lead | 200 mmf | Broadcast | Rotor Fully Open | Oscillator C-50B |
| | 1400 kc | External antenna lead | 200 mmf | Broadcast | Turn Rotor to Max. Output Set pointer to 1400 kc See Note A | Antenna C-45 |
| | 600 kc | External antenna lead | 200 mmf | Broadcast | Turn Rotor to Max. Output and Rock See Note B | 600 Kc padder C-51 |
| Repeat above oscillator adjustments at 1620 and 600 KC until readjusting the oscillator Range B Trimmer C-50B causes no further improvement in output. | | | | | | |
| Short Wave | 15.5 MC | External antenna lead | 400 ohm | Short Wave | Rotor Fully Open | Oscillator C-50A |
| | 15 MC | External antenna lead | 400 ohm | Short Wave | Turn Rotor to Max. Output | Antenna C-46 |
| Reassemble chassis in cabinet | | | | | | |
| Broadcast | 1400 kc | External antenna lead | 200 mmf | Broadcast | Turn Rotor to Max. Output | Antenna C-45 |

After each range is completed, repeat the procedure as a final check.
Note A—If the pointer is not at 1400 KC on the dial, reset pointer at the 1400 KC mark on the dial scale.

Note B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

# MONTGOMERY WARD

**OPERATING VOLTAGES**— Chassis for Models 74WG-2505A are available for operation on the following power supply:

105-125 volts AC, 50-60 cycles

**HOW TO ORDER PARTS**— Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Repair parts should be ordered from your nearest Wards Retail Store, Catalog Order office or Mail Order House.

## REPLACEMENT PARTS LIST

**Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance**

### CAPACITORS

| Ref. No. | Part No. | Description | | | Qty. Used in Set |
|---|---|---|---|---|---|
| C-1<br>C-5<br>C-6<br>C-7<br>C-8<br>C-17<br>C-19<br>C-20 | 47X496 | 500 mmf | | Ceramic | 8 |
| C-2 | 26A433 | Tuner & Gang Condenser Assembly | | | 1 |
| C-3 | 17A249 | 5-25 mmf | | Trimmer | 1 |
| C-4<br>C-16<br>C-26 | 47X495 | 47 mmf | | Ceramic | 3 |
| C-9<br>C-10 | 47X497 | 100 mmf | | Ceramic | 2 |
| C-11<br>C-14 | 17A247 | 3-12 mmf | | Trimmer | 2 |
| C-12 | 47X500 | 5 mmf | | Ceramic | 1 |
| C-15<br>C-38 | 47X499 | 47 mmf | | Ceramic | 2 |
| C-18 | 47X498 | 47 mmf | | Ceramic | 1 |
| C-21 | 47X488 | 51 mmf | | Ceramic | 1 |
| C-22<br>C-29<br>C-30 | 47X487 | 22 mmf | | Ceramic | 3 |
| C-23A<br>C-23B<br>C-31A<br>C-31B | 17A248 | 70-150 mmf | | Dual Trimmer | 2 |
| C-24<br>C-55 | D66403 | .04 mf | 400 V | Tubular | 2 |
| C-25 | B66503 | .05 mf | 200 V | Tubular | 1 |
| C-27<br>C-28<br>C-61 | D66203 | .02 mf | 400 V | Tubular | 3 |
| C-32<br>C-33<br>C-34<br>C-36 | 47X491 | 4700 mmf | | Molded | 4 |
| C-35 | 47X489 | 10 mmf | | Ceramic | 1 |
| C-37<br>C-58 | B66103 | .01 mf | 200 V | Tubular | 2 |
| C-39 | 47X492 | 2700 mmf | | Molded | 1 |
| C-41<br>C-42<br>C-54<br>C-59 | 47X501 | 68 mmf | | Ceramic | 4 |
| C-43 | 45X352 | 5 mf | 250 V | Dry Electrolytic | 1 |
| C-44 | 47X445 | 270 mmf | | Molded | 1 |
| C-45 | 17A123 | 1.5-12 mmf | | Trimmer | 1 |
| C-46 | 17A244 | 5-50 mmf | | Trimmer | 1 |
| C-47 | 47X503 | 47 mmf | | Ceramic | 1 |
| C-48 | 47X474 | 360 mmf | | Silvered Mica | 1 |
| C-49 | 47X467 | 470 mmf | | Molded | 1 |
| C-50A<br>C-50B | 17A246 | 3.2-35 mmf | | Dual Trimmer | 1 |
| C-51 | 17A241 | 300-475 mmf | | Trimmer | 1 |
| C-52 | 47X481 | 286 mmf | | Silvered Mica | 1 |
| C-53 | 47X504 | 40 mmf | | Ceramic | 1 |
| C-56A<br>C-56B | 47X112 | 50 mmf | | Dual Mica | 1 |
| C-57 | B66403 | .04 mf | 200 V | Tubular | 1 |
| C-60 | 47X470 | 330 mmf | | Molded | 1 |
| C-62 | B66402 | .004 mf | 200 V | Tubular | 1 |
| C-63 | B66254 | .25 mf | 200 V | Tubular | 1 |
| C-64 | 45X351 | 20 mf | 450 V | Dry Electrolytic | 1 |
| C-65 | 45X302 | 40 mf | 450 V | Dry Electrolytic | 1 |
| C-66 | D66302 | .003 mf | 400 V | Tubular | 1 |

### RESISTORS

| Ref. No. | Part No. | Ohms | Watts | Description | Qty. Used in Set |
|---|---|---|---|---|---|
| R-1<br>R-11<br>R-22 | B85105 | 1 meg | 0.5 | Carbon | 3 |
| R-2<br>R-12<br>R-16 | B83680 | 68 | 0.5 | Carbon | 3 |
| R-3<br>R-28 | B85153 | 15K | 0.5 | Carbon | 2 |
| R-4<br>R-8 | B85102 | 1K | 0.5 | Carbon | 2 |
| R-5 | B85104 | 100K | 0.5 | Carbon | 1 |
| R-6 | B84103 | 10K | 0.5 | Carbon | 1 |
| R-7 | D85153 | 15K | 2.0 | Carbon | 1 |

### RESISTORS (Cont.)

| Ref. No. | Part No. | Ohms | Watts | Description | Qty. Used in Set |
|---|---|---|---|---|---|
| R-9 | C85183 | 18K | 1.0 | Carbon | 1 |
| R-10<br>R-24<br>R-26 | B85225 | 2.2 meg | 0.5 | Carbon | 3 |
| R-13 | C84683 | 68K | 1.0 | Carbon | 1 |
| R-14<br>R-18 | B85222 | 2200 | 0.5 | Carbon | 2 |
| R-15 | B85473 | 47K | 0.5 | Carbon | 1 |
| R-17 | C84393 | 39K | 1.0 | Carbon | 1 |
| R-19 | B84273 | 27K | 0.5 | Carbon | 1 |
| R-20<br>R-21 | B83153 | 15K | 0.5 | Carbon | 2 |
| R-23 | B84393 | 39K | 0.5 | Carbon | 1 |
| R-25 | C84273 | 27K | 1.0 | Carbon | 1 |
| R-27 | Part of 13X549 Cable and Socket assembly | | | | 1 |
| R-29 | 36X363 | 500K | Volume Control | | 1 |
| R-30 | 43X217 | 6.2 | 0.5 | W.W. | 1 |
| R-31 | B85475 | 4.7 meg | 0.5 | Carbon | 1 |
| R-32<br>R-34 | B85224 | 220K | 0.5 | Carbon | 2 |
| R-33 | 40X259 | 3.0 meg | Tone Control | | 1 |
| R-35 | B83514 | 510K | 0.5 | Carbon | 1 |
| R-36 | B83104 | 100K | 0.5 | Carbon | 1 |
| R-37 | B84820 | 82 | 0.5 | Carbon | 1 |
| R-38 | B85474 | 470K | 0.5 | Carbon | 1 |
| R-39<br>R-40 | B84104 | 100K | 0.5 | Carbon | 2 |

### TRANSFORMERS AND COILS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| L-1 | 9A1881 | Filament Choke Assembly | 1 |
| L-2<br>L-5 | 9A1880 | FM Mixer Plate Choke | 2 |
| L-3 | 9A1874 | R-F Coil | 1 |
| L-4 | 9A1882 | FM Oscillator Plate Choke | 1 |
| T-1 | 9A1900 | Di-Pole Antenna | 1 |
| T-2 | 9A1875 | Antenna Coil Assembly | 1 |
| T-3 | 9A1812 | "D" Antenna Coil Assembly | 1 |
| T-4 | 26A436 | "B" Range Loop Antenna Assembly | 1 |
| T-5 | 9A1873 | Oscillator Coil Assembly | 1 |
| T-6 | 9A1813 | "B" and "D" Oscillator Coil Assembly | 1 |
| T-7 | 9A1876 | 1st I-F Coil Assembly | 1 |
| T-8 | 9A1877 | 2nd I-F Coil Assembly | 1 |
| T-9 | 9A1895 | Discriminator Coil Assembly | 1 |
| T-10 | 53X286 | Power Transformer (60 cycle) | 1 |
| T-10 | 53X287 | Power Transformer (25 cycle | 1 |
| T-10 | 53X288 | Power Transformer (40 cycle) | 1 |
| T-11 | | Output Transformer (see miscellaneous) | 1 |

### MISCELLANEOUS

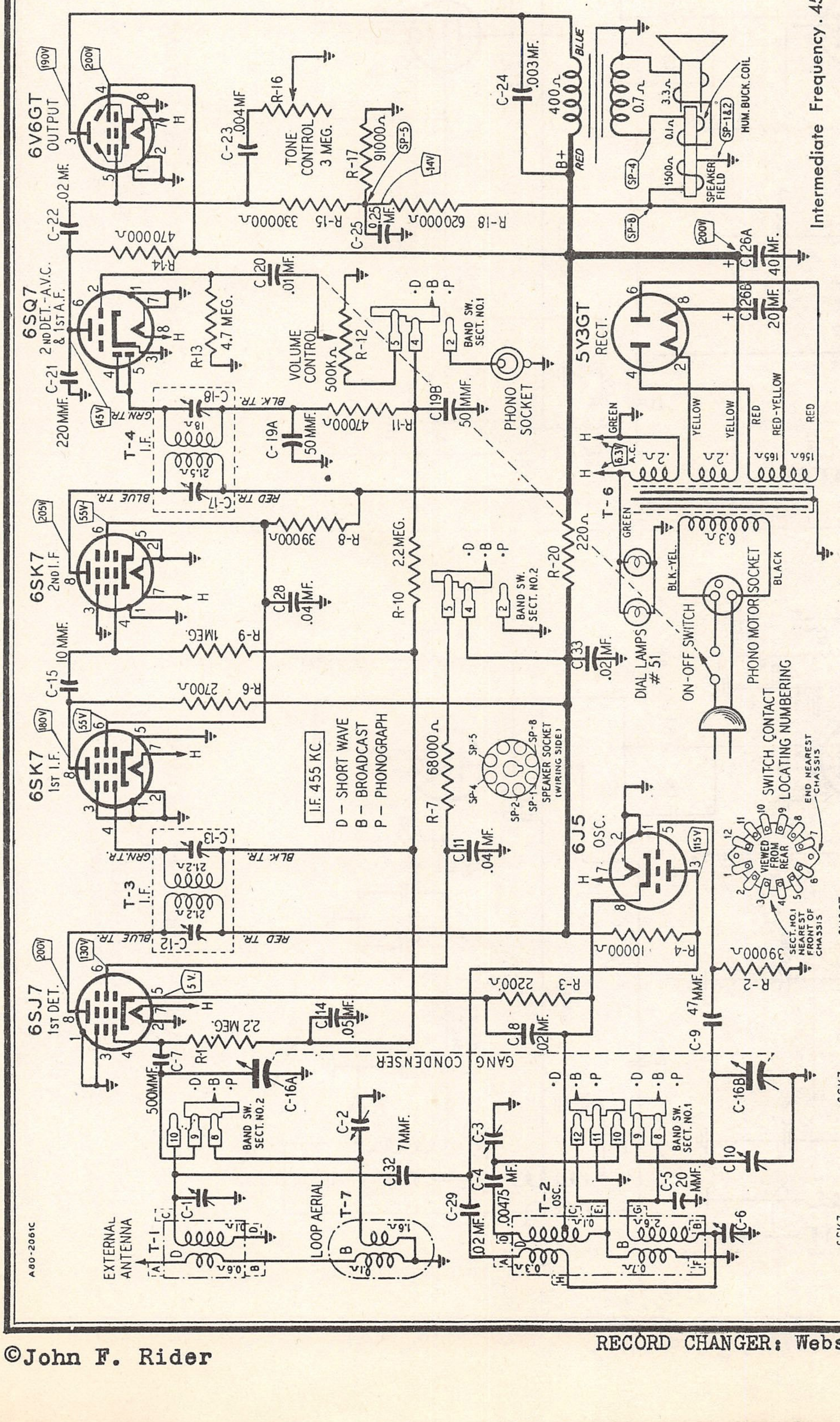
| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | 12A470 | 10" E.D. Speaker complete with output transformer | 1 |
| | | Cone and voice coil assembly (specify part number and letters stamped on speaker) | |
| | | Output transformer (specify part number and letters stamped on speaker) | |
| | 3A303 | Tube socket—octal (8 prong) molded | 3 |
| | 3A425 | Tube socket—miniature | 5 |
| | 32X386 | Tube shield—miniature | 7 |
| | 3A427 | Tube socket—Miniature (for FM R-F and Converter Tubes) | 2 |
| | 13X549 | Cable and socket assembly—tuning indicator | 1 |
| | 3A305 | Phono Socket—single pin | 1 |
| | 3A304 | Phono motor socket | 1 |
| | 2A367 | Band switch | 1 |
| | 13X328 | Line cord and plug assembly | 1 |
| | 10A510 | Knob—tuning-band-tone | 3 |
| | 10A513 | Knob—volume control and switch | 1 |
| | 10A509 | Push Button | 6 |
| | 28X320 | Push Button Spring | 6 |
| | 26A439 | Escutcheon Assembly | 1 |
| | 4X870 | Escutcheon Eye | 1 |

### DIAL AND DRIVE ASSEMBLY

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | 26A435 | Dial Bracket Assembly | 1 |
| | 58X590 | Dial | 1 |
| | 58X591 | Dial Background | 1 |
| | 15X221 | Pointer | 1 |
| | 26A438 | Dial Drum Assembly | 2 |
| | 26X500 | Dial Drum Shaft | 1 |
| | 26A440 | Pulley and Collar Assembly (For Dial Drum Shaft) | 1 |
| | 26A437 | Pulley Assembly (For Band Switch) | 1 |
| | 26X469 | Band Switch Shaft | 1 |
| | 24X553 | Pinion Gear (For Band Switch Shaft) | 1 |
| | 26A441 | Crown Gear Assembly (For Mtg. to Band Switch) | 1 |
| | 26A434 | Idler Bracket Assembly | 1 |
| | 25X1389 | Drive Shaft Bracket | 1 |
| | 26X467 | Drive Shaft | 1 |
| | 24X551 | Drive Shaft Spool | 1 |
| | 10X60 | Drive Cord and Clip Assembly (Band Change) | 1 |
| | 28X524 | Tension Spring (Band Change) | 1 |
| | 10X61 | Drive Cord and Clip Assembly (Dial Drive) | 1 |
| | 28X530 | Tension Spring (Dial Drive) | 1 |
| | 7A209 | Indicator Light Socket Assembly | 4 |
| | 41X72 | Light Shield | 4 |
| | 7A187 | Pilot Light Socket Assembly (Dual) | 1 |
| | 41X35 | Light Shield | 2 |
| | | No. 47 Pilot Light | 6 |
| | 25X498 | Tuning Eye Clamp | 1 |
| | 25X1396 | Tuning Eye Bracket | 1 |

MONTGOMERY WARD

MODEL 74WG-2703A


6SJ7 1ST DET.
6SK7 1ST I.F.
6SK7 2ND I.F.
6SQ7 2ND DET.-A.V.C. & 1ST A.F.
6V6GT OUTPUT
6J5 OSC.
5Y3GT RECT.
T-1
T-2 OSC.
T-3 I.F.
T-4 I.F.
T-6
T-7
EXTERNAL ANTENNA
LOOP AERIAL
GANG CONDENSER
BAND SW. SECT. NO.1
BAND SW. SECT. NO.2
VOLUME CONTROL 500K
TONE CONTROL 3 MEG.
PHONO SOCKET
PHONO MOTOR SOCKET
DIAL LAMPS #51
ON-OFF SWITCH
SPEAKER SOCKET (WIRING SIDE)
SPEAKER FIELD
HUM. BUCK. COIL
I.F. 455 KC
D - SHORT WAVE
B - BROADCAST
P - PHONOGRAPH
SWITCH CONTACT LOCATING NUMBERING
VIEWED FROM REAR
SECT. NO.1 NEAREST FRONT OF CHASSIS
END NEAREST CHASSIS
200V
130V
5 V.
180V
55V
205V
55V
45V
190V
200V
115V
200V
6.3V
14V
A80-2061C

Intermediate Frequency. 455 KC

## TUBE SOCKET VOLTAGES

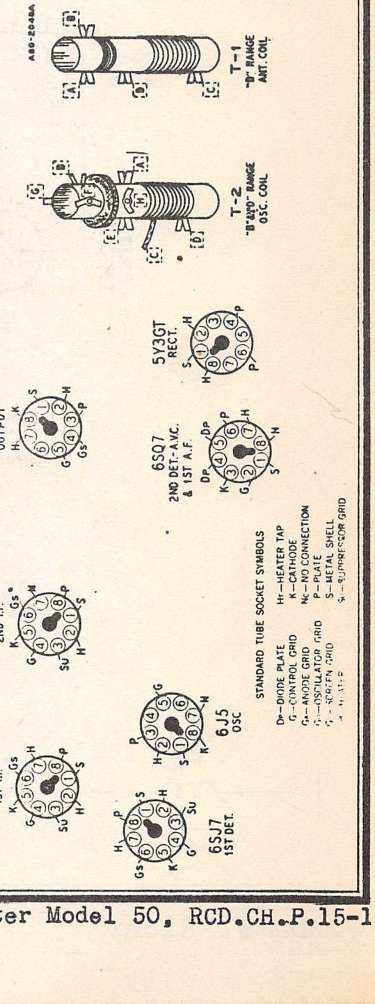
Socket voltages are shown on the schematic diagram at the tube socket terminals. All voltages are between the socket terminal and chassis ground.

The readings were taken with a 1000 ohm per volt meter and all plate and screen voltages read on a 500 volt scale.

Conditions of measurement are:

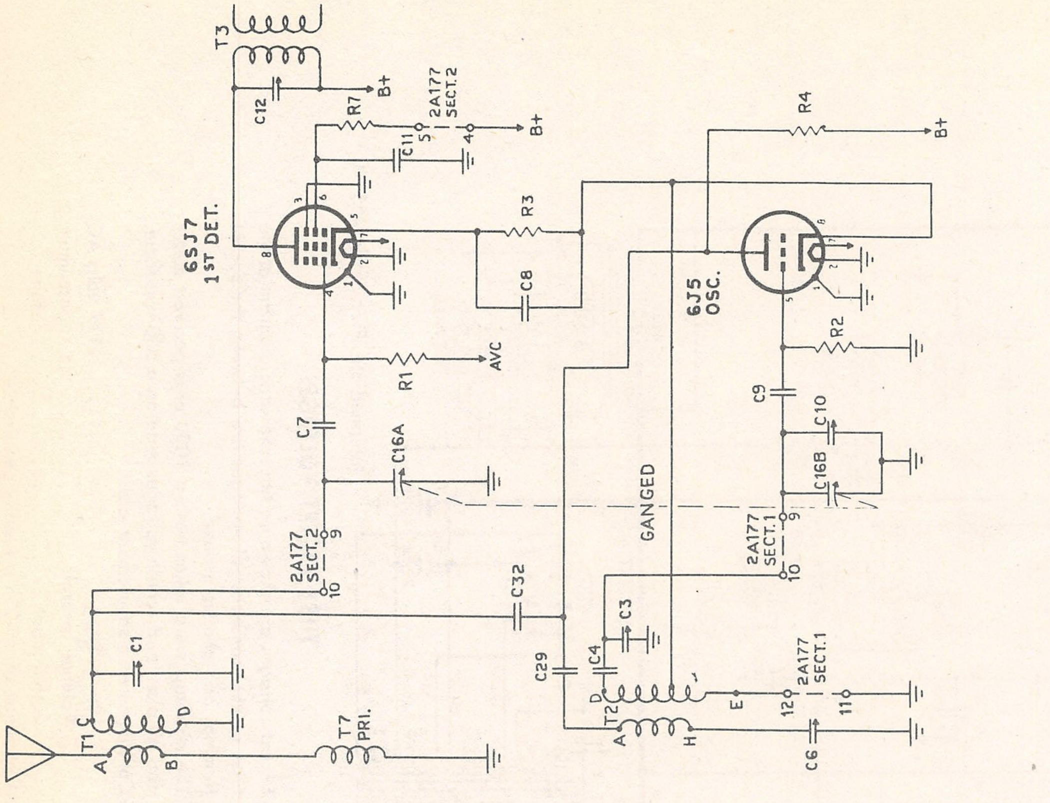
Line voltage..........117 volts AC
Volume control..........maximum
Signal input..........none

A variation of ±10% is usually permissible.

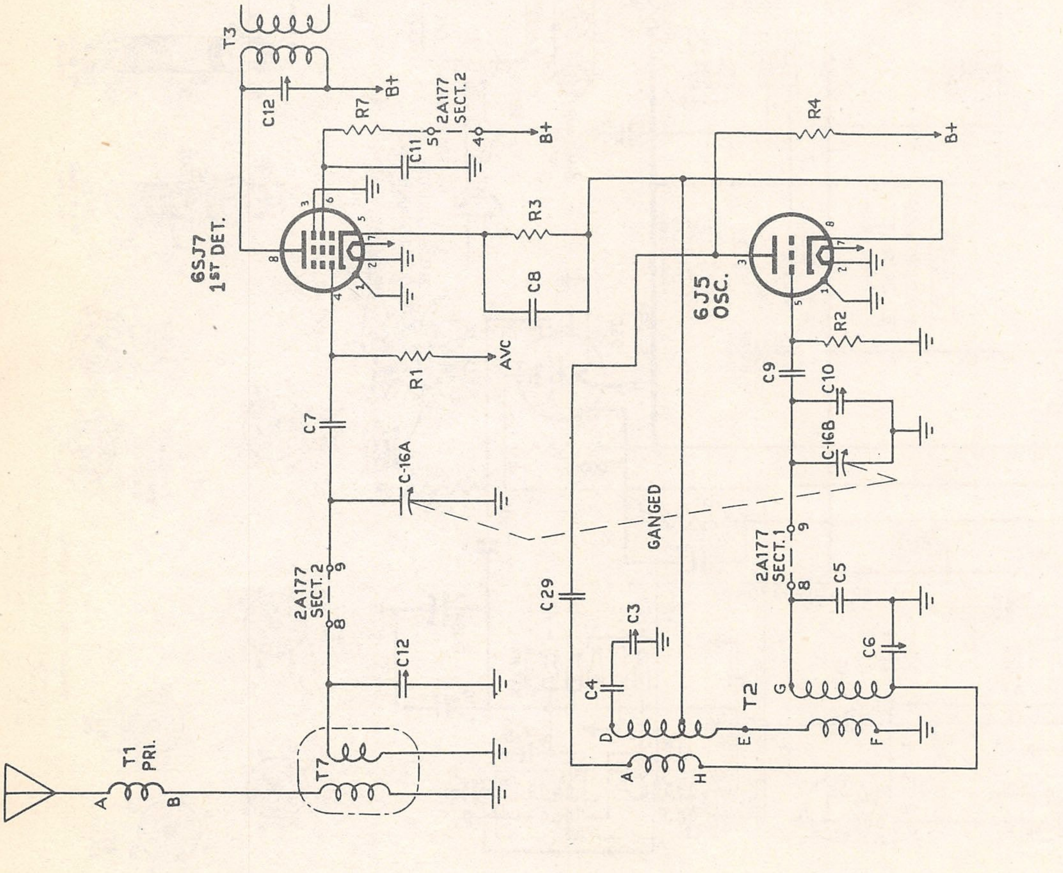

T-1 "B" RANGE ANT. COIL
T-2 "B"AND"D" RANGE OSC. COIL
A80-2046A
6SJ7 1ST DET.
6SK7 1ST I.F.
6J5 OSC
6SK7 2ND I.F.
6SQ7 2ND DET.-A.V.C. & 1ST A.F.
6V6GT OUTPUT
5Y3GT RECT.
STANDARD TUBE SOCKET SYMBOLS
D—DIODE PLATE
G—CONTROL GRID
Ga—ANODE GRID
Go—OSCILLATOR GRID
Gs—SCREEN GRID
H—HEATER TAP
K—CATHODE
Nc—NO CONNECTION
P—PLATE
S—METAL SHELL
Su—SUPPRESSOR GRID

RECORD CHANGER: Webster Model 50, RCD.CH.P.15-1

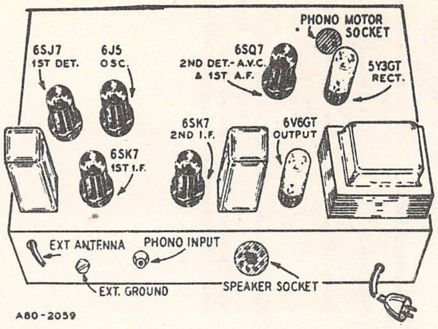
## MONTGOMERY WARD


T3
C12
R7
B+
2A177 SECT.2
C11
5
4
B+
6SJ7 1ST DET.
R3
C8
R4
B+
6J5 OSC.
R2
AVC
R1
C7
C16A
C9
C10
C16B
GANGED
2A177 SECT.2
10
9
2A177 SECT.1
10
9
C32
C1
C29
C4
C3
2A177 SECT.1
12
11
T1
A
B
C
D
T7 PRI.
T2
A
H
D
E
C6

BAND-SWITCH SHOWN
AT 2ND POSITION.
D RANGE
5.71 - 18.3 MC


T3
C12
R7
B+
2A177 SECT.2
C11
5
4
B+
6SJ7 1ST DET.
R3
C8
R4
B+
6J5 OSC.
R2
AVC
R1
C7
C9
C10
C-16A
C-16B
GANGED
2A177 SECT.2
8
9
2A177 SECT.1
8
9
C5
C29
C3
C12
C6
C4
T2
G
D
E
F
A
H
T1 PRI.
A
B
T7

BAND-SWITCH SHOWN
AT 1ST POSITION.
B RANGE
540 - 1600 KC


PHONO MOTOR SOCKET
6SJ7 1ST DET.
6J5 OSC.
6SQ7 2ND DET.-A.V.C. & 1ST A.F.
5Y3GT RECT.
6SK7 2ND I.F.
6V6GT OUTPUT
6SK7 1ST I.F.
EXT ANTENNA
PHONO INPUT
EXT. GROUND
SPEAKER SOCKET
A80-2059

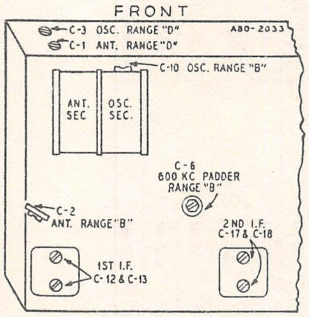
## DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new 10X59 drive cord or a piece of cord 46" long and tie one end to the tension spring. Hook the other end of the tension spring to the tab on the drive pulley. Pass the cord through the slot in the drive pulley rim and continue one half turn counterclockwise around the drive pulley. Then pass the cord around idler stud A and wind three turns clockwise around the tuning shaft (turns must progress away from chassis). Pass cord through string guide B, over pulleys C and D and around idler stud E. Wrap ¾ turn counterclockwise around drive pulley, stretch the tension spring and tie free end of the cord to spring. Cut off any excess cord.

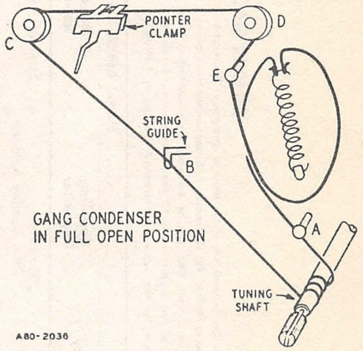
## 50 CYCLE OPERATION

If it is desired to use the radio and record player on a 50 cycle power supply, it will be necessary to replace the metal drive pulley on the record player motor shaft with a 50 cycle pulley. This pulley is listed in the parts list.

To change the pulley, turn the record selector post to the 12" position and lift the turntable off the record changer. Loosen the set screw holding the drive pulley on the motor shaft and remove the old pulley. Install the new 50 cycle pulley and replace the turntable.


FRONT
C-3 OSC. RANGE "D"
C-1 ANT. RANGE "D"
A80-2033
C-10 OSC. RANGE "B"
ANT. SEC
OSC. SEC.
C-6 600 KC PADDER RANGE "B"
C-2 ANT. RANGE "B"
2ND I.F. C-17 & C-18
1ST I.F. C-12 & C-13

TRIMMER POSITIONS


C
POINTER CLAMP
D
E
STRING GUIDE
B
GANG CONDENSER IN FULL OPEN POSITION
A
TUNING SHAFT
A80-2036

DRIVE DIAGRAM

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

| | SIGNAL GENERATOR | | Dummy Antenna | Band Switch Setting | Condenser Setting | ADJUST TRIMMERS TO MAXIMUM |
|---|---|---|---|---|---|---|
| | Frequency Setting | Connection at Radio | | | | |
| I-F | 455 kc | 6SJ7, Pin 4 | .1 mf | B Range | Turn Rotor to Full Open | 2nd I-F (C17) & (C18)<br>1st I-F (C12) & (C13) |
| RANGE B | 1600 kc | Antenna Lead | 100 mmf | B Range | Turn Rotor to Full Open | Oscillator Range B (C10) |
| | 1400 kc | Antenna Lead | 100 mmf | B Range | Turn Rotor to Max. Output Set Indicator to 1400 KC See Note A | Antenna Range B (C2) |
| | 600 kc | Antenna Lead | 100 mmf | B Range | Turn Rotor to Max. Output | 600 kc (C6)<br>Rock Rotor—See Note B |
| Repeat above oscillator adjustments at 1600 and 600 kc until readjusting the oscillator Range B Trimmer (C10) causes no further improvement in output. | | | | | | |
| RANGE D | 18,300 kc | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C3) |
| | 17,000 kc | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Antenna Range D (C1)<br>Rock Rotor—See Note B |
| LOOP RANGE B | Reassemble chassis in cabinet.<br>1400 kc | Antenna Lead | 100 mmf | B Range | Turn Rotor to Max. Output | Antenna Range B (C2) |

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, re-set pointer at the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

# REPLACEMENT PARTS INFORMATION

**OPERATING VOLTAGES** Chassis for Model 74WG-2703A, are available for operation on the following power supply:

105-125 volts AC, 60 cycles

**HOW TO ORDER PARTS** Should it be necessary to write us or to order any repair parts, it is important that the complete model number which appears on the label attached to the rear of the chassis be specified. Repair parts should be ordered from your nearest Wards Retail Store, Catalog Order office or mail Order House.

## REPLACEMENT PARTS LIST

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance

### CAPACITORS

| Ref. No. | Part No. | Description | | | Qty. Used in Set |
|---|---|---|---|---|---|
| C-1<br>C-3 | 17A163 | 2-25 mmf<br>2-25 mmf | | Ant. "D" Range Trimmer<br>Osc. "D" Range Trimmer | 1 |
| C-2 | 17A149 | 1.8-12 mmf | | Loop aerial trimmer | 1 |
| C-4 | 46X289 | .00475 | 180 V | Tubular | 1 |
| C-5 | 47X482 | 20 mmf | | Molded | 1 |
| C-6 | 17A234 | 300-450 mmf | | 600 kc Padder | 1 |
| C-7 | D67501 | .0005 mf | 400 V | Tubular | 1 |
| C-8<br>C-29 | B66203 | .02 | 200 V | Tubular | 2 |
| C-9 | 47X463 | 47 mmf | | Molded | 1 |
| C-10 | | Part of gang condenser C-16 | | | |
| C-11<br>C-28 | D66403 | .04 mf | 400 V | Tubular | 2 |
| C-12<br>C-13 | | Part of 1st I-F Assembly | | | |
| C-14 | B66503 | .05 mf | 200 V | Tubular | 1 |
| C-15 | 47X477 | 10 mmf | | Molded | 1 |
| C-16 | 14A150 | Gang condenser assembly | | | 1 |
| C-17<br>C-18 | | Part of 2nd I-F Assembly | | | |
| C-19A<br>C-19B | 47X112 | 50 mmf | | Dual Mica | 1 |
| C-20 | B66103 | .01 mf | 200 V | Tubular | 1 |
| C-21 | 47X468 | 220 mmf | | Molded | 1 |
| C-22<br>C-33 | D66203 | .02 mf | 400 V | Tubular | 2 |
| C-23 | B66402 | .004 mf | 200 V | Tubular | 1 |
| C-24 | D66302 | .003mf | 400 V | Tubular | 1 |
| C-25 | B66254 | .25 mf | 200 V | Tubular | 1 |
| C-26A<br>C-26B | 45X277 | 40 mf<br>20 mmf | 400 V<br>450 V | Dry electrolytic | 1 |
| C-32 | 47X182 | 7 mmf | | Ceramic | 1 |

### RESISTORS

| Ref. No. | Part No. | Ohms | Watts | | Qty. Used in Set |
|---|---|---|---|---|---|
| R-1<br>R-10 | B85225 | 2.2 meg. | 0.5 | Carbon | 2 |
| R-2 | B84393 | 39,000 | 0.5 | Carbon | 1 |
| R-3 | B84222 | 2200 | 0.5 | Carbon | 1 |
| R-4 | C84103 | 10,000 | 1.0 | Carbon | 1 |
| R-6 | B84272 | 2700 | 0.5 | Carbon | 1 |
| R-7 | B84683 | 68,000 | 0.5 | Carbon | 1 |
| R-8 | C84393 | 39,000 | 1.0 | Carbon | 1 |
| R-9 | B85105 | 1.0 meg. | 0.5 | Carbon | 1 |
| R-11 | B85473 | 47,000 | 0.5 | Carbon | 1 |
| R-12 | 36X311 | 500,000 | Volume control, ON-OFF switch | | 1 |
| R-13 | B85475 | 4.7 meg. | 0.5 | Carbon | 1 |
| R-14 | B85474 | 470,000 | 0.5 | Carbon | 1 |
| R-15 | B85334 | 330,000 | 0.5 | Carbon | 1 |
| R-16 | 40X259 | 3 meg. | Tone control | | 1 |
| R-17 | B83913 | 91,000 | 0.5 | Carbon | 1 |
| R-18 | B83624 | 620,000 | 0.5 | Carbon | 1 |
| R-20 | B85221 | 220 | 0.5 | Carbon | 1 |

### TRANSFORMERS AND COILS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| T-1 | 9A1451 | Antenna transformer assembly "D" range | 1 |
| T-2 | 9A1452 | Oscillator coil assembly | 1 |
| T-3 | 9A1810 | 1st I-F Transformer and can assembly | 1 |
| T-4 | 9A1811 | 2nd I-F Transformer and can assembly | 1 |
| T-5 | 51X97 | Output transformer | 1 |
| T-6 | 53X235 | 117 volt, 60 cycle standard power transformer | 1 |
| T-7 | 9A1395 | "B" Band loop antenna | 1 |

### MISCELLANEOUS

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | 12A455 | 10" Electro dynamic speaker | 1 |
| | | Cone and voice coil assembly (specify part number and letter stamped on speaker) | 1 |
| | 3A303 | Tube Socket—octal (8 prong) molded | 7 |
| | 3A293 | Speaker socket—octal (8 prong) molded | 1 |
| | 3A304 | Phono motor socket | 1 |
| | 3A305 | Single pin-tip socket (phono) | 1 |
| | 10A579 | Knob (Volume control) | 1 |
| | 10A578 | Knob (Tuning) | 1 |
| | 10A618 | Knob (Tone control) | 1 |
| | 10A619 | Knob (Band change) | 1 |
| | 13X328 | Line cord and plug assembly | 1 |
| | 2A177 | Band and phono switch | 1 |
| | 8X99 | Rubber chassis cushions (chassis to cabinet) | 4 |

### DIAL AND DRIVE ASSEMBLY

| Ref. No. | Part No. | Description | Qty. Used in Set |
|---|---|---|---|
| | 25X839 | Gang mounting bracket | 1 |
| | 6X26 | Rubber grommets — Mounting gang condenser and bracket to chassis | 4 |
| | 20X347 | Con. cushion studs — Mounting gang condenser and bracket to chassis | 4 |
| | 19X432 | Flat washer — Mounting gang condenser and bracket to chassis | 4 |
| | 26A459 | Pulley Mtg. Plate Assem. Complete with idler pulleys, idler studs, brace bracket, string guide and dial background | 1 |
| | 58X681 | Dial scale glass | 1 |
| | 30X184 | Glass clamp | 2 |
| | 4X962 | Dial escutcheon | 1 |
| | | No. 2 x ⅜ Phillips Fr. oval hd. Stat. bronze (screws for escutcheon mounting) | 5 |
| | 15X190 | Pointer | 1 |
| | 10X59 | Drive cord | 1 |
| | 28X113 | Drive cord tension spring | 1 |
| | 26X336 | Drive shaft | 1 |
| | 25X580 | Drive shaft bracket | 1 |
| | 19X192 | "C" washers for drive shaft | 2 |
| | 7A142 | Pilot light socket assembly | 2 |
| | | Dial lamp (No. 51) | 2 |
| | 41X75 | Light shield | 2 |

### TYPE W-28A111 RECORD CHANGER PARTS

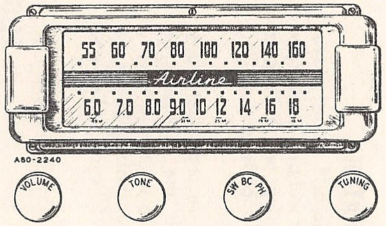
| Part No. | Description | Qty. Used in Set |
|---|---|---|
| W-15X084-6 | Motor assembly, 60 cycle, 115 volt | 1 |
| Astatic L-75 | Crystal cartridge | 1 |
| W41P544-4 | 50 cycle drive pulley | 1 |

## RECEIVER STAGE SENSITIVITIES

The table below lists the sensitivity at the input of each stage. The receiver should be tuned to 1000 KC for all readings. All measurements are based on an output of .5 watt. This may be measured by disconnecting the speaker voice coil and substituting a 3.2 ohm, 5 watt resistor across the secondary winding of the output transformer. A reading of 1.26 volts across this resistor will be equivalent to a .5 watt output. The volume control must be set to maximum.

The signal source must be an accurately calibrated signal generator capable of supplying both 1000 KC and 455 KC signals modulated 30% with a 400 cycle audio signal. Variations of Plus or Minus 25% are usually permissible.

| SIGNAL GENERATOR | | | | INPUT FOR .5 WATT OUTPUT |
|---|---|---|---|---|
| Frequency | Coupling Capacitor | Connection to Receiver | Ground Connection | |
| 1000 kc | 200 mmf or RMA Dummy Antenna | External antenna lead | Chassis | 2.3 microvolts |
| 1000 kc | .05 mf | 6SJ7 1st Detector, Pin 4 | Same as above | 17 microvolts |
| 455 kc | .05 mf | 6SJ7 1st Detector, Pin 4 | Same as above | 13.0 microvolts |
| 455 kc | .05 mf | 6SK7 1st I-F, Pin 4 | Same as above | 1300 microvolts |
| 455 kc | .05 mf | 6SK7 2nd I-F, Pin 4 | Same as above | 3400 microvolts |
| 400 cycles | .05 mf | 6SQ7 1st A-F, Pin 2 | Same as above | .07 volt |
| 400 cycles | .05 mf | 6V6GT Output, Pin 5 | Same as above | 3.8 volts |



## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Power Supply | 105-125 volts AC, 60 cycles, 55 watts normal, 72 watts phono operating |
| Frequency Range | B range—540-1600 KC<br>D range—5.71 to 18.3 MC |
| Selectivity | 43 KC broad at 1000 times signal, 1000 KC |
| Sensitivity | (for .5 watt output) with external antenna<br>B range—2.5 microvolts average<br>D range—12 microvolts average |
| Power Output | 3.5 watts maximum<br>2 watts, 10% distortion |
| Loud Speaker | Electro dynamic |
| Voice Coil Impedance | 3.2 ohms at 400 cycles |

# MOTOROLA, INC.

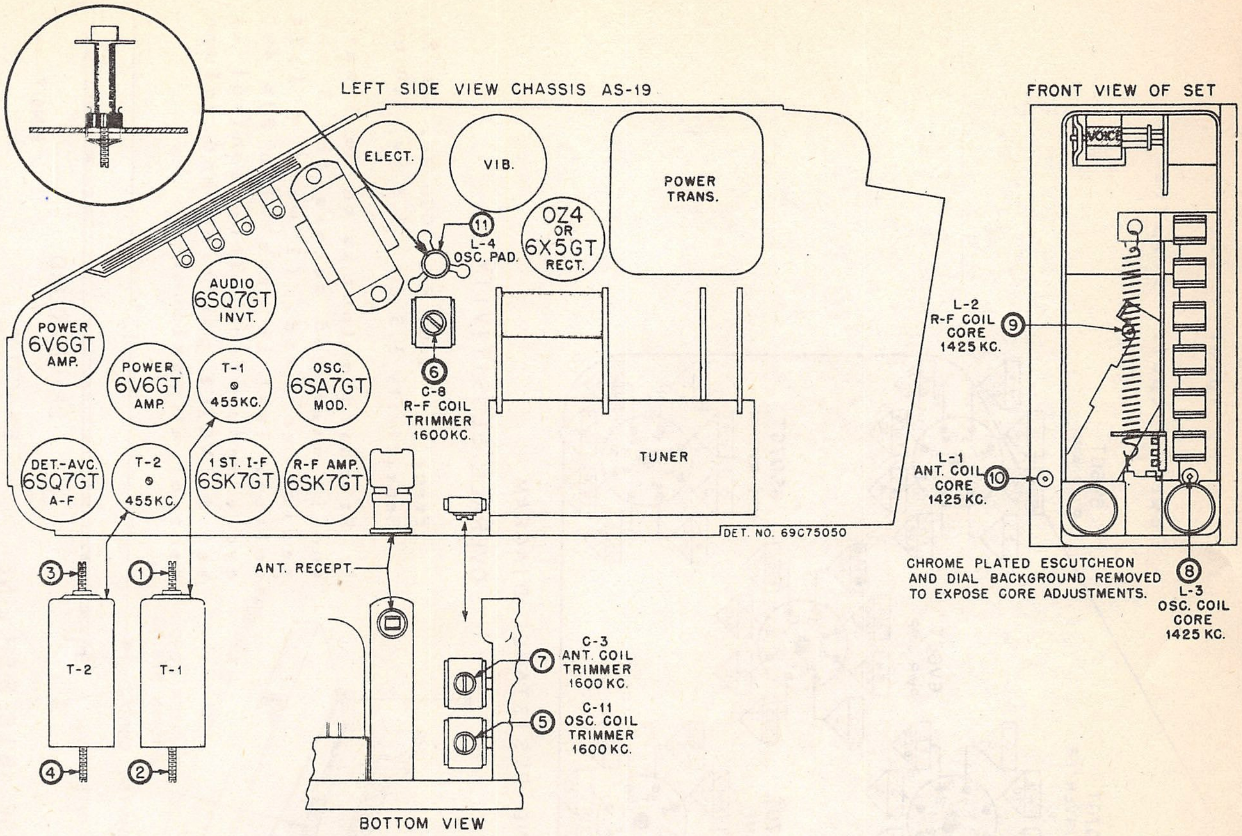

LEFT SIDE VIEW CHASSIS AS-19
ELECT.
VIB.
POWER TRANS.
0Z4 OR 6X5GT RECT.
11 L-4 OSC. PAD.
AUDIO 6SQ7GT INVT.
POWER 6V6GT AMP.
POWER 6V6GT AMP.
T-1 455KC.
OSC. 6SA7GT MOD.
6 C-8 R-F COIL TRIMMER 1600KC.
TUNER
DET-AVC. 6SQ7GT A-F
T-2 455KC.
1 ST. I-F 6SK7GT
R-F AMP. 6SK7GT
DET. NO. 69C75050
ANT. RECEPT
3
1
T-2
T-1
4
2
C-3 ANT. COIL TRIMMER 1600KC.
7
C-11 OSC. COIL TRIMMER 1600KC.
5
BOTTOM VIEW
FRONT VIEW OF SET
VOICE
L-2 R-F COIL CORE 1425KC.
9
L-1 ANT. COIL CORE 1425KC.
10
CHROME PLATED ESCUTCHEON AND DIAL BACKGROUND REMOVED TO EXPOSE CORE ADJUSTMENTS.
8
L-3 OSC. COIL CORE 1425 KC.

FIGURE 5. TUBE AND TRIMMER LOCATION DETAIL.

## ALIGNMENT TABLE

*Refer to Figure 5 for location of trimmers and adjustable iron cores.*

| STEP | TUNER POSITION SET TO | DUMMY ANTENNA | SIGNAL GENERATOR LEAD CONNECTED TO | SIG. GEN. SET AT | ADJUST FOR PEAK ON OUTPUT METER |
|---|---|---|---|---|---|
| 1. | High frequency end (cores out) | .1 mfd. at Sig. Gen. | Osc.-Mod. grid (#5 pin) | 455 Kc | #1 and 2 P & S in T-1<br>#3 and 4 P & S in T-2 |
| 2. | High frequency end, tuning shaft against stop. Cores should be set to project 1-1/8" from cans. | 60 mmf. at Sig. Gen. in series in 21" long coax lead. | Antenna Receptacle | 1600 Kc | #5 Osc. trimmer C-11<br>#6 R.F. trimmer C-8<br>#7 Ant. trimmer C-3 |
| 3. | EXACTLY one full turn in from high frequency end. Use knob set screw as an indicator. Start measuring turn the moment tuner carriage starts moving inward. | " | " | 1425 Kc | #8 Osc. Core of L-3<br>#9 R.F. Core of L-2<br>#10 Ant. Core of L-1 |
| 4. | EXACTLY four more full turns in (as indicated by knob setscrew) | " | " | Power turned OFF | #11 Osc. Pad core of L-4 for maximum noise. |

5. Assemble and install receiver in car and connect car antenna. Turn the dial to approximately 1400 Kc (not to a local station) and adjust antenna trimmer for maximum noise. This adjustment is referred to as Antenna Padder in Figure 7 .

*NOTE:* If oscillator padder core adjustment is too far off, repeat alignment procedure, steps 2, 3, and 4. It may be necessary to repeat alignment more than once if padder adjustment has been indiscriminately tampered with.

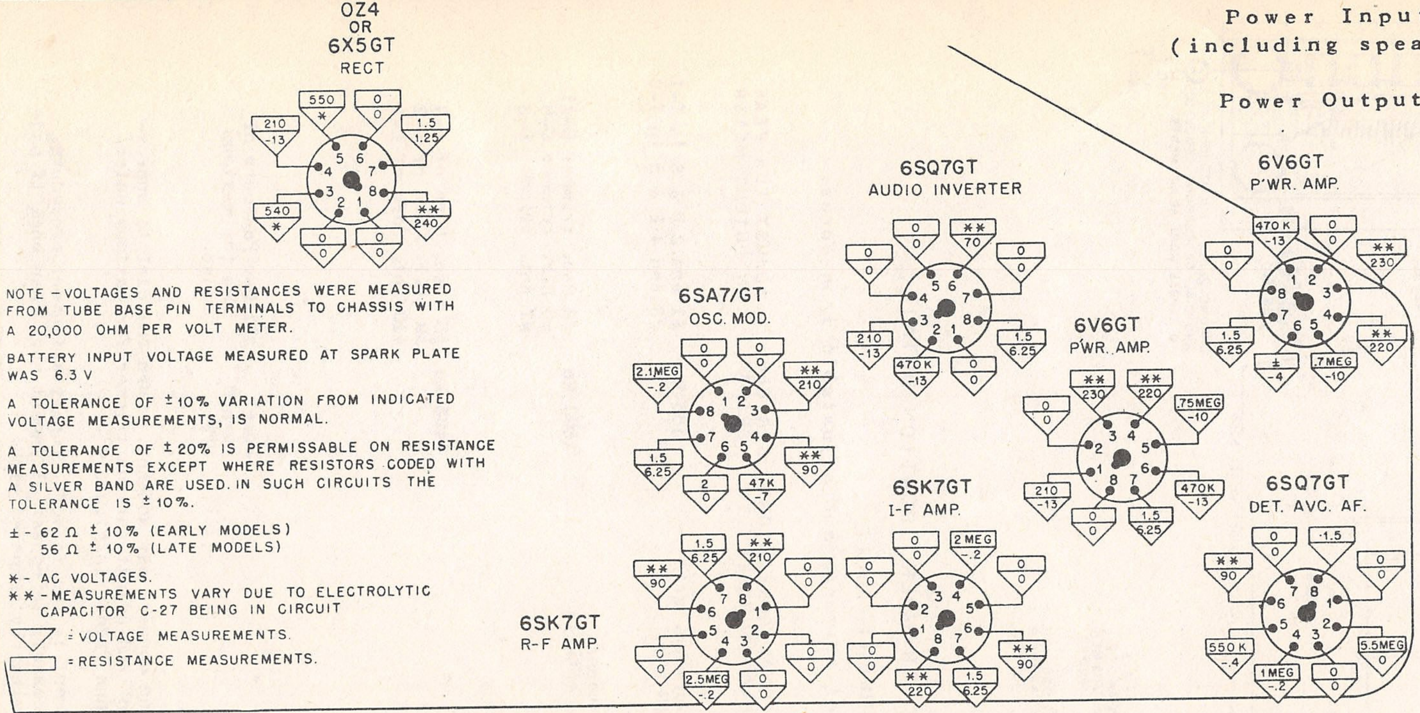
For schematic, see P.15-10

**MODEL CR6**

## MOTOROLA, INC.

Power Input: 10 A. at 6.3V
(including speaker field)

Power Output: 9 watts


0Z4 OR 6X5GT RECT
550 *
0 0
1.5 1.25
210 -13
540 *
0 0
0 0
** 240
6SQ7GT AUDIO INVERTER
0 0
** 70
210 -13
470K -13
1.5 6.25
6V6GT P'WR. AMP.
470K -13
0 0
** 230
1.5 6.25
± -4
.7MEG -10
** 220
6SA7/GT OSC. MOD.
2.1MEG -.2
** 210
1.5 6.25
2 0
47K -7
** 90
6V6GT P'WR. AMP.
** 230
** 220
.75MEG -10
210 -13
470K -13
1.5 6.25
6SK7GT I-F AMP.
2 MEG -.2
** 220
1.5 6.25
** 90
6SQ7GT DET. AVC. AF.
-1.5
** 90
550K -.4
1MEG -.2
5.5MEG 0
6SK7GT R-F AMP.
1.5 6.25
** 210
** 90
2.5MEG -.2

NOTE – VOLTAGES AND RESISTANCES WERE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.

BATTERY INPUT VOLTAGE MEASURED AT SPARK PLATE WAS 6.3 V

A TOLERANCE OF ± 10% VARIATION FROM INDICATED VOLTAGE MEASUREMENTS, IS NORMAL.

A TOLERANCE OF ± 20% IS PERMISSABLE ON RESISTANCE MEASUREMENTS EXCEPT WHERE RESISTORS CODED WITH A SILVER BAND ARE USED. IN SUCH CIRCUITS THE TOLERANCE IS ± 10%.

± - 62 Ω ± 10% (EARLY MODELS)
56 Ω ± 10% (LATE MODELS)

* - AC VOLTAGES.
** - MEASUREMENTS VARY DUE TO ELECTROLYTIC CAPACITOR C-27 BEING IN CIRCUIT

▽ = VOLTAGE MEASUREMENTS.
▭ = RESISTANCE MEASUREMENTS.

DET. NO. 63C75052

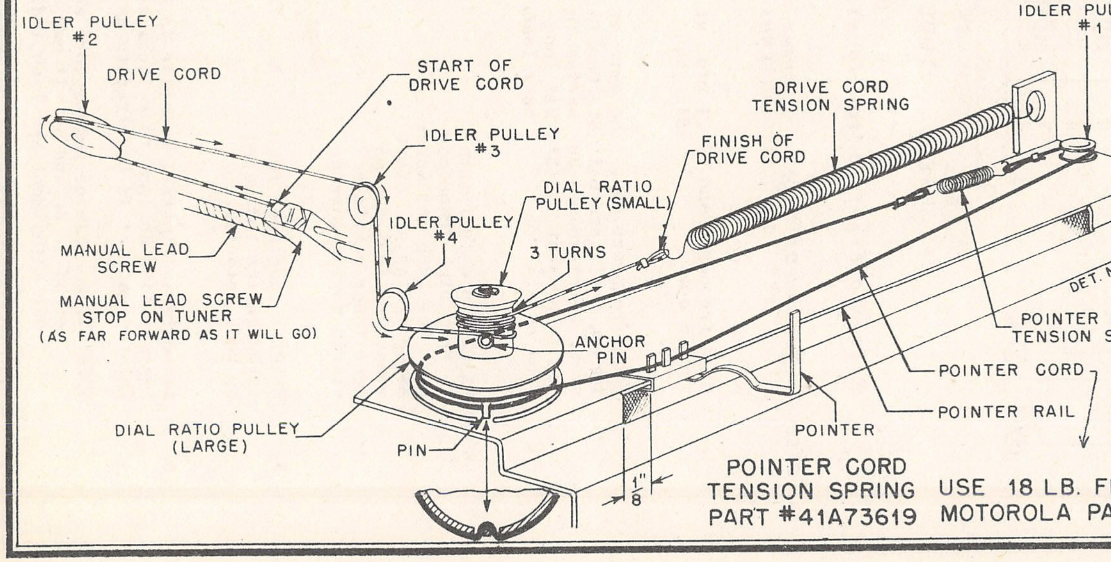
RIGHT SIDE VIEW OF CHASSIS

VOLTAGE AND RESISTANCE DIAGRAM

## OVERALL SENSITIVITY

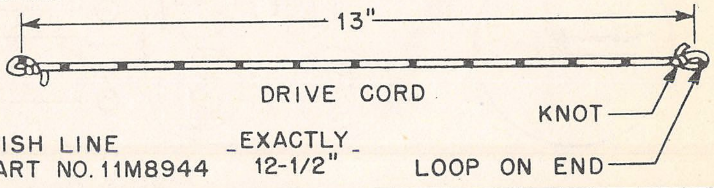
| Freq. | 1400 Kc. | 1000 Kc. | 600 Kc. |
|---|---|---|---|
| Sensitivity | 1.5 uv | 1.5 uv | 1.0 uv |

Standard output is to be 1 watt and is measured across the 3 ohm resistive load. (1 watt = 1.74 volts). Test is made with 30% 400 cycle modulation. Tone control is set to VOICE position and volume control at maximum.


IDLER PULLEY #2
DRIVE CORD
START OF DRIVE CORD
IDLER PULLEY #3
DRIVE CORD TENSION SPRING
FINISH OF DRIVE CORD
DIAL RATIO PULLEY (SMALL)
IDLER PULLEY #4
3 TURNS
IDLER PULLEY #1
MANUAL LEAD SCREW
MANUAL LEAD SCREW STOP ON TUNER (AS FAR FORWARD AS IT WILL GO)
ANCHOR PIN
DET. No. 69C75049
POINTER CORD TENSION SPRING
POINTER CORD
POINTER RAIL
POINTER
DIAL RATIO PULLEY (LARGE)
PIN
1/8"

POINTER CORD TENSION SPRING PART #41A73619

USE 18 LB. FISH LINE MOTOROLA PART NO. 11M8944


13"
DRIVE CORD
KNOT
EXACTLY 12-1/2"
LOOP ON END

## ELIMINATION OF IGNITION INTERFERENCE

*a. Install distributor suppressor.*
*b. Install generator condenser.*

Mount the generator condenser on the generator frame, under the ground lead screw. Connect the space tip end of the condenser wire under the battery terminal of the generator. *WARNING: Do not connect the condenser wire to the field terminal.*

c. *Install hood bonds.*

Remove one of drive screws that holds the cloth tape along the rear edge of the hood. Insert Hood Bond under tape so hole lines up with hole drive screw was in, put in self-tapping screw and fold back over tape so rough points of hood bond are against under side of hood when hood is closed.

## ADDITIONAL MOTOR NOISE HINTS

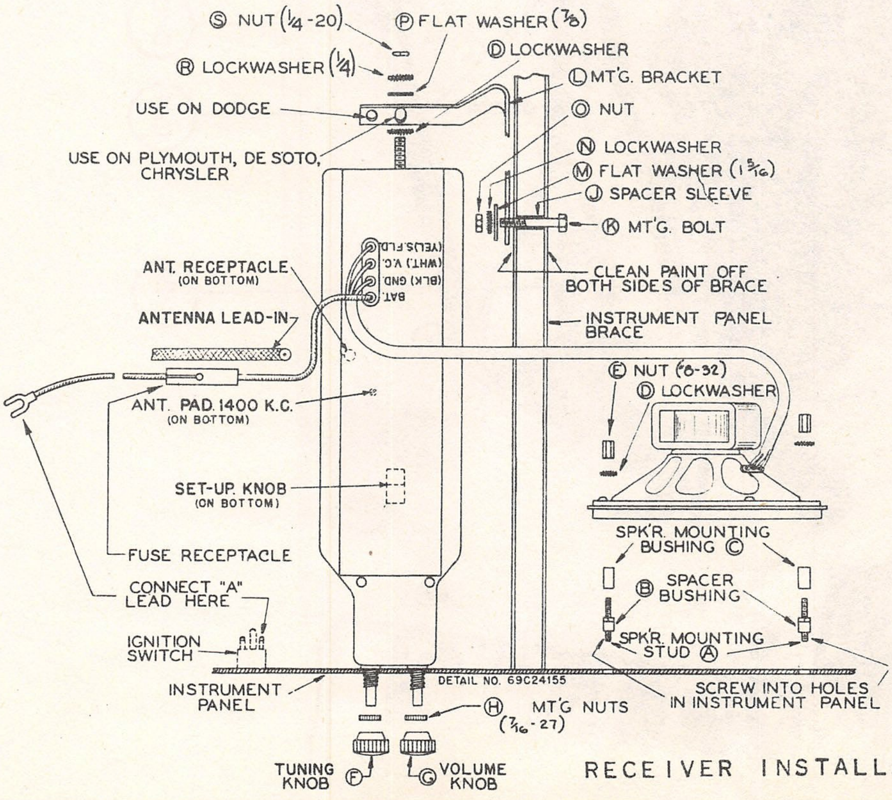
In most cars, the steps outlined above will completely take care of ignition interference. However, there are occasions when additional corrections are needed. Below are listed some suggestions which may be helpful in curing these unusual cases.

a. When checking the car for motor noise, clamp the hood down tight.

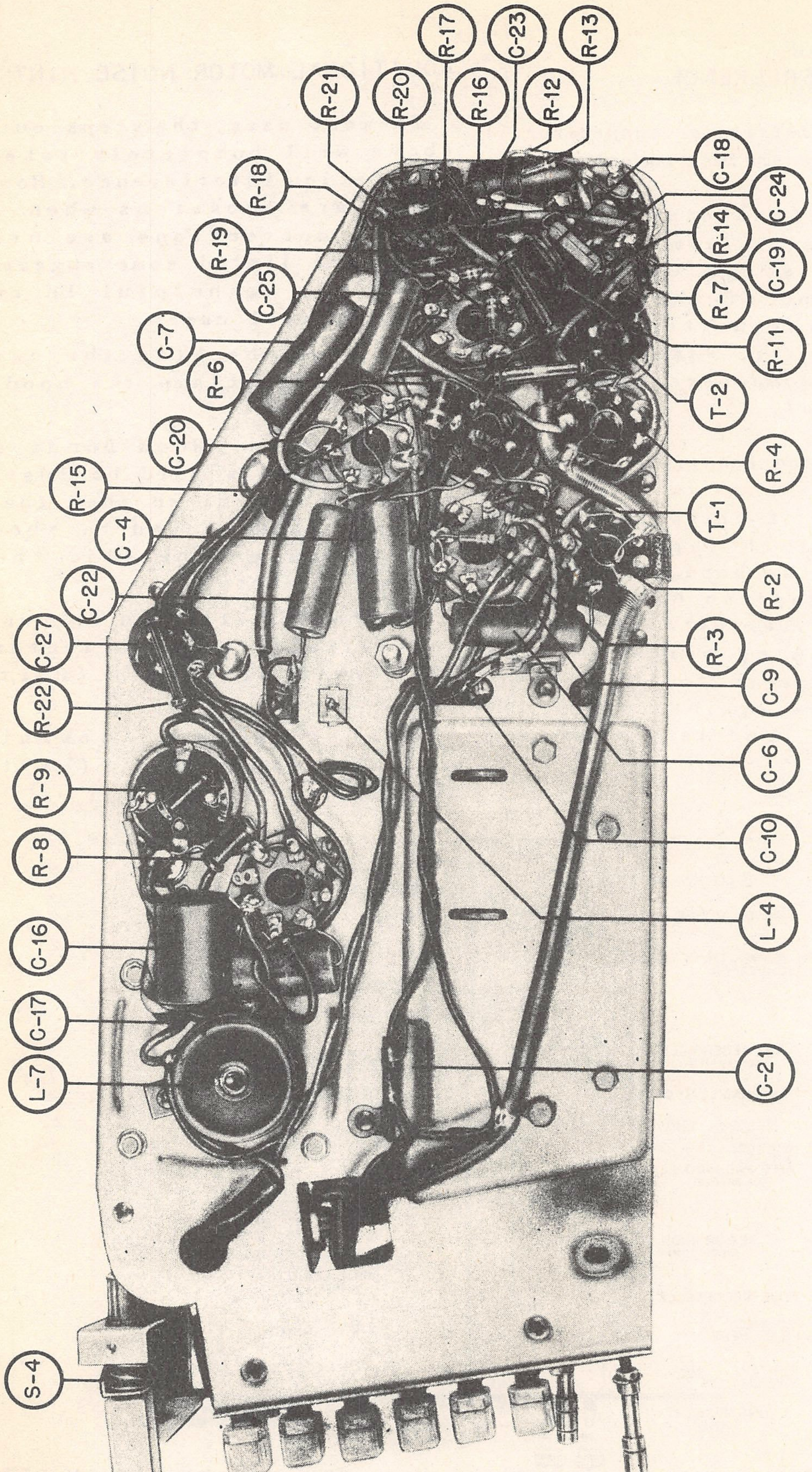
b. Motorola Hood Bonds (Part No. 39A4205) should be installed at the shoulders so that the hood makes a good-ground to the cowl of the car on the side the antenna is mounted.

c. Wheel static can be cured by installing static collectors in the front hub caps. (Part No. 39A20513).

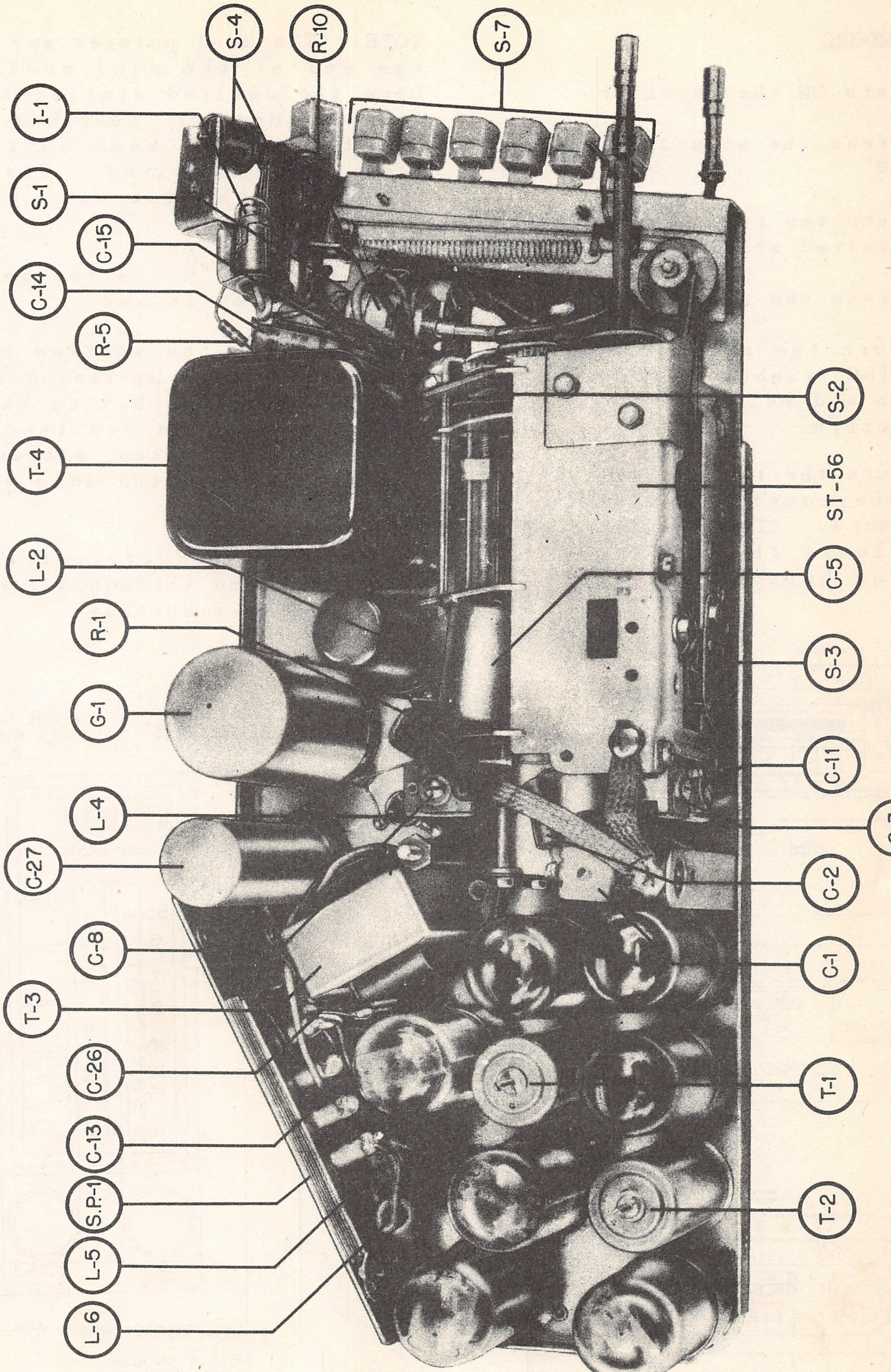
d. If required, install an ammeter condenser, (Part No. 8K4661).


Ⓢ NUT (1/4-20)
Ⓟ FLAT WASHER (7/8)
Ⓓ LOCKWASHER
Ⓡ LOCKWASHER (1/4)
Ⓛ MT'G. BRACKET
USE ON DODGE
Ⓞ NUT
USE ON PLYMOUTH, DE SOTO, CHRYSLER
Ⓝ LOCKWASHER
Ⓜ FLAT WASHER (1 5/16)
Ⓙ SPACER SLEEVE
Ⓚ MT'G. BOLT
(YEL) S.FLD.
(WHT.) V.C.
(BLK) GND.
BAT.
ANT. RECEPTACLE (ON BOTTOM)
CLEAN PAINT OFF BOTH SIDES OF BRACE
ANTENNA LEAD-IN
INSTRUMENT PANEL BRACE
Ⓔ NUT (#8-32)
Ⓓ LOCKWASHER
ANT. PAD. 1400 K.C. (ON BOTTOM)
SET-UP. KNOB (ON BOTTOM)
SPK'R. MOUNTING BUSHING Ⓒ
FUSE RECEPTACLE
Ⓑ SPACER BUSHING
CONNECT "A" LEAD HERE
IGNITION SWITCH
SPK'R. MOUNTING STUD Ⓐ
INSTRUMENT PANEL
DETAIL NO. 69C24155
SCREW INTO HOLES IN INSTRUMENT PANEL
Ⓗ MT'G NUTS (7/16-27)
TUNING KNOB Ⓕ
Ⓖ VOLUME KNOB

RECEIVER INSTALLATION DETAIL


R-17
C-23
R-13
R-21
R-20
R-16
R-12
R-18
C-18
C-24
R-19
R-14
C-19
C-25
R-7
C-7
R-11
R-6
T-2
C-20
R-4
R-15
T-1
C-4
C-22
R-2
C-27
R-3
C-9
R-22
C-6
R-9
C-10
R-8
L-4
C-16
C-17
C-21
L-7
S-4

RIGHT SIDE VIEW OF CHASSIS


S-4
R-10
S-7
I-1
S-1
C-15
C-14
R-5
T-4
L-2
R-1
G-1
L-4
C-27
C-8
T-3
C-26
C-13
S.P-1
L-5
L-6
S-2
ST-56
C-5
S-3
C-11
C-3
C-2
C-1
T-1
T-2

LEFT SIDE VIEW OF CHASSIS.

MODEL CR6
MODEL PD6
MODELS FD6,NH6

## MOTOROLA, INC.

## SETTING THE PUSH BUTTONS

**PROCEDURE**

a. Turn ON the receiver

b. Press the manual button marked "M"

c. Turn the tuning knob until the desired station is tuned in.

d. Press the number one button.

e. Turn the set-up lever CLOCKWISE (right) as far as it will go and release allowing it to return.

f. Turn the tuning knob until the previously noted program is heard. (The dial will not indicate the station to which the button is set.)

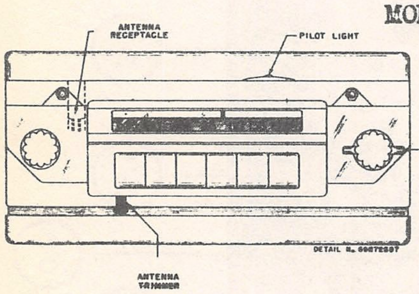
NOTE: The dial pointer may reach the end of the dial scale before the desired station is received. However, continue turning the tuning knob until the station is received. The dial pointer mechanism will not be affected.

g. Press the "M" button and the "1" button is set.

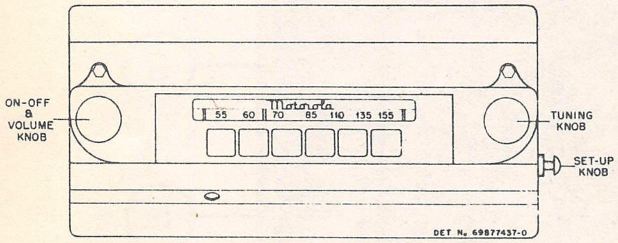
NOTE: Check the setting of the automatic button by tuning in the desired station, having the "M" button pushed in and then push the automatic button, either button should give the same volume and clarity.

h. Repeat the above procedure, steps b and through g for each of the push buttons.

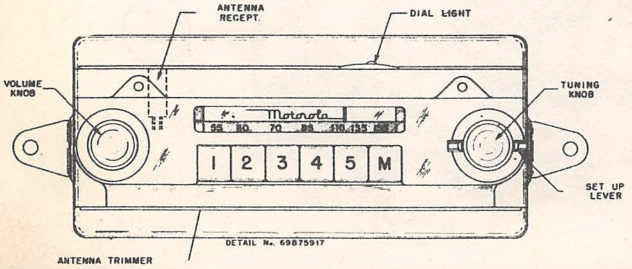
**MODEL NH6**


ANTENNA RECEPTACLE
PILOT LIGHT
SET UP LEVER
DETAIL N. 69872597
ANTENNA TRIMMER

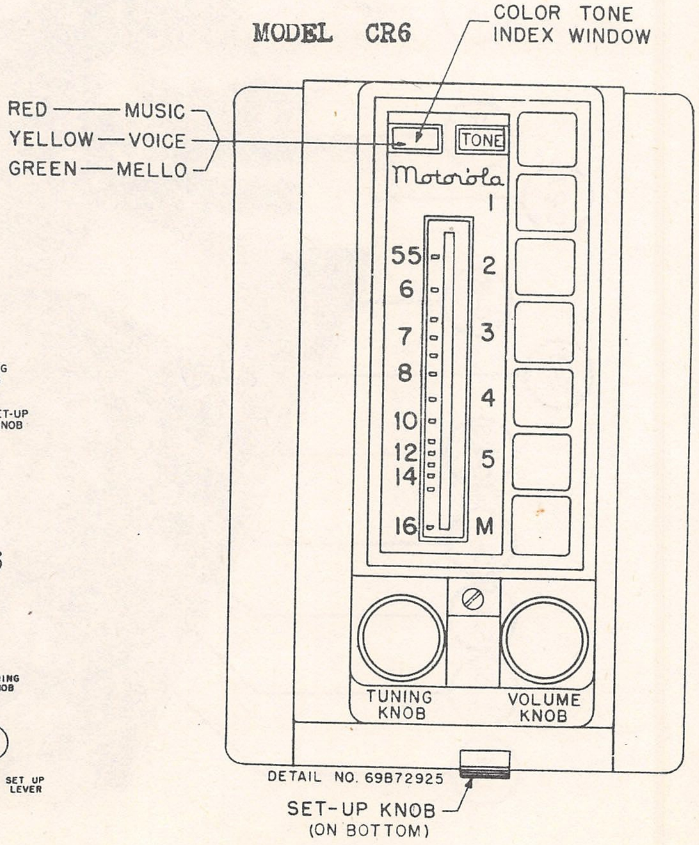
**MODEL PD6**


ON-OFF & VOLUME KNOB
Motorola
55 60 70 85 110 135 155
TUNING KNOB
SET-UP KNOB
DET N. 69877437-0

**MODEL FD6**


ANTENNA RECEPT.
DIAL LIGHT
VOLUME KNOB
TUNING KNOB
Motorola
55 60 70 85 110 135 155
1
2
3
4
5
M
SET UP LEVER
DETAIL N. 69875917
ANTENNA TRIMMER

**MODEL CR6**


COLOR TONE INDEX WINDOW
RED — MUSIC
YELLOW — VOICE
GREEN — MELLO
TONE
Motorola
1
2
3
4
5
M
55
6
7
8
10
12
14
16
TUNING KNOB
VOLUME KNOB
DETAIL NO. 69B72925
SET-UP KNOB (ON BOTTOM)

Two types of I.F.-Diode transformers have been used. The transformer shields for the late units have a powdered iron sleeve whereas none was used with the early I.F.-Diode transformers. See Figure 5.

The late transformer or shield assemblies are not interchangeable with the early ones. Although a late transformer and shield can be used to replace an early transformer and shield combination, it is not recommended because of difficulty in replacing shields which are staked to the chassis. Do not attempt to intermix the transformers and shields. If the wrong combination of transformer and shield is used, the transformer will not peak at the I.F. frequency of 455 Kc.

Replace transformer coil assemblies, if necessary, with same type as in the receiver.

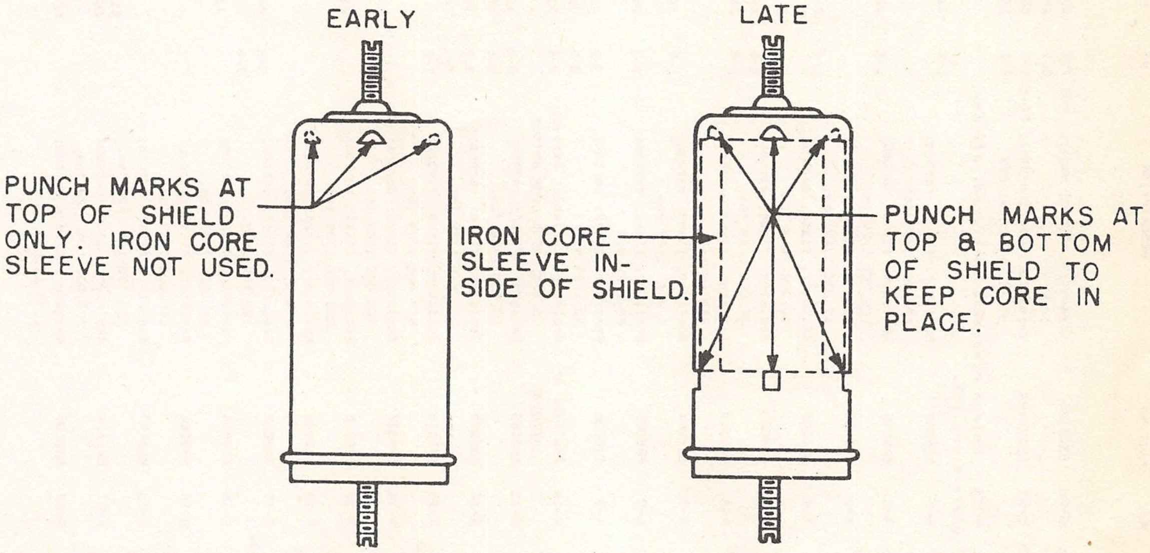
The capacitor across each winding of both types of I.F.-Diode transformers is a dual 100 mmf. wafer type silver mica, which is a part of the transformer assembly.

EARLY SETS

Transformer, I.F. or diode: Part No. 24B70827
Shield: Part No. 26B70107

LATE SETS:

Transformer, I.F. or diode: Part No. 24B76553.
Shield & Iron Core Sleeve Assembly: Part No. 1A71049.


EARLY
LATE
PUNCH MARKS AT TOP OF SHIELD ONLY. IRON CORE SLEEVE NOT USED.
IRON CORE SLEEVE INSIDE OF SHIELD.
PUNCH MARKS AT TOP & BOTTOM OF SHIELD TO KEEP CORE IN PLACE.

USE PART NO. 24B70827 I-F—DIODE TRANSFORMER IN THIS SHIELD ONLY.

USE PART NO. 24B76553 I-F—DIODE TRANSFORMER IN THIS SHIELD ONLY.

I.F.-DIODE (EARLY-LATE) TRANSFORMER IDENTIFICATION DETAIL

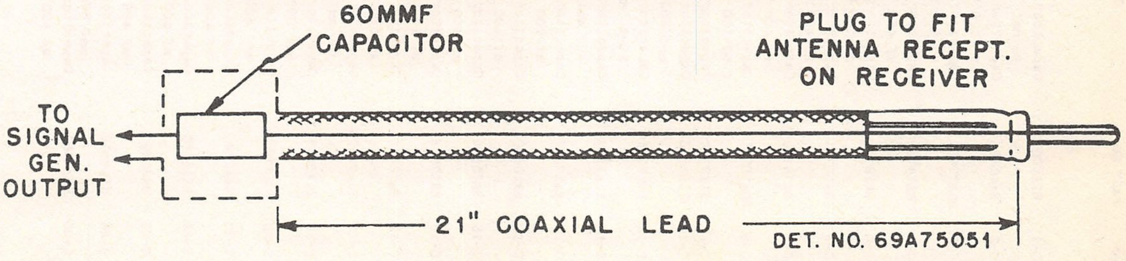

60MMF CAPACITOR
PLUG TO FIT ANTENNA RECEPT. ON RECEIVER
TO SIGNAL GEN. OUTPUT
21" COAXIAL LEAD
DET. NO. 69A75051

FIGURE 2. DUMMY ANTENNA CONSTRUCTION DETAIL

# MOTOROLA, INC.

| REF. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C-1 | 21A20877 | Capacitor, fixed: metal mica; 90 mmf |
| C-2 | 8A4529 | Capacitor, fixed: paper; .006 mf 100 V |
| C-3 | 20A70601 | Capacitor, variable: mica; 50-180 mmf |
| C-4 | 8A14791 | Capacitor, fixed: paper; .05 mf 400 V |
| C-5 | 8A19133 | Capacitor, fixed: paper; .5 mf 100 V |
| C-6 | 8A14791 | Capacitor, fixed: paper; .05 mf 400 V |
| C-7 | 8K13166 | Capacitor, fixed: paper; .1 mf 400 V |
| C-8 | 20A70601 | Capacitor, variable: mica; 50-180 mmf |
| C-9 | 21K70720 | Capacitor, fixed: mica; 5 mmf |
| C-10 | 21R6513 | Capacitor, fixed: mica; 50 mmf 300 V |
| C-11 | 20A70214 | Capacitor, variable: mica; 30-60 mmf |
| C-12 | 21A71872 | Capacitor, fixed: ceramic; 400 mmf |
| C-13 | 8A17028 | Capacitor, fixed: paper; .5 mf 100 V |
| C-14 | 8K23690 | Capacitor, fixed: paper; .01 mf 400 V |
| C-15 | 8K23690 | Capacitor, fixed: paper; .01 mf 400 V |
| C-16 | 8A17028 | Capacitor, fixed: paper; .5 mf 100 V |
| C-17 | 8A12840 | Capacitor, fixed: paper; .006 mf 1600 V |
| C-18 | 21A70176 | Capacitor, fixed: mica; dual 120 mmf |
| C-19 | 21R6513 | Capacitor, fixed: mica; 50 mmf 300 V |
| C-20 | 21R6638 | Capacitor, fixed: mica; 1000 mmf 500 V |
| C-21 | 8A4736 | Capacitor, fixed: paper; .002 mf 400 V |
| C-22 | 8K13166 | Capacitor, fixed: paper; .1 mf 400 V |
| C-23 | 8K23690 | Capacitor, fixed: paper; .01 mf 400 V |
| C-24 | 21R6648 | Capacitor, fixed: mica; 250 mmf 500 V |
| C-25 | 8K23690 | Capacitor, fixed: paper; .01 mf 400 V |

| REF NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C-26 | 8K13165 | Capacitor, fixed: paper; .003 1000 V |
| C-27 | 23A75429 | Capacitor, electrolytic: 20-20 mf 400 V, 20 mf 25V |

***NOTE: Unless otherwise specified, all Resistors are 20%.***

| REF NO. | PART NO. | DESCRIPTION |
|---|---|---|
| R-1 | 6R6032 | Resistor, fixed: carbon; 470,000 1/2W Ins. |
| R-2 | 6R6075 | Resistor, fixed: carbon; 100,000 1/2W Ins. |
| R-3 | 6R6056 | Resistor, fixed: carbon; 47,000 1/2W Ins. |
| R-4 | 6R6106 | Resistor, fixed: carbon; 10,000 1W N.I. |
| R-5 | 6R6028 | Resistor, fixed: carbon; 22,000 1/2W Ins. |
| R-6 | 6R6147 | Resistor, fixed: carbon; 330 1W Ins. |
| R-7 | 6R6004 | Resistor, fixed: carbon; 1 meg. 1/2W Ins. |
| R-8 | 6R6005 | Resistor, fixed: carbon; 50 1/2W N.I. |
| R-9 | 6R6005 | Resistor, fixed: carbon; 50 1/2W N.I. |
| R-10 | 18A71925 or 18A70172 | Resistor, variable: carbon; .5 meg; with SPST switch |
| R-11 | 6R6056 | Resistor, fixed: carbon; 47,000 1/2W Ins. |
| R-12 | 6R3927 | Resistor, fixed: carbon; 2.2 meg 1/2W Ins. |
| R-13 | 6R2118 | Resistor, fixed: carbon; 3.3 meg 1/2W Ins. |
| R-14 | 6R6015 | Resistor, fixed: carbon; 220,000 1/2W Ins. |
| R-15 | 6R6015 | Resistor, fixed: carbon; 220,000 1/2W Ins. |
| R-16 | 6R6004 | Resistor, fixed: carbon; 1 meg. 1/2W Ins. |
| R-17 | 6R6253 | Resistor, fixed: carbon; 150 10% 1W N.I. |
| R-18 | 6R5614 | Resistor, fixed: carbon; 56 10% 1/2W Ins. |
| R-19 | 6R6032 | Resistor, fixed: carbon; 470,000 1/2W Ins. |
| R-20 | 6R6407 | Resistor, fixed: carbon; 220,000 10% 1/2W Ins. |
| R-21 | 6R6414 | Resistor, fixed: carbon; 270,000 10% 1/2W Ins. |
| R-22 | 6R6184 | Resistor, fixed: carbon; 1000 1W N.I. |

| REF. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| F-1 | 65K4637 | Fuse: 20 amp; type 3AG |
| G-1 | 48B3333 | Vibrator, non-sync. |
| I-1 | 65X4151 | Bulb: 6.3 v, type #51 |
| L-1 | 1A71881 | Coil, antenna or R.F. (See solenoid tuner ST-56 Service Manual before replacing). |
| L-2 | 1A71881 | Coil, antenna or R.F. (See solenoid tuner ST-56 Service Manual before replacing). |
| L-3 | 1A71879 | Coil, oscillator. (See solenoid tuner ST-56 Service Manual before replacing). |
| L-4 | 24A70227 | Coil, oscillator padder: includes mounting clip and adjustable iron core. |
| L-5 | 24K70840 | Coil, "A" choke |
| L-6 | 24K73535 | Coil, dial light & speaker field choke: 9 turns #16 yellow wire |
| L-7 | 24A70199 | Coil, "A" choke: with mounting bracket |
| S-1 | Part of R-10 | Switch; SPST (Part of volume control R-10) |
| S-2 | 40B70952 | Switch, selector |
| S-3 | 1B70944 | Switch Assembly, solenoid |
| S-4 | 1X74087 | Switch, tone control: with bracket; complete |
| S-5 | 40A70931 | Switch, mute |
| S-7 | 1K73625 | Switch, push button assembly |
| S.P.1 | 1X75194 | Spark plate assembly |
| T-1 & T-2 | 24B70827 | Transformer, I.F. or diode: 455 kc; iron core tuned; less shield can. (Used in early sets only) |
|  | or<br>24B76553 | Transformer, I.F. or diode: 455 kc; iron core tuned; less shield can. (Used in late sets only) |
| T-3 | 25K72044 | Transformer, output |
| T-4 | 25B70950 | Transformer, power |
|  | 1X74121 | Accessories, group CR6: Includes all parts necessary to install receiver in car, except speaker assembly and receiver mounting bracket. |
|  | 8A4491 | Capacitor, generator |
|  | 1X74111 | Cord, Assembly: dial pointer cord |
|  | 1X74293 | Cord, Assembly: drive cord; with lug on one end |

| PART NO. | DESCRIPTION |
|---|---|
| 1X71047 | Core & Palnut Assembly (I.F. & diode coil top tuning iron core with nut) |
| 1X71048 | Core & Clip Assembly (I.F. & diode bottom tuning iron core & clip) |
| 1X4895 | Lead, battery: 10" long; insulated bushing and contact eyelet on one end, red insulated pin on other end. |
| 1X4894 | Lead, fuse: 20" long; fuse receptacle on one end, spade lug on other end |
| 1X27619 | Lead, speaker: 3 conductor rubber covered lead with insulated pin terminals on one end |
| 1K72125 | Pointer & Slider Assembly |
| 1X74106 | Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together |
| 1X70646 | Receptacle, antenna: metal ferrule with ins. contact |
| 9A70208 | Socket, tube: 4 prong (vibrator socket) |
| 9A6788 | Socket, tube: octal; plain |
| 9A70165 | Socket, tube: octal; shielded type (for R.F. & I.F. amp) |
| 1X74142 | Speaker Assembly: includes mounting plate and connecting cable |
| 50B71900<br>or<br>50B74946 or 50B74041 | Speaker: 6" electro; 3 ohm V.C. less mtg. plate and lead |
| 6X17117 | Suppressor, distributor |
| 40A72112 | Switch, tone: consists of switch leafs, contacts and insulator assembly only. |
| 1X74109 | Tone Indicator Assembly: consists of clear plastic indicator drum; bakelite cam and ratchet, and colored tone strip |
| 1X74080 | Tuner, Model ST-56- CR6 (complete) |

## MOTOROLA, INC.

## SETTING THE PUSH BUTTONS

1. Turn ON the receiver.

2. Press the push button marked "M"

3. Turn the tuning knob until the desired station is tuned in. (Make mental note of the program)

4. Press the number one button.

5. Turn the set-up lever CLOCKWISE (right) as far as it will go and release, allowing it to return.

6. Turn the tuning knob until the previously heard program is heard. (The dial will not indicate the station to which the button is set).

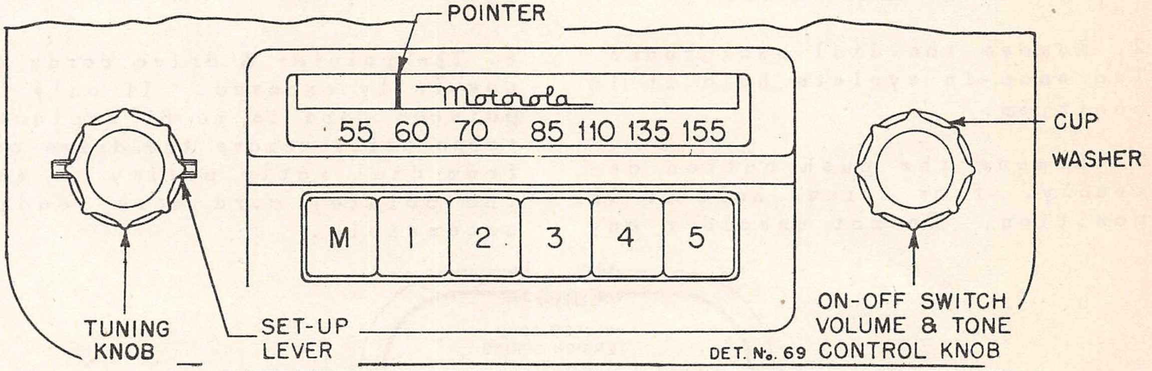
NOTE: The dial pointer may reach the end of the dial scale before the desired station is received. However, continue turning the tuning knob until the station is received. The dial pointer mechanism will not be affected.

7. Press the "M" button and the number one push button is set.

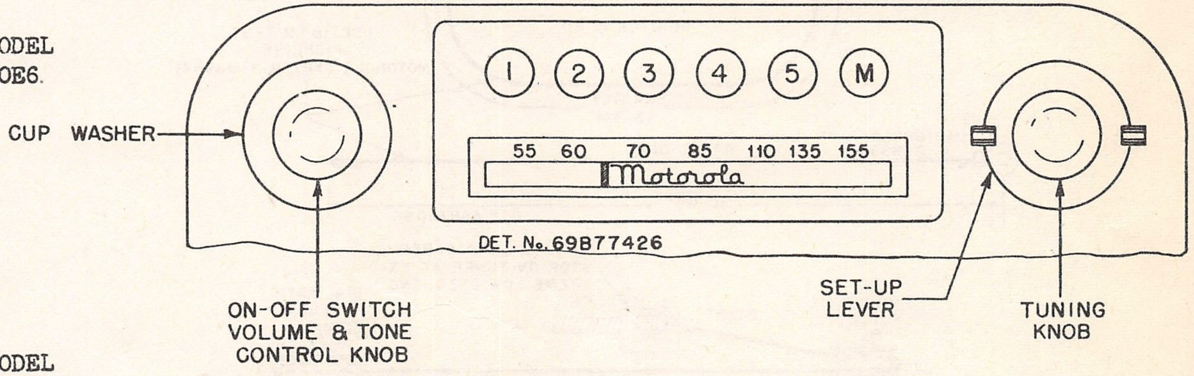
NOTE: Check the setting of the automatic button by tuning in the desired station having the "M" button pushed in, and then push the automatic button that is set to the same station that was tuned in manually, either button should give the same volume and clarity. Any difference indicates that the push button was not set correctly.

8. Repeat the above procedure, steps 2 through 7 for each of the push buttons.

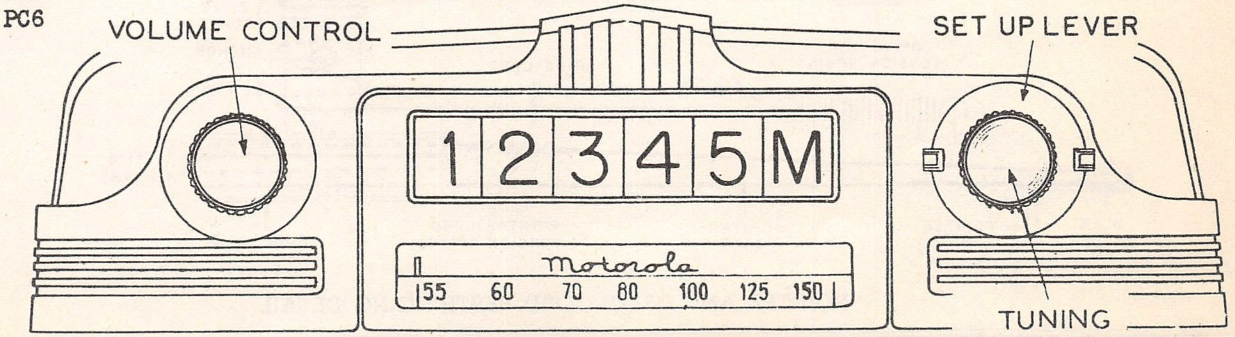
MODEL CT6


POINTER
Motorola
55 60 70 85 110 135 155
M
1
2
3
4
5
CUP WASHER
TUNING KNOB
SET-UP LEVER
ON-OFF SWITCH VOLUME & TONE CONTROL KNOB
DET. No. 69

MODEL OE6.


1
2
3
4
5
M
CUP WASHER
55 60 70 85 110 135 155
Motorola
DET. No. 69B77426
ON-OFF SWITCH VOLUME & TONE CONTROL KNOB
SET-UP LEVER
TUNING KNOB

MODEL PC6


VOLUME CONTROL
SET UP LEVER
1
2
3
4
5
M
motorola
55 60 70 80 100 125 150
TUNING

For I-F transformer notes, see P.16-7

For schematic, see P.15-11

MOTOROLA, INC.

## WARNING: CHECK VOLTAGE REGULATOR

Many late cars develop exceedingly high voltage due to improper adjustment of voltage regulator, which shortens the life of radio tubes, vibrator, electrical accessories and headlights. When voltage exceeds 7.3 volts with motor running at about 35 miles per hour and no load on battery, have the voltage regulator adjusted for maximum voltage of 7.3 volts under a no load condition.

## TO REPLACE DIAL LIGHT

It will be necessary to remove set from car when replacing dial light. Pry out large snap button directly under push-button "M" and replace with a #44 bayonet base pilot lamp.

## POINTER AND DRIVE CORD REPLACEMENT

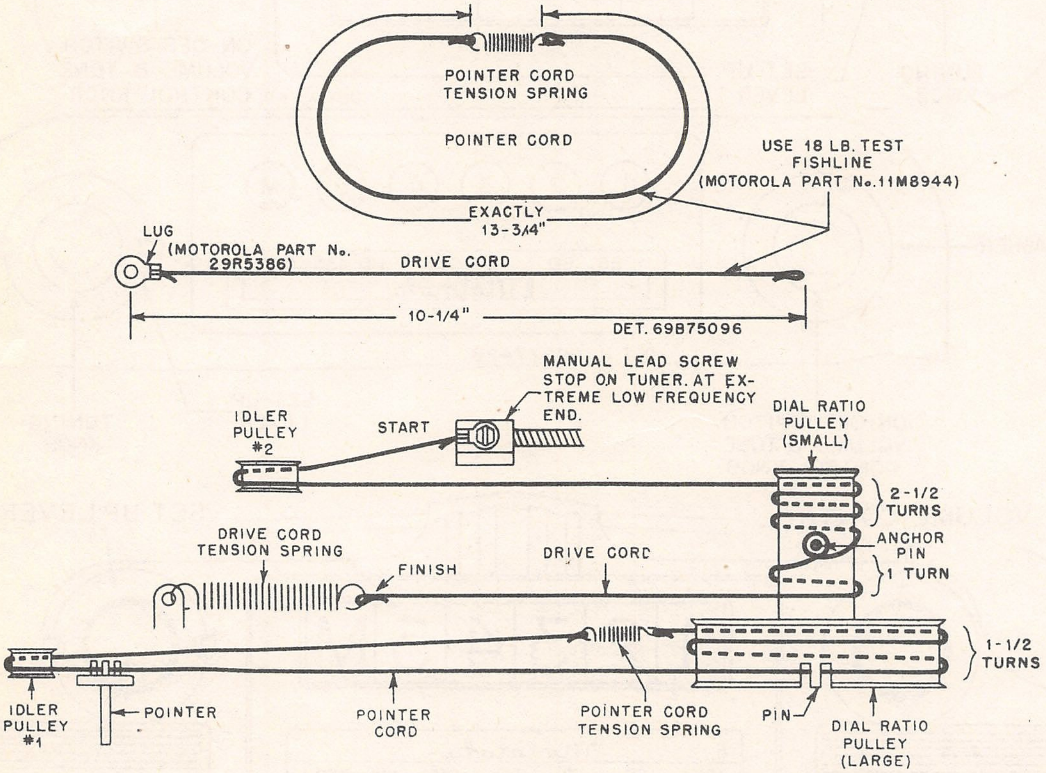
### PREPARE RECEIVER AS FOLLOWS

1. Remove the front cover.

2. Remove the dial background. Two snap-in eyelets hold it in position.

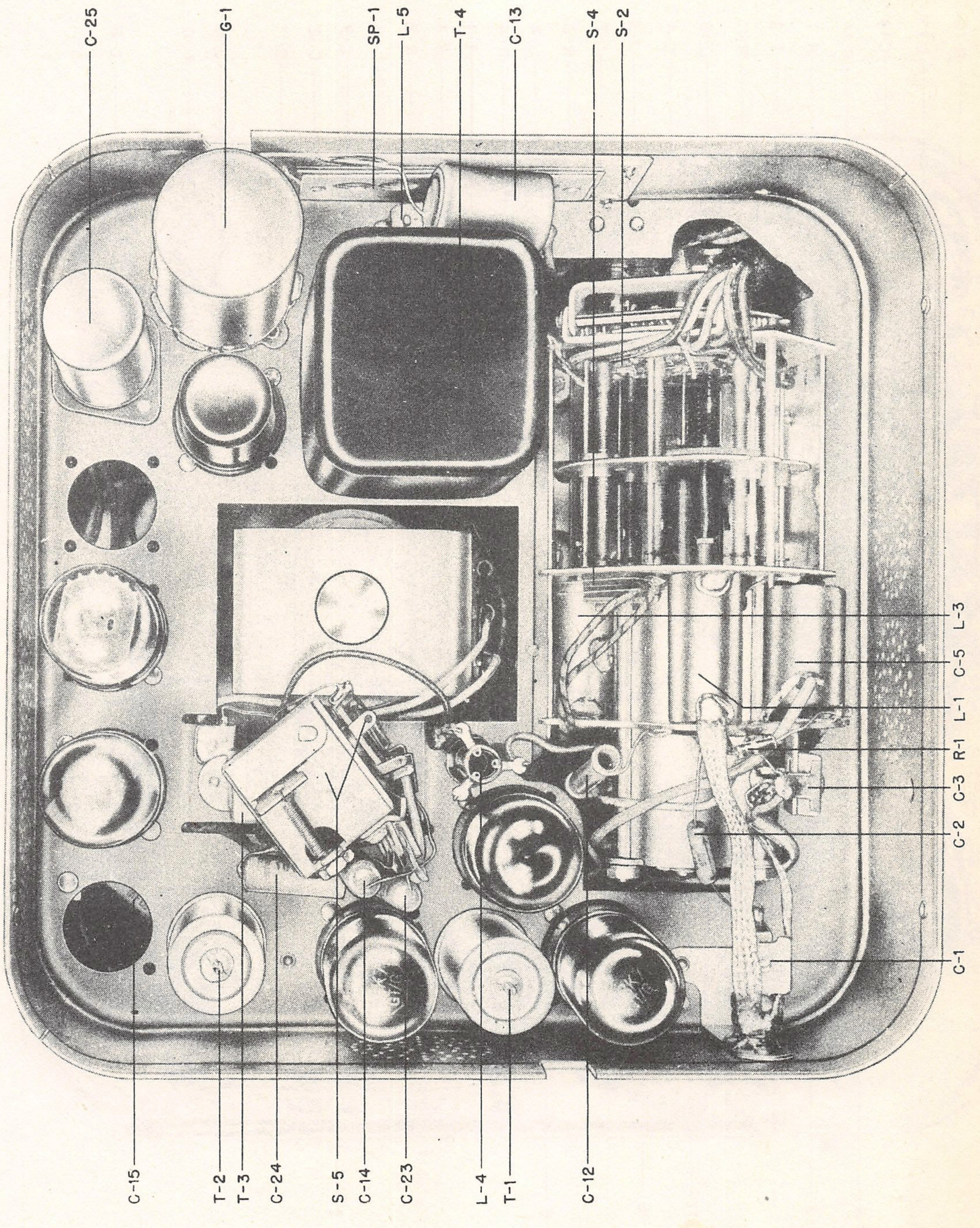
3. Remove the push button assembly. Four screws hold it in position. Do not unsolder any wire leads; just lay the push button assembly on top of the set.

4. The pointer & drive cords are now fully exposed. If only the pointer cord is to be replaced, temporarily remove the drive cord from dial ratio pulley to make the pointer cord more readily accessible.


POINTER CORD TENSION SPRING
POINTER CORD
USE 18 LB. TEST FISHLINE (MOTOROLA PART No.11M8944)
EXACTLY 13-3/4"
LUG
(MOTOROLA PART No. 29R5386)
DRIVE CORD
10-1/4"
DET. 69B75096
MANUAL LEAD SCREW STOP ON TUNER. AT EXTREME LOW FREQUENCY END.
IDLER PULLEY #2
START
DIAL RATIO PULLEY (SMALL)
2-1/2 TURNS
ANCHOR PIN
1 TURN
DRIVE CORD TENSION SPRING
FINISH
DRIVE CORD
1-1/2 TURNS
IDLER PULLEY #1
POINTER
POINTER CORD
POINTER CORD TENSION SPRING
PIN
DIAL RATIO PULLEY (LARGE)

POINTER AND DRIVE CORD RESTRINGING DETAIL

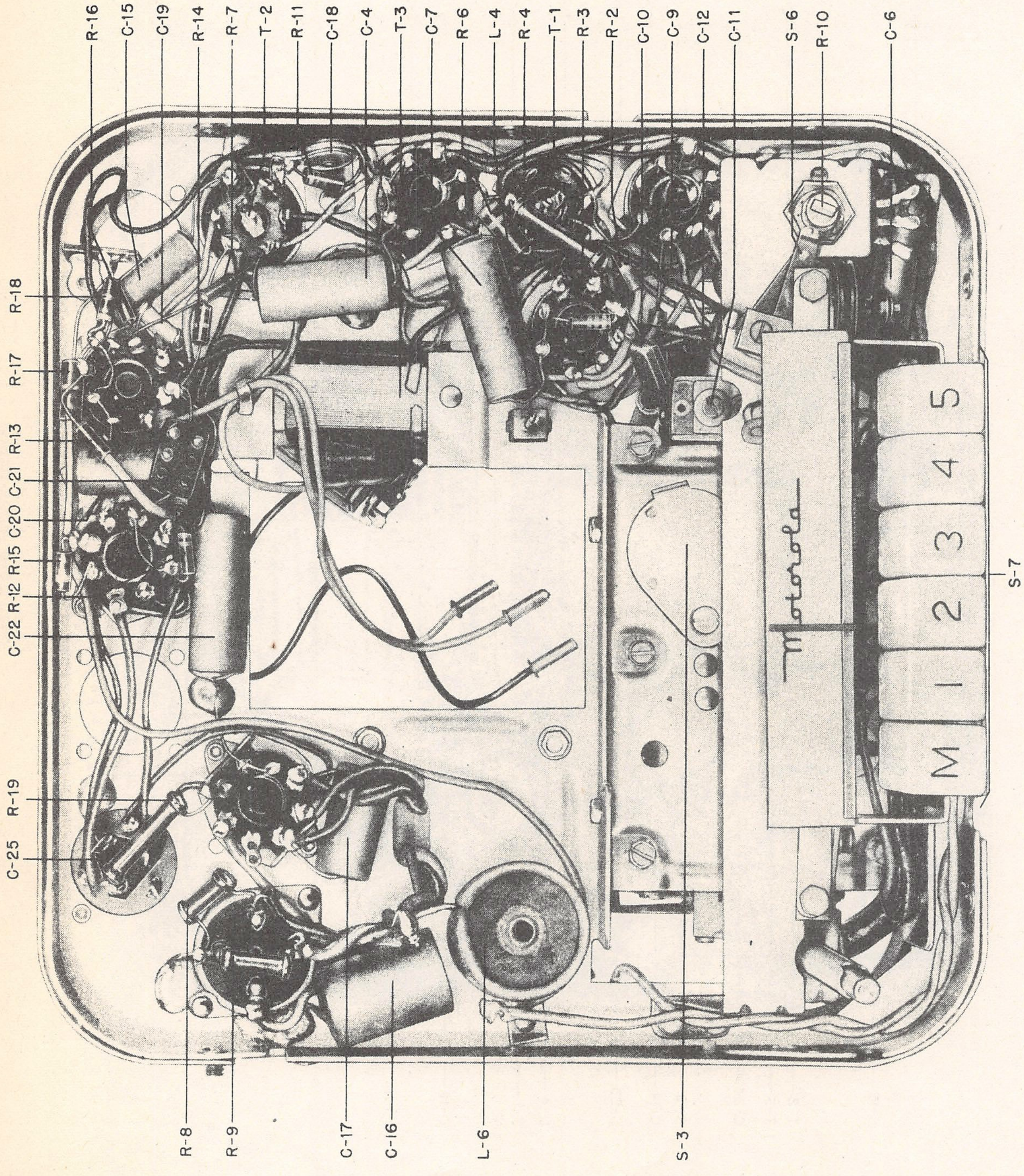
MOTOROLA, INC.


C-25
G-1
SP-1
L-5
T-4
C-13
S-4
S-2
L-3
C-5
L-1
R-1
C-3
C-2
C-1
C-15
T-2
T-3
C-24
S-5
C-14
C-23
L-4
T-1
C-12

CHASSIS TOP VIEW

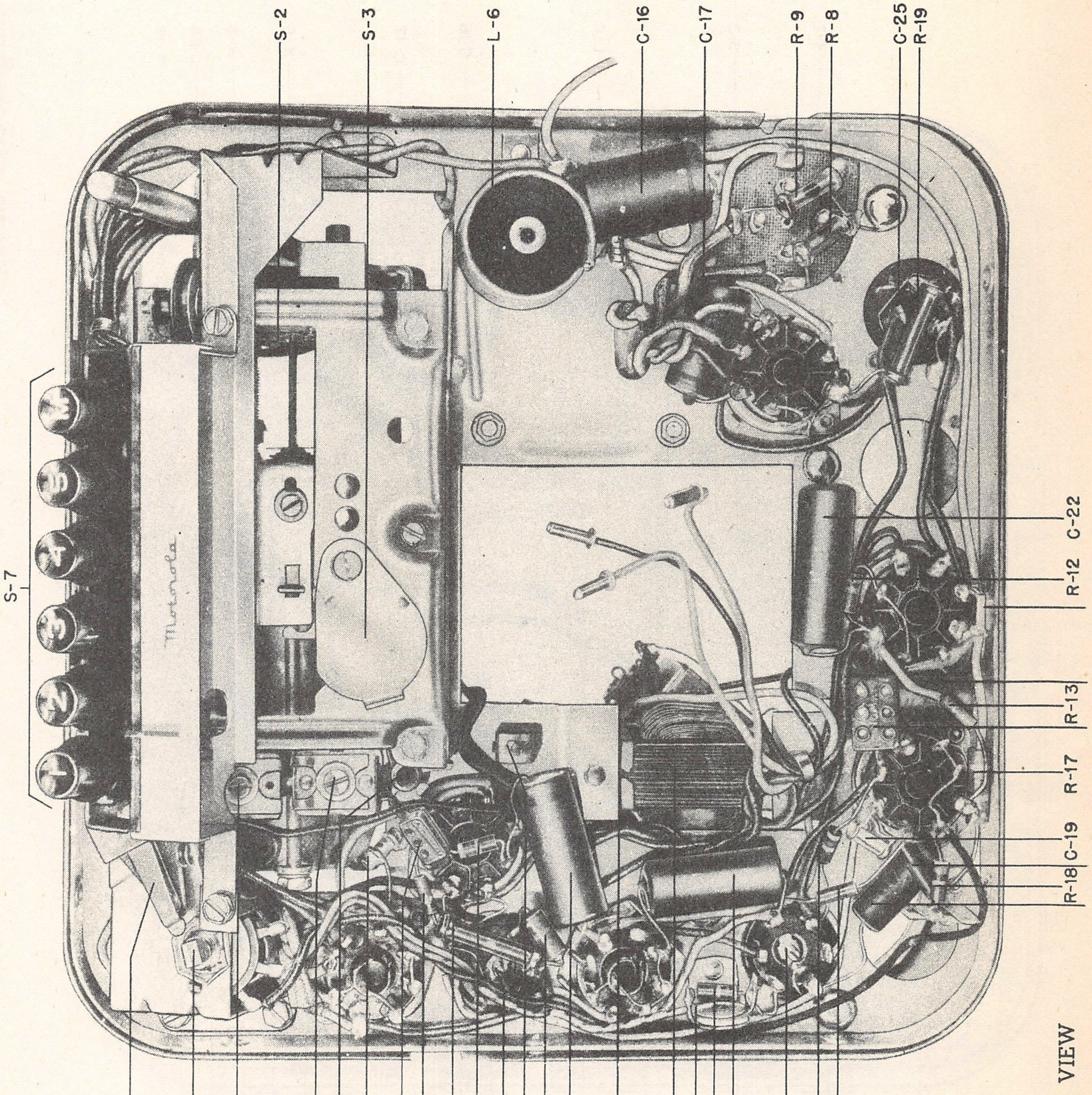
**MODEL CT6**

MOTOROLA, INC.


R-16
C-15
C-19
R-14
R-7
T-2
R-11
C-18
C-4
T-3
C-7
R-6
L-4
R-4
T-1
R-3
R-2
C-10
C-9
C-12
C-11
S-6
R-10
C-6
R-18
R-17
R-13
C-21
C-20
R-15
R-12
C-22
R-19
C-25
R-8
R-9
C-17
C-16
L-6
S-3
S-7
Motorola
M
1
2
3
4
5

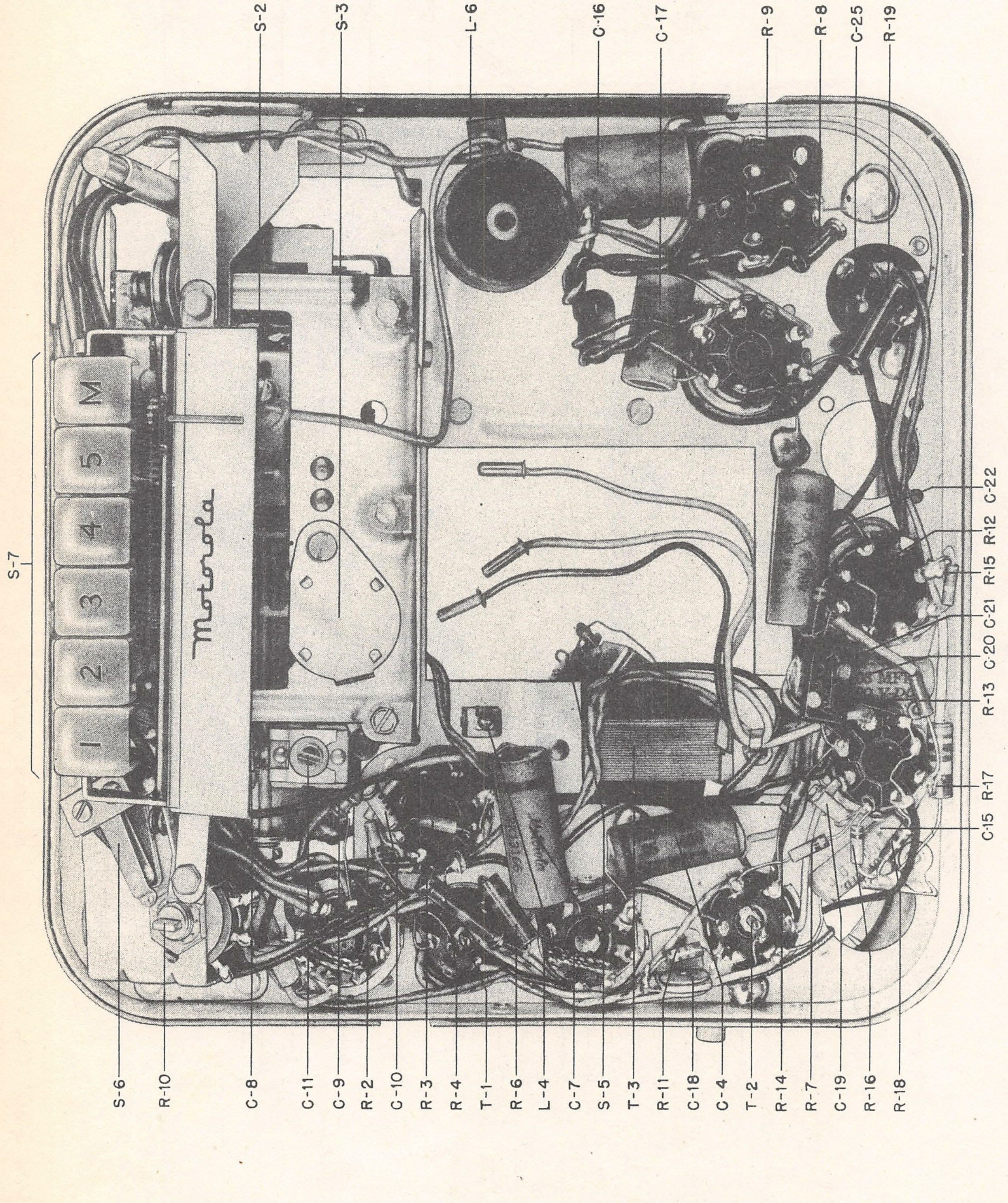
CHASSIS BOTTOM VIEW

# MOTOROLA, INC.


S-2
S-3
L-6
C-16
C-17
R-9
R-8
C-25
R-19
C-22
R-12
R-13
R-17
C-19
R-18
S-7
Motorola
S-6
R-10
C-8
C-11
C-12
C-9
C-10
R-2
R-4
R-3
T-1
L-4
R-6
C-7
S-5
T-3
C-18
R-11
C-4
T-2
R-14
R-7

CHASSIS BOTTOM VIEW

MOTOROLA, INC.


S-2
S-3
L-6
C-16
C-17
R-9
R-8
C-25
R-19
S-7
M
5
4
3
2
1
Motorola
C-22
R-12
R-15
C-21
C-20
R-13
R-17
C-15
S-6
R-10
C-8
C-11
C-9
R-2
C-10
R-3
R-4
T-1
R-6
L-4
C-7
S-5
T-3
R-11
C-18
C-4
T-2
R-14
R-7
C-19
R-16
R-18

CHASSIS BOTTOM VIEW

**MODELS CT6,OE6,PC6**

# MOTOROLA, INC.

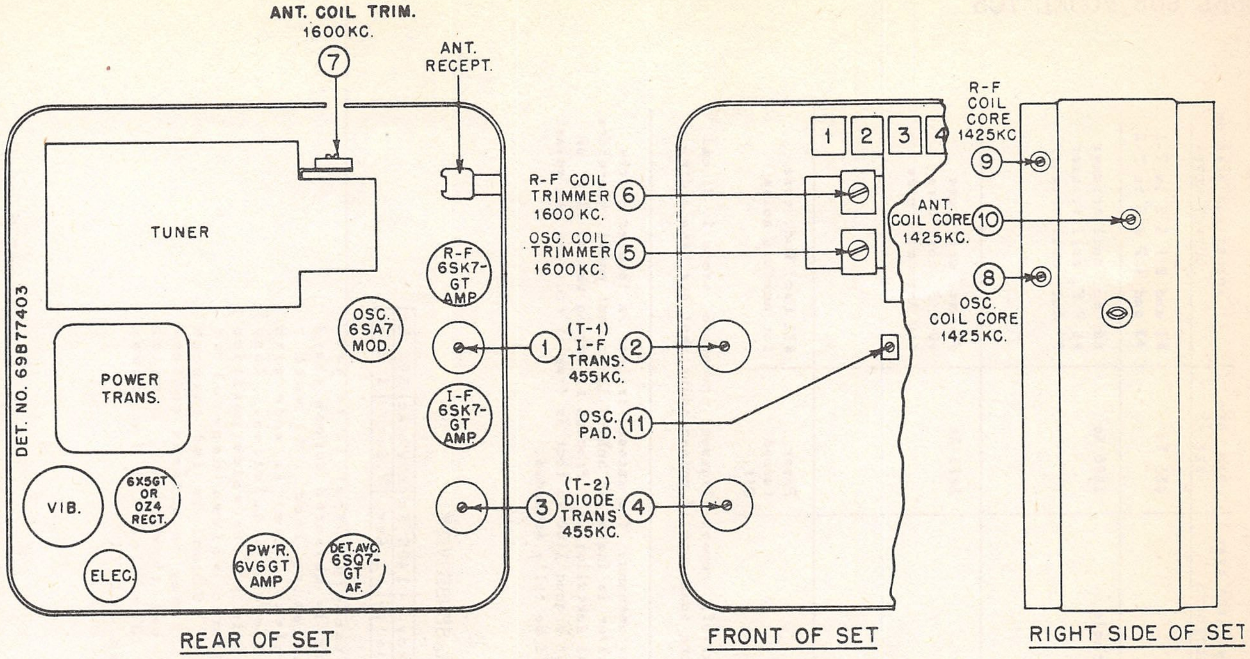
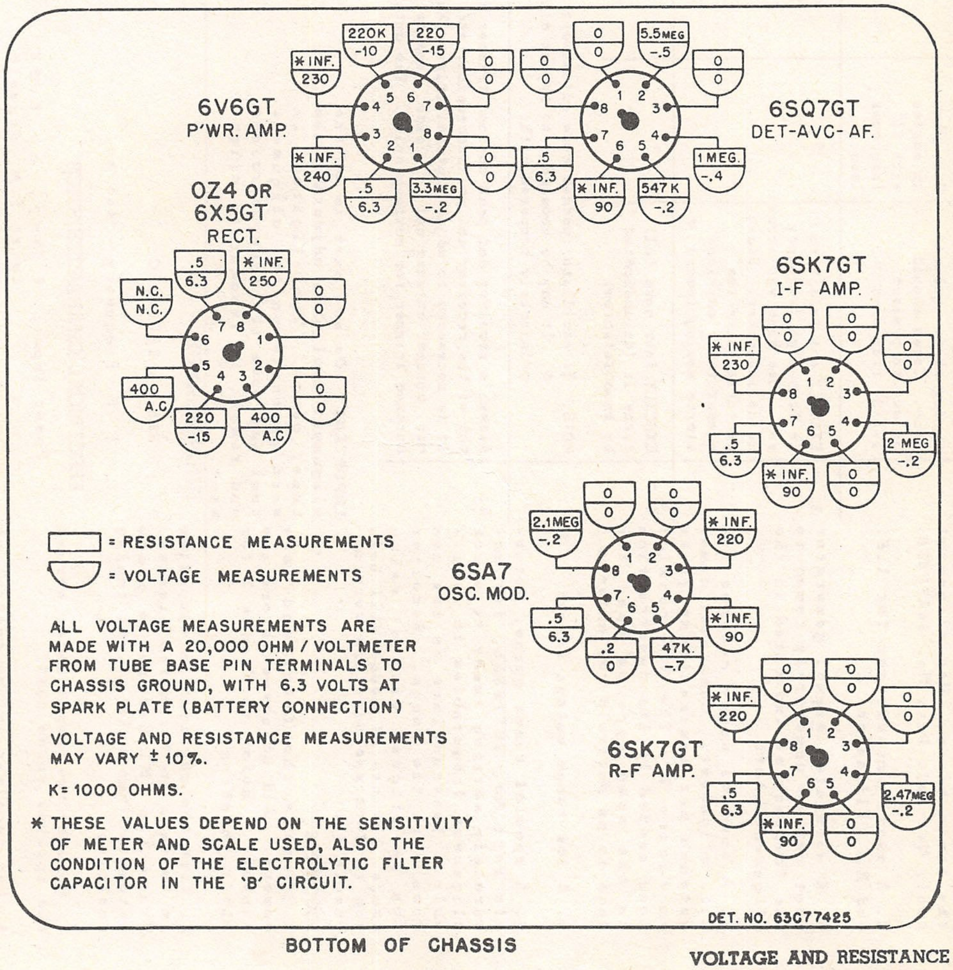

ANT. COIL TRIM. 1600KC. ⑦
ANT. RECEPT.
TUNER
POWER TRANS.
DET. NO. 69B77403
VIB.
6X5GT OR OZ4 RECT.
ELEC.
PW'R. 6V6GT AMP
DET.AVC. 6SQ7-GT AF.
OSC. 6SA7 MOD.
R-F 6SK7-GT AMP
I-F 6SK7-GT AMP
R-F COIL TRIMMER ⑥ 1600 KC.
OSC. COIL TRIMMER ⑤ 1600KC.
① (T-1) I-F TRANS. 455KC. ②
OSC. PAD. ⑪
③ (T-2) DIODE TRANS 455KC. ④
1 2 3 4
R-F COIL CORE 1425KC ⑨
ANT. COIL CORE ⑩ 1425KC.
⑧ OSC. COIL CORE 1425KC.
REAR OF SET
FRONT OF SET
RIGHT SIDE OF SET

FIGURE 3. TUBE AND TRIMMER LOCATION DETAIL


6V6GT P'WR. AMP.
220K -10
220 -15
0 0
*INF. 230
*INF. 240
.5 6.3
3.3MEG -.2
0 0
6SQ7GT DET-AVC-AF.
0 0
5.5MEG -.5
0 0
0 0
.5 6.3
*INF. 90
547K -.2
1 MEG. -.4
OZ4 OR 6X5GT RECT.
.5 6.3
*INF. 250
N.C. N.C.
0 0
400 A.C.
220 -15
400 A.C.
0 0
6SK7GT I-F AMP.
0 0
0 0
*INF. 230
0 0
.5 6.3
*INF. 90
0 0
2 MEG -.2
6SA7 OSC. MOD.
0 0
0 0
2.1MEG -.2
*INF. 220
.5 6.3
.2 0
47K. -.7
*INF. 90
6SK7GT R-F AMP.
0 0
0 0
*INF. 220
0 0
.5 6.3
*INF. 90
0 0
2.47MEG -.2
= RESISTANCE MEASUREMENTS
= VOLTAGE MEASUREMENTS
DET. NO. 63C77425

ALL VOLTAGE MEASUREMENTS ARE MADE WITH A 20,000 OHM / VOLTMETER FROM TUBE BASE PIN TERMINALS TO CHASSIS GROUND, WITH 6.3 VOLTS AT SPARK PLATE (BATTERY CONNECTION)

VOLTAGE AND RESISTANCE MEASUREMENTS MAY VARY ± 10%.

K= 1000 OHMS.

* THESE VALUES DEPEND ON THE SENSITIVITY OF METER AND SCALE USED, ALSO THE CONDITION OF THE ELECTROLYTIC FILTER CAPACITOR IN THE 'B' CIRCUIT.

BOTTOM OF CHASSIS

VOLTAGE AND RESISTANCE DIAGRAM

MODELS CT6,OE6,PC6
MODELS FD6,NH6
MODEL 405,MODEL 505
MODEL 605,MODEL 705

MOTOROLA, INC.

## ALIGNMENT

### EQUIPMENT REQUIRED

1. A special tool for adjusting the tuner cores. Use alignment tool, Motorola Part No. 66A76278.

2. A small screwdriver for I.F. and R.F. Alignment.

3. A modulated signal generator that can be accurately tuned to the frequencies indicated in the alignment chart.

4. A special dummy antenna for R.F. alignment. Construct dummy antenna per instructions given in Figure 2. The 21" coaxial lead needed in its construction is the same type as used for lead-in on Motorola car antenna.

5. A low range output meter.

6. A special tuner gauge, Motorola Part No. 66X76825, for accurately setting tuner to exact alignment frequencies is available. Instructions on its use come with the gauge. Receiver can be aligned without using gauge, but use of gauge will help you to do a speedier and more accurate job.

### PROCEDURE

1., Remove the front and rear covers. All adjustments are now exposed. Refer to Figure 3 for their location.

2. Turn the receiver on and allow it to warm up for a few minutes. Press the "M" button to place automatic tuner in manual tuning position.

3. Connect the output meter across the speaker voice coil.

4. Set receiver volume control at maximum and tone control to voice position (high position).

5. Refer to the following alignment chart for procedure.

| STEP | TUNER POSITION SET TO | DUMMY ANTENNA | SIGNAL GENERATOR LEAD CONNECTED TO | SIG. GEN. SET AT | ADJUST FOR PEAK ON OUTPUT METER |
|---|---|---|---|---|---|
| 1. | High frequency end (cores out) | .1 mfd. at Sig. Gen. | Osc Mod grid (#5 pin) | 455 Kc | #1 and 2 P & S in T-1<br>#3 and 4 P & S in T-2 |
| 2. | High frequency end, tuning shaft against stop. Cores should be set to project 1-1/8" from cans. * | 60 mmf. at Sig. Gen. in series with 21" long coax lead. | Antenna receptacle | 1600 Kc | #5 Osc. coil trimmer<br>#6 R.F. coil trimmer<br>#7 Ant. coil trimmer |
| 3. | EXACTLY one full turn in from high frequency end. Use knob set screw as an indicator. Start measuring turn the moment tuner carriage starts moving inward * | " | " | 1425 Kc | #8 Osc. coil core<br>#9 R.F. coil core<br>#10 Ant. coil core |
| 4. | EXACTLY four more full turns in (as indicated by knob setscrew) | " | " | Power turned Off. | #11 Osc. Pad. core for maximum noise |
| | NOTE: If oscillator padder core adjustment is too far off, repeat alignment procedure, steps 2, 3, and 4. It may be necessary to repeat alignment more than once if padder adjustment has been indiscriminately tampered with. | | | | |
| 5. | Assemble receiver and peak antenna trimmer (#7) to car antenna. The antenna trimmer is located at the top of the receiver and is inaccessible when the receiver is installed behind instrument panel, therefore, it is necessary to adjust antenna trimmer before final installation. Proceed by laying set on floor of car, connect antenna and "A" leads, tune set to a spot around 1400 kc that is free of stations and adjust antenna trimmer for maximum noise. The antenna should be fully extended. | | | | |

IMPORTANT: Do not push in on the alignment tool when adjusting the tuner cores. The slightest inward pressure on the alignment tool may move the tuner carriage and result in inaccurate alignment.

### TUNING RANGE

535 to 1600 K.C.

I. F. Frequency - 455 kc.

### ELECTRICAL CHARACTERISTICS

Power Input: 6 Amp. at 6.3V (with P.M. dynamic type speaker)
7.5 Amp. at 6.3V (with electrodynamic type speaker)

Power Output: 5.6 watts (max.)

### OVERALL SENSITIVITY

| Frequency | 1400 Kc | 1000 Kc | 600 Kc |
|---|---|---|---|
| Sensitivity | 1.4uv | 1.6uv | 1.4 uv |

Standard output is to be 1 watt and is measured across the 3 ohm resistive load. (1 watt = 1.74 volts). Test is made with 30% 400 cycle modulation. Tone control is set to voice position (high) and volume control at maximum. Signal is fed through 60 mmf. dummy to antenna connector of set through 21" coaxial lead. See Figure 2 for dummy antenna detail.

MOTOROLA

# MOTOROLA, INC.

## PARTS LIST - MODELS CT6. PC6, OE6

| REF. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C-1 | 21A20877 | Capacitor, fixed: metal mica; 90 mmf |
| C-2 | 8A4529 | Capacitor, fixed: paper; .006 mf. 100V |
| C-3 | 20A70601 | Capacitor, variable: mica; 50-180 mmf.; with mounting bracket |
| C-4 | 8A14791 | Capacitor, fixed: paper; .05 mf. 400V |
| C-5 | 8A19133 | Capacitor, fixed: paper; .5 mf. 100V |
| C-6 | 8A14791 | Capacitor, fixed: paper; .05 mf. 400V |
| C-7 | 8K13166 | Capacitor, fixed: paper; .1 mf. 400V |
| C-8 | 20A70601 | Capacitor, variable; mica; 50-180 mmf.; with mounting bracket |
| C-9 | 21K70720 | Capacitor, fixed: mica; 5 mmf. 500V |
| C-10 | 21R6513 | Capacitor, fixed: mica; 50 mmf. 300V |
| C-11 | 20A70214 | Capacitor, variable; mica; 30-60 mmf.; with mounting bracket |
| C-12 | 21A71872 | Capacitor, fixed: ceramic; 400 mmf. 5% 500V |
| C-13 | 8A17028 | Capacitor, fixed: paper; .5 mf. 100V |
| C-14 | 8K23690 | Capacitor, fixed: paper; .01 mf. 400V |
| C-15 | 8K23690 | Capacitor, fixed: paper; .01 mf. 400V |
| C-16 | 8A19133 | Capacitor, fixed: paper; .5 mf. 100V |
| C-17 | 8A12840 | Capacitor, fixed: paper; .006 mf. 1600V |
| C-18 | 21A70176 | Capacitor, fixed: mica; dual 120 mmf. |
| C-19 | 21R6513 | Capacitor, fixed: mica; 50 mmf. 300V |
| C-20 | 8A71911 | Capacitor, fixed: paper; .03 mf. 400V |
| C-21 | 21R6648 | Capacitor, fixed: mica; 250 mmf. 500V |
| C-22 | 8A13166 | Capacitor, fixed: paper; .1 mf. 400V |
| C-23 | 8A71909 | Capacitor, fixed: paper; .004 mf. 400V |
| C-24 | 8A71910 | Capacitor, fixed: paper; .006 mf. 400V |
| C-25 | 23A75429 | Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V |
| F-1 | 65K4637 | Fuse: 20 Amp.: type 3AG |
| G-1 | 48B3333 | Vibrator: full wave; non-sync. |
| I-1 | 65X10867 | Bulb: 6-8V, .25 Amp., tubular bayonet; type #44 |
| L-1 | 1A71881 | Coil, antenna or R.F. (specify color of paint dots on old coil when ordering) |
| L-2 | 1A71881 | Coil, antenna or R.F. (specify color of paint dots on old coil when ordering) |
| L-3 | 1A71879 | Coil, oscillator (specify color of paint dots on old coil when ordering) |
| L-4 | 24A70227 | Coil, oscillator padder: includes mounting clip and adjustable iron core |
| L-5 | 24A74934 | Coil, "A" choke |
| L-6 | 24A70199 | Coil, "A" choke: with mounting bracket |
| R-1 | 6R6032 | Resistor, fixed: carbon; 470,000 1/2W Ins. |
| R-2 | 6R6075 | Resistor, fixed: carbon; 100,000 1/2W Ins. |
| R-3 | 6R6056 | Resistor, fixed: carbon; 47,000 1/2W Ins. |
| R-4 | 6R6106 | Resistor, fixed: carbon; 10,000 1W N.I. |
| R-5 | 6R6028 | Resistor, fixed: carbon; 22,000 1/2W Ins. |
| R-6 | 6R6147 | Resistor, fixed: carbon; 330 1W Ins. |
| R-7 | 6R6004 | Resistor, fixed: carbon; 1 meg 1/2W Ins. |
| R-8 | 6R6005 | Resistor, fixed: carbon; 50 1/2W N.I. |
| R-9 | 6R6005 | Resistor, fixed: carbon; 50 1/2W N.I. |
| R-10 | 18A71925 or 18A70172 | Resistor, variable: carbon; 500,000 with S.P.S.T. switch; tapped at 50,000 ohms; less shaft |
| R-11 | 6R6056 | Resistor, fixed: carbon; 47,000 1/2W Ins. |
| R-12 | 6R2118 | Resistor, fixed: carbon; 3.3 meg 1/2W Ins. |
| R-13 | 6R3927 | Resistor, fixed: carbon; 2.2 meg 1/2W Ins. |
| R-14 | 6R6032 | Resistor, fixed: carbon; 470,000 1/2W Ins. |
| R-15 | 6R6015 | Resistor, fixed: carbon; 220,000 1/2W Ins. |
| R-16 | 6R6004 | Resistor, fixed: carbon; 1 meg 1/2W Ins. |
| R-17 | 6R6390 | Resistor, fixed: carbon; 180 10% 1W Ins. |
| R-18 | 6R5550 | Resistor, fixed: carbon; 47 10% 1/2W Ins. |
| R-19 | 6R6184 | Resistor, fixed: carbon; 1000 1W N.I. |
| S-1 | | ON-OFF switch (part of volume control R-10) |
| S-2 | 1B70944 | Switch, solenoid: with mounting plate |
| S-3 | 40B70952 | Switch, selector |
| S-4 | 40A70931 | Switch, mute |
| S-5 | 1X71470 | Relay, MR-5 Tone control: complete |
| | 1K70677 | Magnet, tone relay |
| S-6 | 40B71383 | Switch, tone control actuating |
| S-7 | 1K73625 | Switch Assembly, push button |
| SP-1 | 1X74252 | Spark Plate Assembly |
| T1 & T2 | 24B70827 | Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in early sets only) |
| | or 24B76553 | Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in late sets only) |
| T-3 | 25A72258 | Transformer, output: with bracket |
| T-4 | 25B70950 | Transformer, power |
| | 9A12705 | Plate, electrolytic capacitor mtg.: bakelite wafer |
| | 1X74268 | Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together |
| | 1X74338 | Shaft Assembly, tuning control: consists of manual tuning shaft with gear, cam and shaft, cam spring, manual tuning shaft bearing block, miter gear bracket and large "C" washer |
| | 9A70208 | Socket, tube: 4 prong (vibrator socket) |
| | 9A6788 | Socket, tube: octal; plain |
| | 9A70165 | Socket, tube: octal; shielded type |
| | 50B73808 or 50B76590 | Speaker, dynamic: 6"; 3 ohm V.C. |
| | 6X4141 | Suppressor distributor |
| | 1X74336 | Tuner, Model ST-56-CT6 (complete) |

## ADDITIONAL PARTS LIST - MODEL CT6

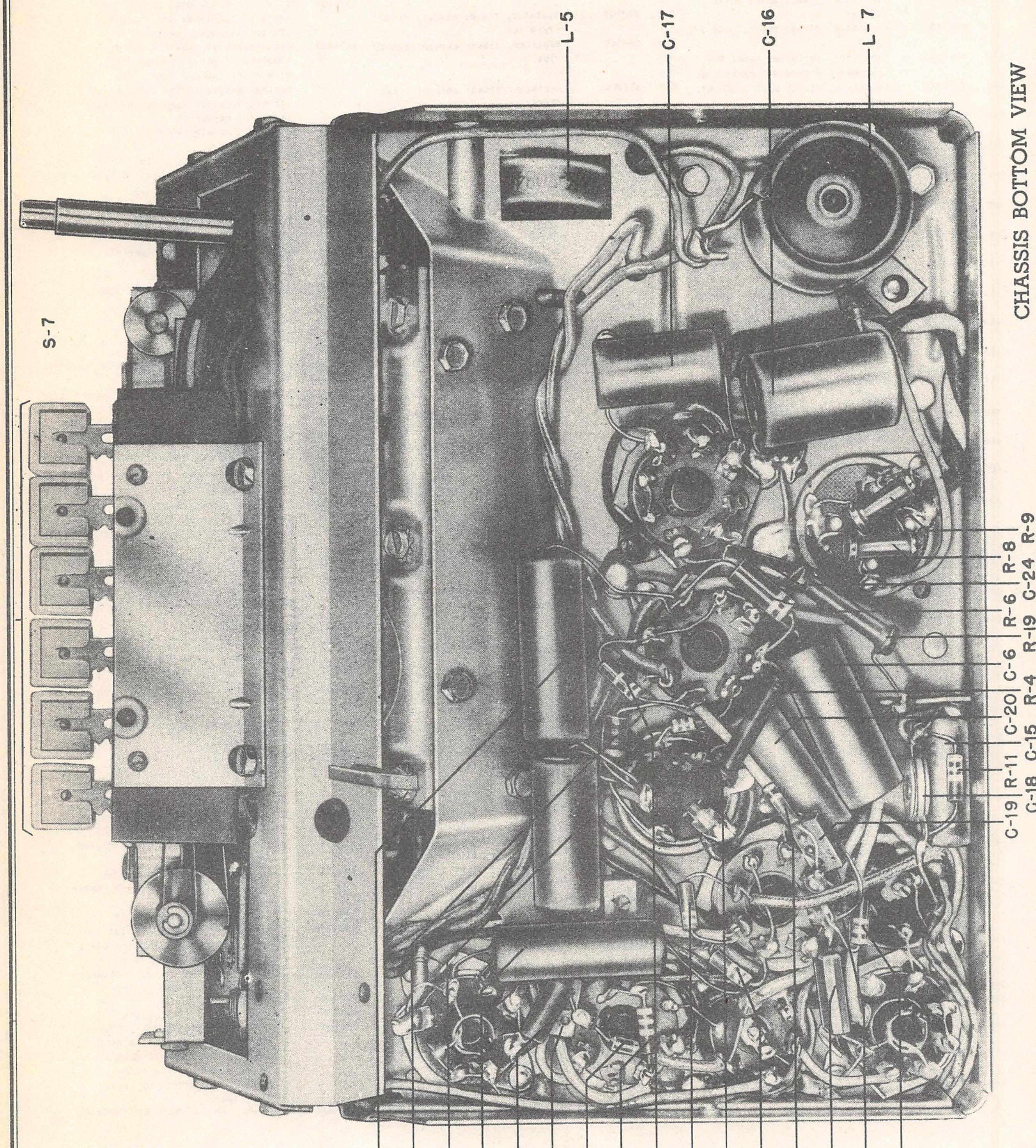
| PART NO. | DESCRIPTION |
|---|---|
| 8K4661 | Capacitor, ammeter |
| 8A4491 | Capacitor, generator |
| 11M8944 | Cord, dial: 18 lb; black |
| 1X74729 | Dial Background & Strip Assembly: plastic; with re-inforcing strip |
| 1X74352 | Dial Light & Bracket Assembly |
| 1X74932 | Lead Assembly, fuse: 20" long; fuse retainer on one end, ammeter clip on other end |
| 1X4895 | Lead Assembly, battery: 10" long; male ferrule on one end |
| 1X76898 | Lead-in, antenna extension: 20" long |

## ADDITIONAL PARTS LIST - MODEL PC6

| PART NO. | DESCRIPTION |
|---|---|
| 8K4661 | Capacitor, ammeter |
| 8A4491 | Capacitor, generator |
| 11M8944 | Cord, dial: 18 lb; black |
| 1X74305 | Dial Background & Strip Assembly: plastic; with reinforcing strip |
| 1X74304 | Dial Light & Bracket Assembly: with 5-1/2" lead |
| 1X4895 | Lead Assembly, battery: 10" long; insulated bushing and contact eyelet on one end, red insulated pin on the other |
| 1X74932 | Lead Assembly, fuse: 20" long; fuse retainer on one end, ammeter clip on other end |
| 1K73886 | Pointer & Slider Assembly |
| 1X74268 | Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together |
| 1X74299 | Shaft Assembly, tuning: consists of manual tuning shaft with gear, cam and shaft, cam spring, manual tuning shaft bearing block, miter gear bracket and large "C" washer |
| 9A70208 | Socket, 4 prong |
| 9A6788 | Socket, tube: octal; plain |
| 9A70165 | Socket, tube: octal; shielded type |
| 50B73808 | Speaker, dynamic: 6" 3 ohm v.c. |
| 1X74336 | Tuner, Model ST-56-PC6 (complete) |

## ADDITIONAL PARTS LIST - MODEL OE6

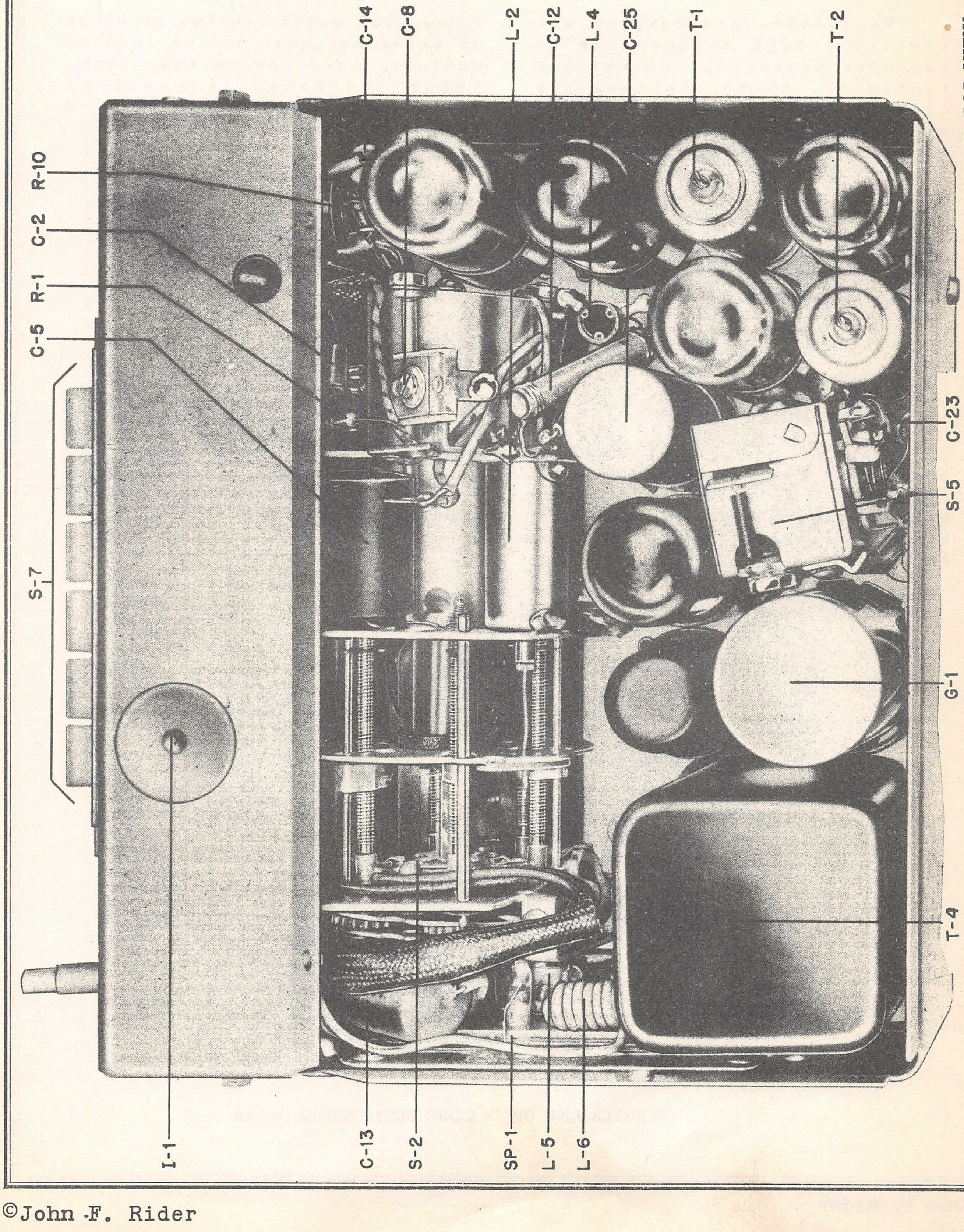
| PART NO. | DESCRIPTION |
|---|---|
| 8A4491 | Capacitor, generator |
| 1X74273 | Dial Background and Strip Assembly: translucent white plastic; with metal reinforcing strip |
| 1X4895 | Lead Assembly, battery: 10" long; insulated bushing and contact eyelet on one end, red insulated pin on other end. |
| 1X4894 | Lead Assembly, fuse: 20" long; fuse receptacle on one end, spade lug on other end |
| 1K73732 | Pointer and Slider Assembly |
| 1X74268 | Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together |
| 49A73806 | Pulley, cord: brass, 5/16 diameter (pointer cord idler pulley) |
| 9A70208 | Socket, 4 prong |
| 9A6788 | Socket, tube: octal, plain |
| 1X74263 | Shaft Assembly, tuning: includes manual tuning shaft with gear, cam & shaft, cam spring, manual tuning shaft bearing block, miter gear bracket and large "C" washer. |
| 1X74336 | Tuner, Model ST-56-OE6 (complete) |


L-5
C-17
C-16
L-7
S-7
R-9
R-8
C-24
R-6
R-19
C-6
R-4
C-20
C-15
R-11
C-18
C-19
C-7
R-17
C-22
C-4
C-9
C-10
R-2
R-3
R-18
R-13
R-15
R-12
R-16
C-21
•R-7
R-14

CHASSIS BOTTOM VIEW

For schematic, see P.15-12
For other data, see P.16-6,16-7,16-16

MOTOROLA, INC.


C-14
C-8
L-2
C-12
L-4
C-25
T-1
T-2
R-10
C-2
R-1
C-5
S-7
C-23
S-5
G-1
T-4
I-1
C-13
S-2
SP-1
L-5
L-6

CHASSIS TOP VIEW

## WARNING: CHECK VOLTAGE REGULATOR

Many late cars develop exceedingly high voltage due to improper adjustment of voltage regulator, which shortens the life of radio tubes, vibrator, electrical accessories and headlights. When voltage exceeds 7.3 volts with motor running at about 35 miles per hour and no load or battery, have the voltage regulator adjusted for maximum voltage of 7.3 volts under a no load condition.

## TO REPLACE DIAL LIGHT

It will be necessary to remove set from car when replacing dial light. Pry off the large plug button directly over the "M" push button and replace with a #44 miniature bayonet base pilot lamp.

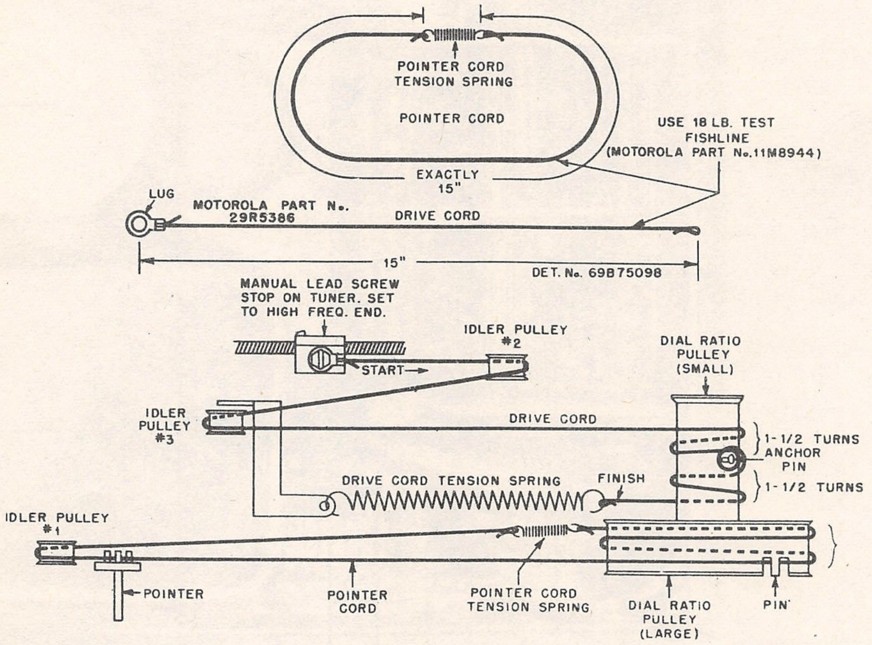
## POINTER AND DRIVE CORD REPLACEMENT

### PREPARE RECEIVER AS FOLLOWS

1. Remove the escutcheon.

2. Remove the push button assembly. Two screws hold it in position. Do not unsolder any wire leads; just lay the push button assembly on top of the set.

3. The pointer & drive cords are now fully exposed. If only the pointer cord is to be replaced, temporarily remove the drive cord to make the pointer cord more readily accessible.


POINTER CORD TENSION SPRING
POINTER CORD
USE 18 LB. TEST FISHLINE (MOTOROLA PART No.11M8944)
EXACTLY 15"
LUG
MOTOROLA PART No. 29R5386
DRIVE CORD
15"
DET. No. 69B75098
MANUAL LEAD SCREW STOP ON TUNER. SET TO HIGH FREQ. END.
START
IDLER PULLEY #2
DIAL RATIO PULLEY (SMALL)
IDLER PULLEY #3
DRIVE CORD
1-1/2 TURNS
ANCHOR PIN
1-1/2 TURNS
DRIVE CORD TENSION SPRING
FINISH
IDLER PULLEY #1
POINTER
POINTER CORD
POINTER CORD TENSION SPRING
DIAL RATIO PULLEY (LARGE)
PIN

POINTER AND DRIVE CORD RESTRINGING DETAIL.

## MOTOROLA, INC.

MODEL FD6

### Hash, Ripple and Mechanical Vibration in Model FD-6.

Some Model FD-6's have been troubled by hash, ripple and mechanical vibration. These conditions can be remedied by dressing leads, changing the position of the screen by-pass capacitor (C06) and adding q copper washer to the hash choke.

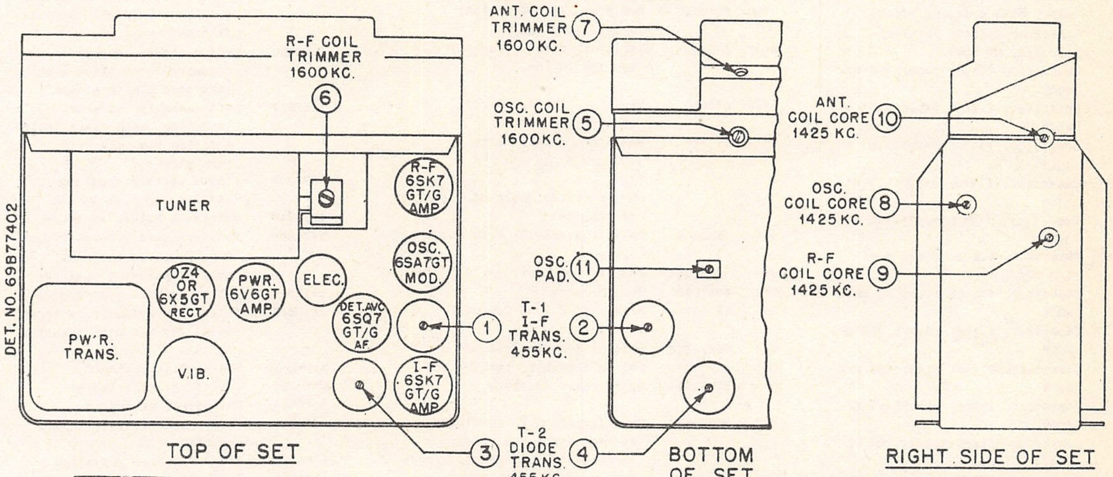
Hash: Remove Capacitor C-6 from its present location and mount it between electrolytic capacitor and the 6SA7 tube along side of the oscillator padder adjustment screw. It is a tight fit but there is room for it.

Dress the vibrator leads (black and green) into the opening in the chassis base. Next, dress the hot "A" (yellow) lead away from the black and green vibrator leads.

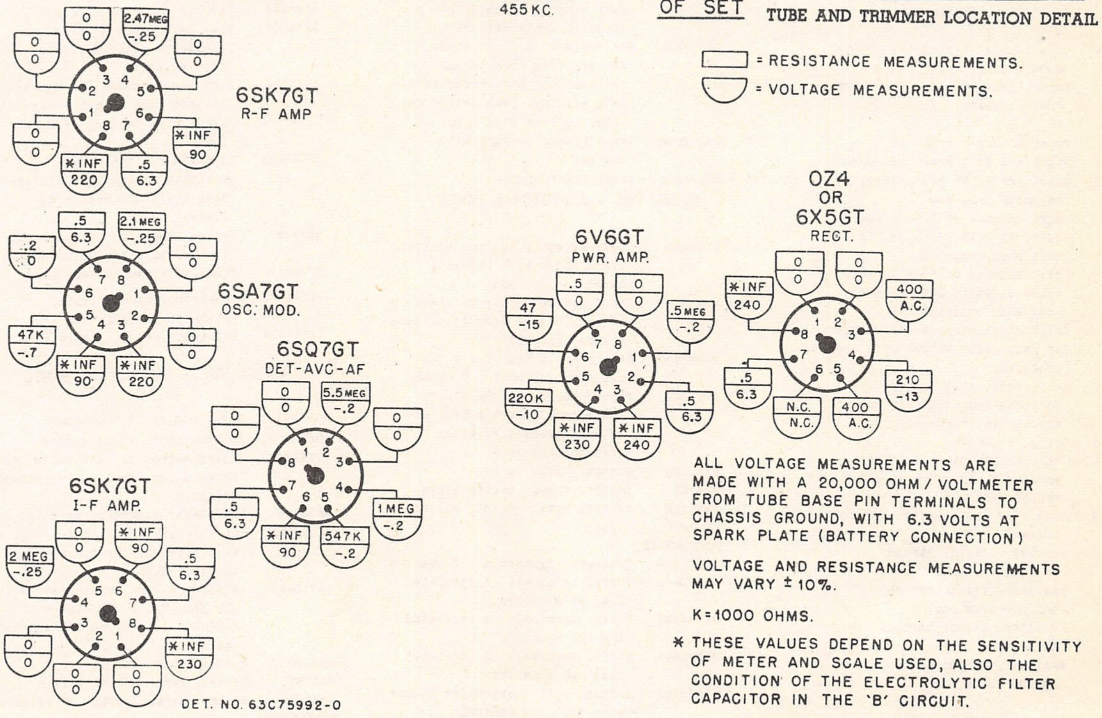
Ripple: Ripple may be reduced by removing the chassis from the housing and removing the nose of the set exposing the volume control. Unsolder the grounded lug of the volume control from the bracket. Attach a lead to this lug and run it back to the cathode terminal of the 6SQ7 tube socket.

Mechanical Vibration: A magnetic field is set up by the hash choke which in some instances causes a mechanical vibration (buzz). This condition can be eliminated by soldering a copper washer, Motorola Part Number 4S8203, (15/16 - 7/32 x .025) on top (end) of the hash choke. Solder the washer to the hash choke eyelet.

MODELS FD 6 and NH6


R-F COIL TRIMMER 1600KC. ⑥
TUNER
R-F 6SK7 GT/G AMP
OSC. 6SA7GT MOD.
ELEC.
OZ4 OR 6X5GT RECT
PWR. 6V6GT AMP.
DET.AVC 6SQ7 GT/G AF
I-F 6SK7 GT/G AMP
PW'R. TRANS.
VIB.
DET. NO. 69B77402
TOP OF SET
ANT. COIL TRIMMER 1600KC. ⑦
OSC. COIL TRIMMER 1600KC. ⑤
OSC. PAD. ⑪
① T-1 I-F TRANS. 455KC. ②
③ T-2 DIODE TRANS. 455KC. ④
BOTTOM OF SET
ANT. COIL CORE 1425 KC. ⑩
OSC. COIL CORE 1425 KC. ⑧
R-F COIL CORE 1425 KC. ⑨
RIGHT SIDE OF SET

TUBE AND TRIMMER LOCATION DETAIL


▭ = RESISTANCE MEASUREMENTS.
◡ = VOLTAGE MEASUREMENTS.
6SK7GT R-F AMP
0 / 0
0 / 0
2.47MEG / -.25
0 / 0
*INF / 90
.5 / 6.3
*INF / 220
0 / 0
6SA7GT OSC. MOD.
.2 / 0
.5 / 6.3
2.1MEG / -.25
0 / 0
0 / 0
*INF / 220
*INF / 90
47K / -.7
6SQ7GT DET-AVC-AF
0 / 0
0 / 0
5.5MEG / -.2
0 / 0
1MEG / -.2
547K / -.2
*INF / 90
.5 / 6.3
6SK7GT I-F AMP.
2 MEG / -.25
0 / 0
*INF / 90
.5 / 6.3
*INF / 230
0 / 0
0 / 0
0 / 0
6V6GT PWR. AMP.
47 / -15
.5 / 0
0 / 0
.5MEG / -.2
.5 / 6.3
*INF / 240
*INF / 230
220K / -10
OZ4 OR 6X5GT RECT.
*INF / 240
0 / 0
0 / 0
400 / A.C.
210 / -13
400 / A.C.
N.C. / N.C.
.5 / 6.3
DET. NO. 63C75992-0

ALL VOLTAGE MEASUREMENTS ARE MADE WITH A 20,000 OHM / VOLTMETER FROM TUBE BASE PIN TERMINALS TO CHASSIS GROUND, WITH 6.3 VOLTS AT SPARK PLATE (BATTERY CONNECTION)

VOLTAGE AND RESISTANCE MEASUREMENTS MAY VARY ± 10%.

K=1000 OHMS.

* THESE VALUES DEPEND ON THE SENSITIVITY OF METER AND SCALE USED, ALSO THE CONDITION OF THE ELECTROLYTIC FILTER CAPACITOR IN THE 'B' CIRCUIT.

VOLTAGE AND RESISTANCE DIAGRAM

## MODELS FD6,NH6

# MOTOROLA, INC.

## MODELS FD6 and NH6

| REF. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C-1 | 21A20877 | Capacitor, fixed: metal mica; 90 mmf |
| C-2 | 8A4529 | Capacitor, fixed: paper;.006 mf. 100V |
| C-3 | 20A70601 | Capacitor, variable:mica;50-180 mmf.; with mounting bracket |
| C-4 | 8A14791 | Capacitor, fixed: paper; .05 mf. 400V |
| C-5 | 8A19133 | Capacitor, fixed: paper; .5 mf. 100V |
| C-6 | 8A14791 | Capacitor, fixed: paper; .05 mf. 400V |
| C-7 | 8K13166 | Capacitor, fixed: paper; .1 mf. 400V |
| C-8 | 20A70601 | Capacitor, variable; mica; 50-180 mmf.; with mounting bracket |
| C-9 | 21K70720 | Capacitor, fixed: mica; 5 mmf. 500V |
| C-10 | 21R6513 | Capacitor, fixed: mica; 50 mmf. 300V |
| C-11 | 20A70214 | Capacitor, variable; mica; 30-60 mmf.; with mounting bracket |
| C-12 | 21A71872 | Capacitor, fixed: ceramic; 400 mmf. 5% 500V |
| C-13 | 8A17028 | Capacitor, fixed: paper; .5 mf. 100V |
| C-14 | 8K23690 | Capacitor, fixed: paper; .01 mf. 400V |
| C-15 | 8K23690 | Capacitor, fixed: paper; .01 mf. 400V |
| C-16 | 8A19133 | Capacitor, fixed: paper; .5 mf. 100V |
| C-17 | 8A12840 | Capacitor, fixed:paper; .006 mf. 1600V |
| C-18 | 21A70176 | Capacitor, fixed: mica; dual 120 mmf. |
| C-19 | 21R6513 | Capacitor, fixed: mica; 50 mmf. 300V |
| C-20 | 8A71911 | Capacitor, fixed: paper; .03 mf. 400V |
| C-21 | 21R6648 | Capacitor, fixed: mica; 250 mmf. 500V |
| C-22 | 8A13166 | Capacitor, fixed: paper; .1 mf. 400V |
| C-23 | 8A71909 | Capacitor, fixed: paper; .004 mf. 400V |
| C-24 | 8A71910 | Capacitor, fixed:paper; .006 mf. 400V |
| C-25 | 23A75429 | Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V |
| E-1 | 1X75200 | Tuner, Model St-56 - FD6 - NH6 PD6: complete |
| F-1 | 65K4637 | Fuse: 20 Amp.; type 3AG |
| G-1 | 48B3333 | Vibrator: full wave; non-sync. |
| I-1 | 65X10867 | Bulb: 6-8V, .25 Amp., tubular bayonet; type #44 |
| L-1 | 1A71881 | Coil, antenna or R.F. (specify color of paint dots on old coil when ordering) |
| L-2 | 1A71881 | Coil, antenna or R. F. (specify color of paint dots on old coil when ordering) |
| L-3 | 1A71879 | Coil, oscillator (specify color of paint dots on old coil when ordering) |
| L-4 | 24A70227 | Coil, oscillator padder: includes mounting clip and adjustable iron core |
| L-5 | 24K70840 | Coil, "A" choke |
| L-6 | 24K73535 | Coil, choke: dial light and speaker field; 9 turns #16 yellow wire |
| L-7 | 24A70199 | Coil, "A" choke: with mounting bracket |
| R-1 | 6R6032 | Resistor, fixed: carbon; 470,000-1/2W Ins. |
| R-2 | 6R6075 | Resistor, fixed: carbon; 100,000-1/2W Ins. |
| R-3 | 6R6056 | Resistor, fixed: carbon; 47,000-1/2W; Ins. |
| R-4 | 6R6106 | Resistor, fixed: carbon; 10,000-1W; N. I. |
| R-5 | 6R6028 | Resistor, fixed: carbon; 22,000-1/2W: Ins. |
| R-6 | 6R6147 | Resistor, fixed: carbon; 330-1W; Ins. |

| REF. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| R-7 | 6R6004 | Resistor, fixed: carbon; 1 meg-1/2W; Ins. |
| R-8 | 6R6005 | Resistor, fixed: carbon; 50-1/2W; N. I. |
| R-9 | 6R6005 | Resistor, fixed: carbon; 50-1/2W; N. I. |
| R-10 | 18A71925 or<br>18A70172 | Resistor, variable: carbon; .5 meg; with S.P.S.T. switch; tapped at 50,000 ohms; less shaft |
| R-11 | 6R6056 | Resistor, fixed: carbon; 47,000-1/2W; Ins. |
| R-12 | 6R2118 | Resistor, fixed: carbon; 3.3 meg 1/2W; Ins. |
| R-13 | 6R3927 | Resistor, fixed: carbon; 2.2 meg 1/2W Ins. |
| R-14 | 6R6032 | Resistor, fixed: carbon; 470,000-1/2W; Ins. |
| R-15 | 6R6015 | Resistor, fixed: carbon; 220,000-1/2W; Ins. |
| R-16 | 6R6004 | Resistor, fixed: carbon; 1 meg 1/2W; Ins. |
| R-17 | 6R6390 | Resistor, fixed: carbon; 180 10% 1W Ins. |
| R-18 | 6R5550 | Resistor, fixed: carbon; 47 10% 1/2W Ins. |
| R-19 | 6R6184 | Resistor, fixed: carbon; 1000 1W N. I. |
| S-1 | | ON-OFF switch (part of volume control R-10) |
| S-2 | 1B70944 | Switch, solenoid: with mounting plate |
| S-3 | 40B70952 | Switch, selector |
| S-4 | 40A70931 | Switch, mute |
| S-5 | 1X71470 | Reley, MR-5 Tone Control: complete |
| S-6 | 40B71383 | Switch, tone control |
| S-7 | 1K73625 | Switch Assembly, push button |
| SP-1 | 1X75194 | Spark Plate Assembly |
| T-1 & T-2 | 24B70827<br>or | Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in early sets only) |
| | 24B76553 | Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in late sets only) |
| T-3 | 25A72258 | Transformer, output: with bracket |
| T-4 | 25B70950 | Transformer, power |

## MODEL FD6 - ADDITIONAL PARTS

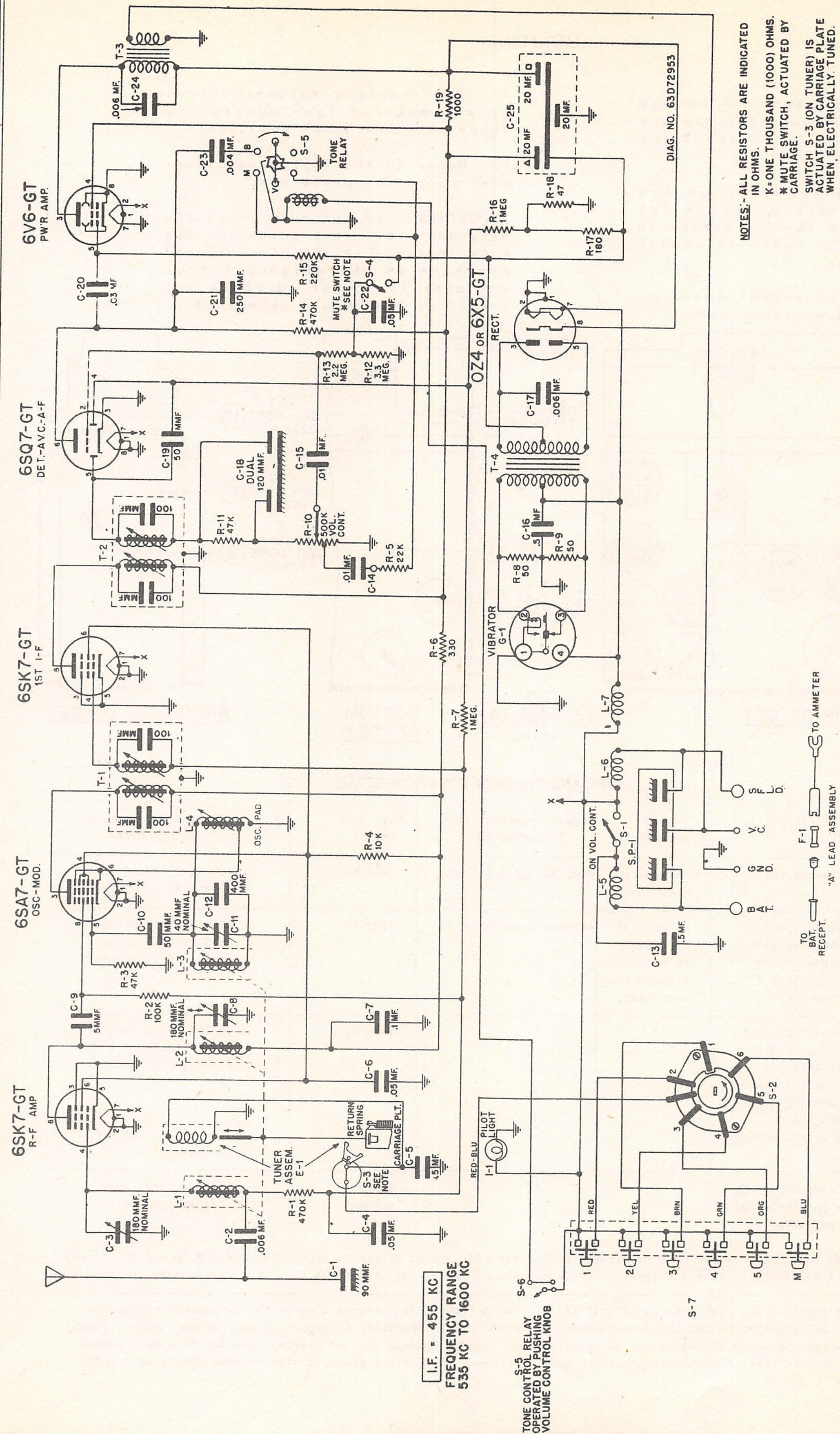
| PART NO. | DESCRIPTION |
|---|---|
| 1X75223 | Shaft Assembly, volume control: brass shaft with bakelite washer at one end |
| 47A73635 | Shaft, volume control: hairpin shaped; 29/32" long (fits into volume control) |
| 26B70107 | Shield, coil (for T-1 & T-2; use with 24B70827 I.F.-diode |
| 1A71049 | Shield and Iron Core Sleeve Assembly (for T-1 & T-2; use with 24B76553 I.F.-diode transformers only) |
| 9A70208 | Socket, tube: 4 Pin |
| 9A6788 | Socket, tube: octal; plain |
| 9A70165 | Socket, tube: octal, shielded type |
| 50B71900 or<br>50B76589 | Speaker: dynamic 6"; 3 ohm v.c. |
| 31K72404 | Strip, terminal: 1 insulated lug, #1 mounting. |
| 31K74292 | Strip, terminal: 1 insulated lug, #2 mounting |
| 31K74291 | Strip, terminal: 2 insulated lugs, #2 mounting |
| 41A51096 | Spring, coil (used under volume knob for tone control operation) |
| 41A73996 | Spring, drive cord tension (large) |
| 41A73619 | Spring, string tension (small) |

| PART NO. | DESCRIPTION |
|---|---|
| 46A72155 | Stud, dial ratio pulley: brass; 1/8" diameter x 51/64" long |
| 6A76813 | Suppressor, distributor |
| 29K5405 | Terminal, insulated pin: black; (speaker ground terminal) |
| 14A74226 | Insulator, switch: armite; 4" x 2-7/16" |
| 36B72165 | Knob, station set-up: die cast; polished chrome finish |
| 36K73406 | Knob, control: with setscrew; (volume & tuning) |
| 29R5386 | Lug, soldering: #4 hot-tin dipped (used on one end of drive cord) |
| 1X4894 | Lead Assembly, fuse: 20" long; fuse retainer on one end, spade lug on other end |
| 1X4895 | Lead Assembly, battery: 10" long, male connector on one end, insulated pin terminal on other end. |
| 1X76859 | Lead Assembly, speaker: 2 conductor with black & white insulated pin terminals |
| 1X27619 | Lead Assembly, speaker: 3 conductor, with black, white & yellow insulated pin terminals |
| 1X72203 | Plate, speaker mounting: includes speaker gasket |
| 1K72248 | Pointer & Slider Assembly |
| 1X74268 | Pulley Assembly, dial ratio: one large and one small pulley assembled together |
| 49A73807 | Pulley, cord: 1/2" groove |
| 1X70646 | Receptacle Assembly, antenna: metal ferrule with insulated contact |
| 34B72259 | Scale, dial; plastic |
| 8K19266 | Capacitor, distributor |
| 8A4491 | Capacitor, generator |
| 42A51461 | Clamp, electrolytic capacitor mounting |
| 42A4215 | Clip, vibrator grounding |
| 11M8944 | Cord, dial: 18 lb; black |
| 1X75221 | Dial Background & Strip Assembly: plastic with reinforcing strip |
| 1X75319 | Dial Light Assembly: miniature bayonet base socket riveted to large plug button; with 12" lead |
| 13C72265 | Escutcheon, front plate: polished chrome finish (less dial scale and retaining frame) |
| 5S7805 | Eyelet, snap-in: steel (dial background strip mounting) |
| 7C74211 | Frame, dial scale retaining |
| 14K74155 | Insulator, electrolytic: fishpaper; 3-7/64 x 2-5/8" |
| 14X51112 | Insulator, fuse: fibre tube |

## MODEL NH6 - ADDITIONAL PARTS

| PART NO. | DESCRIPTION |
|---|---|
| 11M8944 | Cord, dial: 18 lb. black |
| 49A73807 | Pulley, cord: 1/2" groove |
| 1X74268 | Pulley Assembly, dial ratio: one large & one small pulley assembled together |
| 1X70646 | Receptacle Assembly, antenna: metal |
| 26B70107 | Shield, coil: (for T-1 & T-2; use with 24B70827 I.F-Diode transformers only) |
| 1A71049 | Shield and Iron Core Sleeve Assembly (for T-1 & T-2; use with 24B76553 I.F.-Diode transformers only) |
| 9A70208 | Socket, tube: 4 pin |
| 9A6788 | Socket, tube: octal; plain |
| 9A70165 | Socket, tube: octal; shielded type |
| 50B71900 or<br>50B76589 | Speaker, dynamic: 6"; 3 ohm v.c. |
| 6X4141 | Suppressor, distributor |

# MOTOROLA, INC.


6V6-GT PW'R AMP.
6SQ7-GT DET.-AVC.-A-F
6SK7-GT 1ST I-F
6SA7-GT OSC-MOD.
6SK7-GT R-F AMP
0Z4 OR 6X5-GT RECT.
VIBRATOR G-1
T-1
T-2
T-3
T-4
C-1 90 MMF.
C-2 .006 MF.
C-3 180 MMF. NOMINAL
C-4 .05 MF.
C-5 .45 MF.
C-6 .05 MF.
C-7 .1 MF.
C-8 180 MMF. NOMINAL
C-9 5 MMF.
C-10 50 MMF.
C-11 40 MMF. NOMINAL
C-12 400 MMF.
C-13 .5 MF.
C-14 .01 MF.
C-15 .01 MF.
C-16 .5 MF.
C-17 .006 MF.
C-18 DUAL 120 MMF.
C-19 50 MMF
C-20 .03 MF
C-21 250 MMF.
C-22 .05 MF.
C-23 .004 MF.
C-24 .006 MF.
C-25 20 MF 20 MF 20 MF.
R-1 470K
R-2 100K
R-3 47K
R-4 10K
R-5 22K
R-6 330
R-7 1 MEG.
R-8 50
R-9 50
R-10 500K VOL. CONT.
R-11 47K
R-12 3.3 MEG.
R-13 2.2 MEG.
R-14 470K
R-15 220K
R-16 1 MEG
R-17 180
R-18 47
R-19 1000
L-1
L-2
L-3
L-4 OSC. PAD
L-5
L-6
L-7
S-1 ON VOL. CONT.
S.P.-I
S-2
S-3 SEE NOTE
S-4
MUTE SWITCH * SEE NOTE
S-5 TONE RELAY
S-6
S-7
TUNER ASSEM. E-1
RETURN SPRING
CARRIAGE PLT.
PILOT LIGHT I-1
RED-BLU
RED
YEL
BRN
GRN
ORG
BLU
1 2 3 4 5 M
B A T.
G N D.
V. C.
S F L D.
TO BAT. RECEPT.
"A" LEAD ASSEMBLY
F-1
TO AMMETER
100 MMF
DIAG. NO. 63D72953
I.F. = 455 KC
FREQUENCY RANGE 535 KC TO 1600 KC
S-5 TONE CONTROL RELAY OPERATED BY PUSHING VOLUME CONTROL KNOB

**NOTES:**- ALL RESISTORS ARE INDICATED IN OHMS.
K = ONE THOUSAND (1000) OHMS.
* MUTE SWITCH, ACTUATED BY CARRIAGE.
SWITCH S-3 (ON TUNER) IS ACTUATED BY CARRIAGE PLATE WHEN ELECTRICALLY TUNED.
C-22 CHANGED TO .1 MF. IN LATE MODELS.

WARNING: Many late model cars develop exceedingly high voltage due to improper adjustment of voltage regulator which shortens the life of radio tubes, vibrators and headlights. When voltage exceeds 7.3 volts with motor running at about 35 miles per hour and no load on battery, have your auto mechanic adjust the voltage regulator for maximum voltage of 7.3 volts under a no load condition.

For I-F transformer notes, see P.16-7
For push button data, see P.16-6

# MOTOROLA, INC.

## ALIGNMENT

### PROCEDURE

1. Remove the top and bottom covers. All adjustments are now exposed. Refer to Figure 3 for their location.

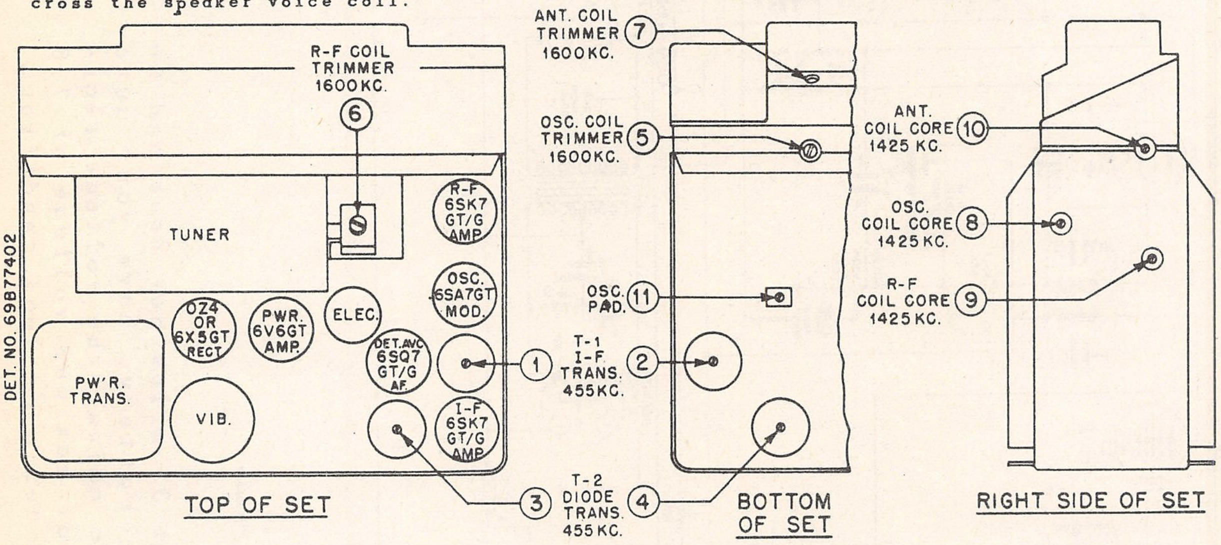
2. Turn the receiver on and allow it to warm up for a few minutes. Press the "M" button to place automatic tuner in manual tuning position.

3. Connect the output meter across the speaker voice coil.

4. Set receiver volume control at maximum and tone control to voice position (high position).

5. Refer to the following alignment chart for procedure.

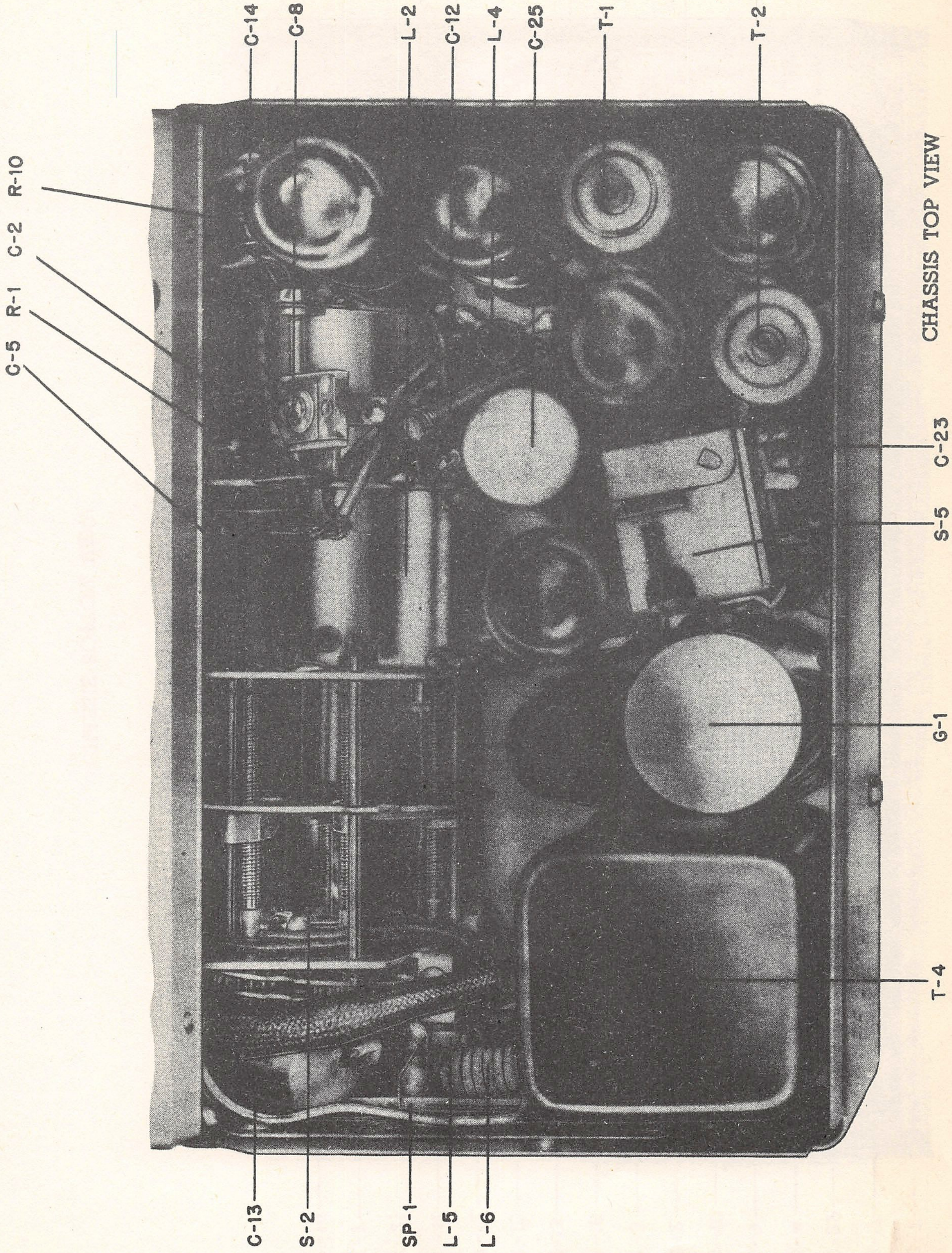
IMPORTANT: Do not push in on the alignment tool when adjusting the tuner cores. The slightest inward pressure on the alignment tool may move the tuner carriage and result in inaccurate alignment.



ANT. COIL TRIMMER ⑦ 1600KC.
R-F COIL TRIMMER 1600KC. ⑥
OSC. COIL TRIMMER ⑤ 1600KC.
ANT. COIL CORE ⑩ 1425 KC.
OSC. COIL CORE ⑧ 1425 KC.
R-F COIL CORE ⑨ 1425 KC.
TUNER
R-F 6SK7 GT/G AMP.
OSC. 6SA7GT MOD.
OZ4 OR 6X5GT RECT.
PWR. 6V6GT AMP.
ELEC.
DET. AVC 6SQ7 GT/G AF.
I-F 6SK7 GT/G AMP.
PW'R. TRANS.
VIB.
OSC. PAD. ⑪
① T-1 I-F TRANS. 455KC. ②
③ T-2 DIODE TRANS. 455KC. ④
DET. NO. 69B77402
TOP OF SET
BOTTOM OF SET
RIGHT SIDE OF SET

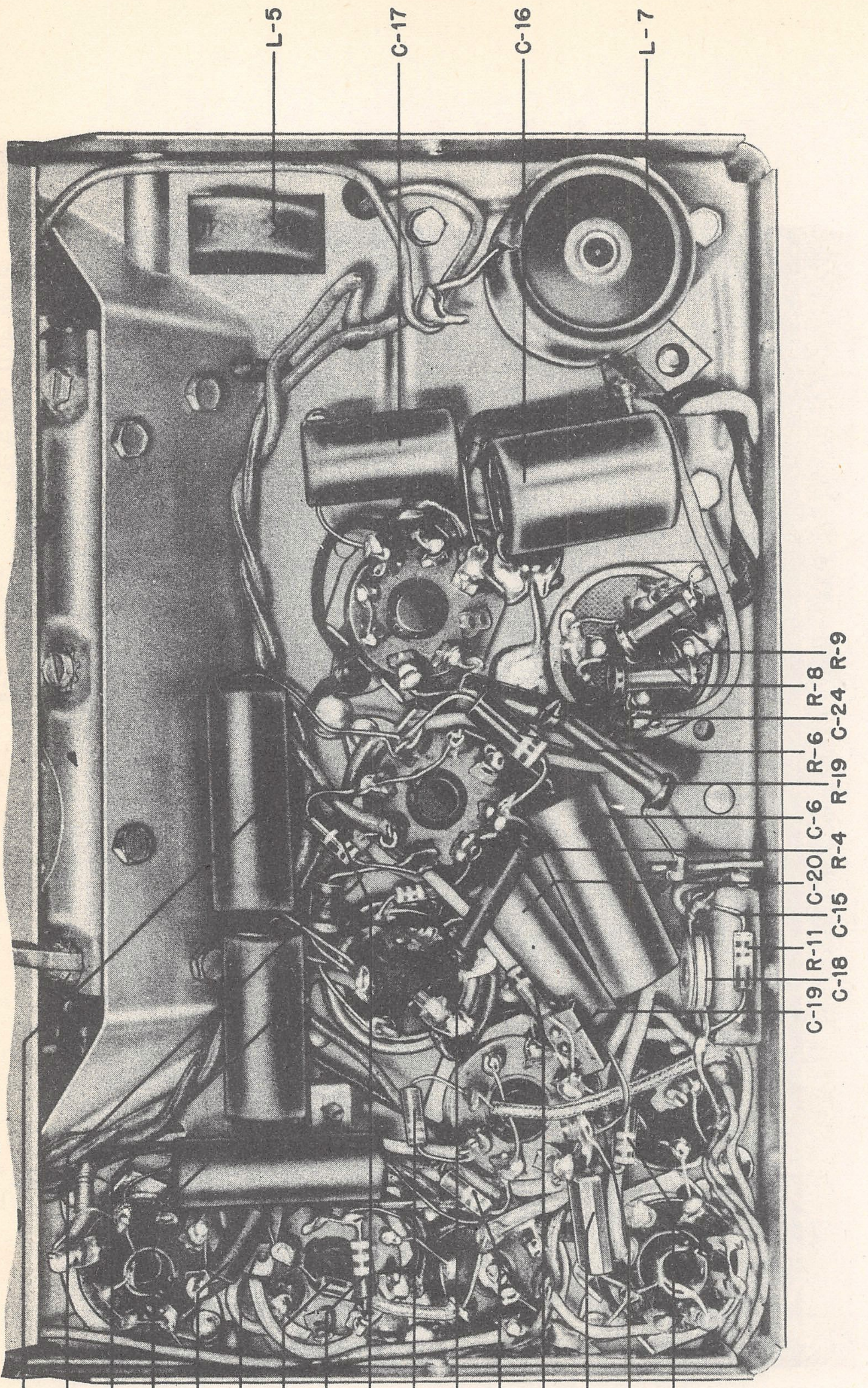
TUBE AND TRIMMER LOCATION DETAIL

| Step | Tuner Position Set to | Dummy Antenna | Signal Generator Lead Connected to | Sig. Gen. Set at | Adjust for Peak on Output Meter |
|---|---|---|---|---|---|
| 1. | High frequency end | .1 mfd. at Sig. Gen. | Osc. Mod grid (#5 pin) | 455 Kc | #1 and 2, P & S in T-1<br>#3 and 4, P & S in T-2 |
| 2. * | High frequency end, tuning shaft against stop. Cores should be set to project 1-1/8" from cans. | 60 mmf. at Sig. Gen. in series with 21" long coax lead. | Antenna Receptacle | 1600 Kc | #5 Osc. coil trimmer<br>#6 R.F. coil trimmer<br>#7 Ant. Coil trimmer |
| 3. * | EXACTLY one full turn in from high frequency end. Use knob set screw as an indicator. Start measuring turn the moment tuner carriage starts moving inward. | " | " | 1425 Kc | #8 Osc. coil core<br>#9 R.F. coil core<br>#10 Ant. coil core |
| 4. | EXACTLY four more full turns in (as indicated by knob setscrew) | " | " | Power turned off | #11 Osc. Pad. core for maximum noise |
| | NOTE: If oscillator padder core adjustment is too far off, repeat alignment procedure, steps 2, 3 and 4. It may be necessary to repeat alignment more than once if padder adjustment has been indiscriminately tampered with. | | | | |
| 5. | Assemble receiver and peak antenna trimmer (#7) to car antenna. The antenna trimmer is inaccessible when the receiver is installed behind instrument panel, therefore, it is necessary to adjust antenna trimmer before final installation. Proceed by laying set on floor of car, connect antenna and "A" leads, tune set to a spot around 1400 kc that is free of stations and adjust antenna trimmer for maximum noise. The antenna should be fully extended. | | | | |


C-14
C-8
L-2
C-12
L-4
C-25
T-1
T-2
R-10
C-2
R-1
C-5
C-23
S-5
G-1
T-4
C-13
S-2
SP-1
L-5
L-6

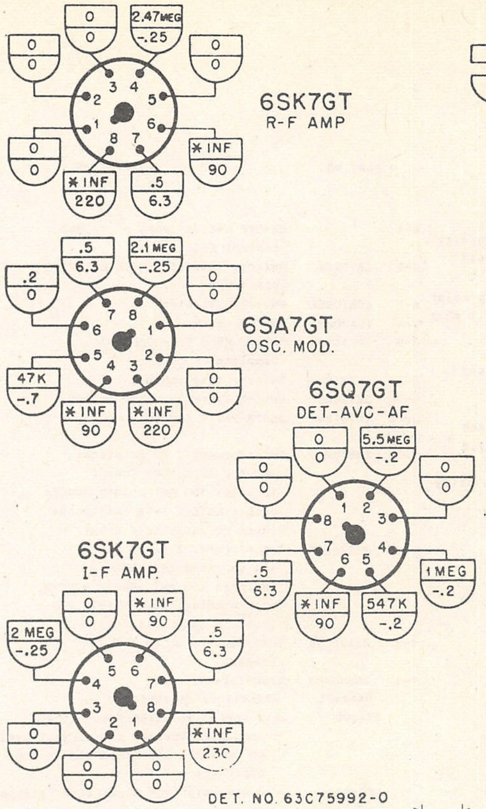
CHASSIS TOP VIEW

MOTOROLA, INC.


L-5
C-17
C-16
L-7
R-9
R-8
C-24
R-6
R-19
C-6
R-4
C-20
C-15
R-11
C-18
C-19
C-7
R-17
C-22
C-4
C-9
C-10
R-2
R-3
R-18
R-13
R-15
R-12
R-16
C-21
R-7
R-14

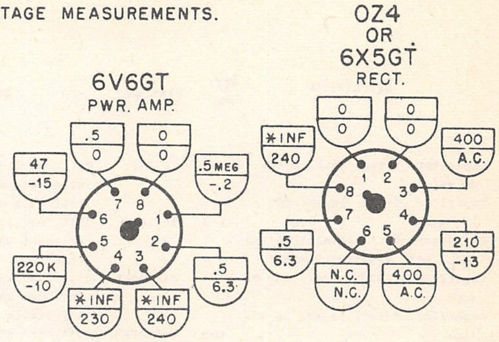
CHASSIS BOTTOM VIEW

# MOTOROLA, INC.


0
0
2.47MEG
-.25
0
0
0
0
0
0
*INF
90
*INF
220
.5
6.3
6SK7GT
R-F AMP
.5
6.3
2.1 MEG
-.25
.2
0
0
0
6SA7GT
OSC. MOD.
47K
-.7
0
0
*INF
90
*INF
220
6SQ7GT
DET-AVC-AF
0
0
5.5MEG
-.2
0
0
0
0
.5
6.3
1MEG
-.2
*INF
90
547K
-.2
6SK7GT
I-F AMP.
0
0
*INF
90
2 MEG
-.25
.5
6.3
0
0
*INF
230
0
0
0
0

▭ = RESISTANCE MEASUREMENTS.

◡ = VOLTAGE MEASUREMENTS.


OZ4
OR
6X5GT
RECT.
6V6GT
PWR. AMP.
.5
0
0
0
47
-15
.5MEG
-.2
220K
-10
.5
6.3
*INF
230
*INF
240
0
0
0
0
*INF
240
400
A.C.
.5
6.3
210
-13
N.C.
N.C.
400
A.C.

ALL VOLTAGE MEASUREMENTS ARE MADE WITH A 20,000 OHM / VOLTMETER FROM TUBE BASE PIN TERMINALS TO CHASSIS GROUND, WITH 6.3 VOLTS AT SPARK PLATE (BATTERY CONNECTION)

VOLTAGE AND RESISTANCE MEASUREMENTS MAY VARY ± 10%.

K=1000 OHMS.

* THESE VALUES DEPEND ON THE SENSITIVITY OF METER AND SCALE USED, ALSO THE CONDITION OF THE ELECTROLYTIC FILTER CAPACITOR IN THE 'B' CIRCUIT.

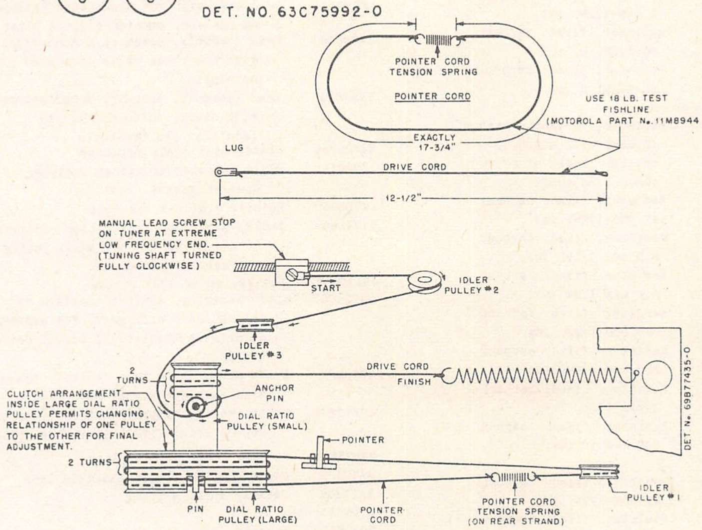

DET. NO. 63C75992-0
POINTER CORD TENSION SPRING
POINTER CORD
USE 18 LB. TEST FISHLINE (MOTOROLA PART No. 11M8944
EXACTLY 17-3/4"
LUG
DRIVE CORD
12-1/2"
MANUAL LEAD SCREW STOP ON TUNER AT EXTREME LOW FREQUENCY END. (TUNING SHAFT TURNED FULLY CLOCKWISE)
START
IDLER PULLEY #2
IDLER PULLEY #3
2 TURNS
CLUTCH ARRANGEMENT INSIDE LARGE DIAL RATIO PULLEY PERMITS CHANGING RELATIONSHIP OF ONE PULLEY TO THE OTHER FOR FINAL ADJUSTMENT.
ANCHOR PIN
DIAL RATIO PULLEY (SMALL)
DRIVE CORD
FINISH
POINTER
DET. No. 69B7435-0
2 TURNS
PIN
DIAL RATIO PULLEY (LARGE)
POINTER CORD
POINTER CORD TENSION SPRING (ON REAR STRAND)
IDLER PULLEY #1

FIGURE 1. POINTER AND DRIVE CORD RESTRINGING DETAIL

## TO REPLACE DIAL LIGHT

It will be necessary to remove set from car when replacing dial light. Pry out the large plug button directly over the "M" push button and replace bulb with a #44 miniature bayonet base pilot lamp.

### POINTER CORD REPLACEMENT

1. Make up the pointer cord as shown in Figure 1. The ends are tied to the pointer cord spring. IT MUST MEASURE 17-3/4" FROM ONE END OF THE SPRING TO THE OTHER AFTER BEING TIED. Secure the knots with a drop of shellac or household cement.

2. Restring as shown in Figure 1.

### DIAL DRIVE CORD REPLACEMENT

1. Make up the drive cord as shown in Figure 1. Secure the knots with a drop of shellac or household cement.

3. Restring as shown in Figure 1.

## POINTER AND DRIVE CORD REPLACEMENT

### PREPARE RECEIVER AS FOLLOWS

1. Remove the escutheon and push button assembly. Four screws hold it in position. Do not unsolder any wire leads; just lay the escutcheon and push button assembly to one side.

2. The pointer cord is now fully exposed. If only the pointer cord is to be replaced, temporarily remove the drive cord to make the pointer cord more readily accessible.

3. To reach drive cord, it will be necessary to remove stamped front of receiver in addition to escutcheon.

**MODEL PD6**

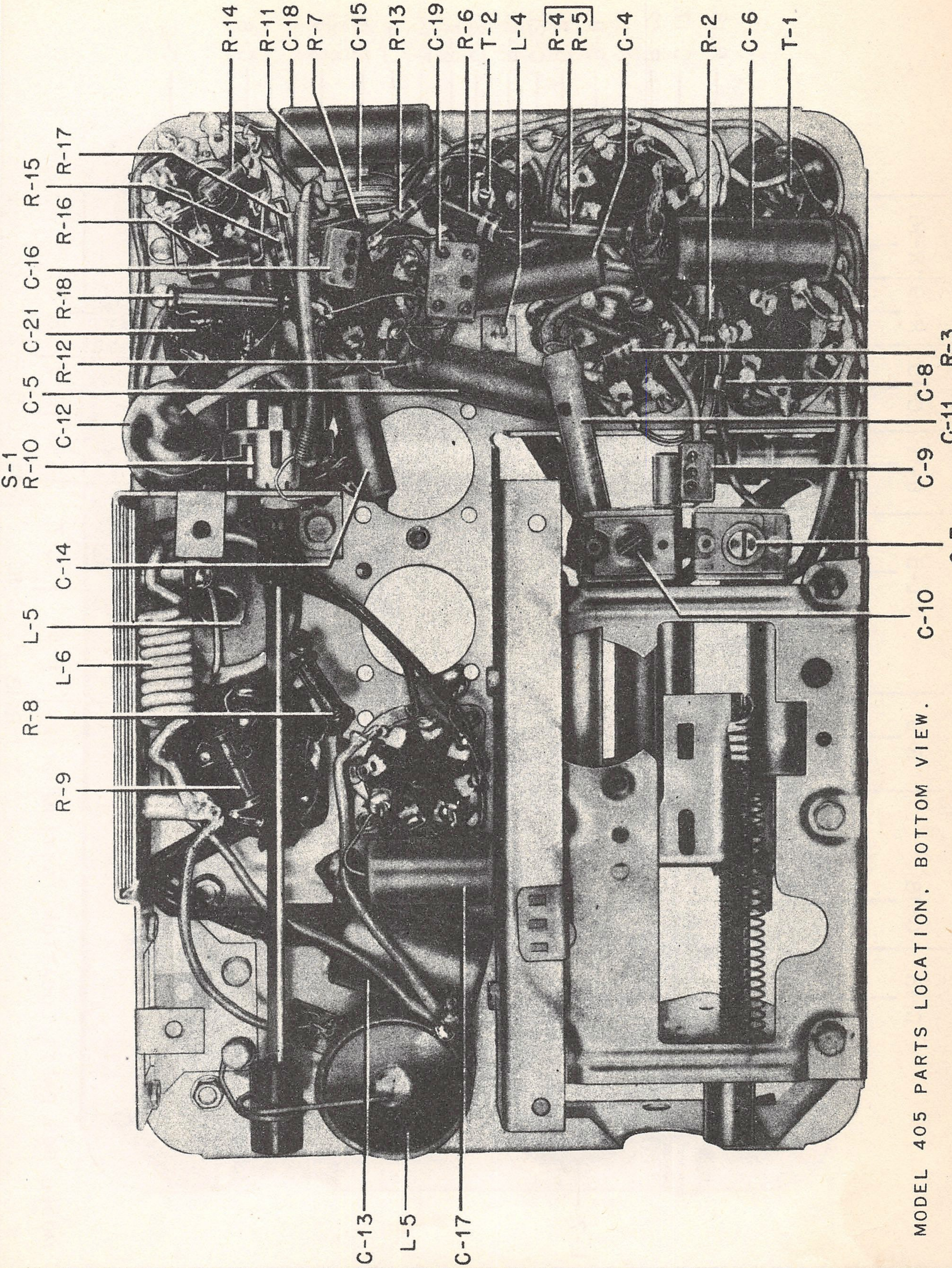
# MOTOROLA, INC.

| REF. NO. | PART NO | DESCRIPTION |
|---|---|---|
| C-1 | 21A20877 | Capacitor, fixed: metal mica; 90 mmf |
| C-2 | 8A4529 | Capacitor, fixed: paper;.006 mf. 100V |
| C-3 | 20A70601 | Capacitor, variable:mica;50-180 mmf.; with mounting bracket |
| C-4 | 8A14791 | Capacitor, fixed: paper; .05 mf. 400V |
| C-5 | 8A19133 | Capacitor, fixed: paper; .5 mf. 100V |
| C-6 | 8A14791 | Capacitor, fixed: paper; .05 mf. 400V |
| C-7 | 8K13166 | Capacitor, fixed: paper; .1 mf. 400V |
| C-8 | 20A70601 | Capacitor, variable; mica; 50-180 mmf.; with mounting bracket |
| C-9 | 21K70720 | Capacitor, fixed: mica; 5 mmf. 500V |
| C-10 | 21R6513 | Capacitor, fixed: mica; 50 mmf. 300V |
| C-11 | 20A70214 | Capacitor, variable; mica; 30-60 mmf.; with mounting bracket |
| C-12 | 21A71872 | Capacitor, fixed: ceramic; 400 mmf. 5% 500V |
| C-13 | 8A17028 | Capacitor, fixed: paper; .5 mf. 100V |
| C-14 | 8K23690 | Capacitor, fixed: paper; .01 mf. 400V |
| C-15 | 8K23690 | Capacitor, fixed: paper; .01 mf. 400V |
| C-16 | 8A19133 | Capacitor, fixed: paper; .5 mf. 100V |
| C-17 | 8A12840 | Capacitor, fixed:paper; .006 mf. 1600V |
| C-18 | 21A70176 | Capacitor, fixed: mica; dual 120 mmf. |
| C-19 | 21R6513 | Capacitor, fixed: mica; 50 mmf. 300V |
| C-20 | 8A71911 | Capacitor, fixed: paper; .03 mf. 400V |
| C-21 | 21R6648 | Capacitor, fixed: mica; 250 mmf. 500V |
| C-22 | 8A13166 | Capacitor, fixed: paper; .1 mf. 400V |
| C-23 | 8A71909 | Capacitor, fixed: paper;.004 mf. 400V |
| C-24 | 8A71910 | Capacitor, fixed:paper;.006 mf. 400V |
| C-25 | 23A75429 | Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V |
| E-1 | 1X75200 | Tuner, Model St-56 - FD6 - NH6 PD6: complete |
| F-1 | 65K4637 | Fuse: 20 Amp.; type 3AG |
| G-1 | 48B3333 | Vibrator: full wave; non-sync. |
| I-1 | 65X10867 | Bulb: 6-8V, .25 Amp., tubular bayonet; type #44 |
| L-1 | 1A71861 | Coil, antenna or R.F. (specify color of paint dots on old coil when ordering) |

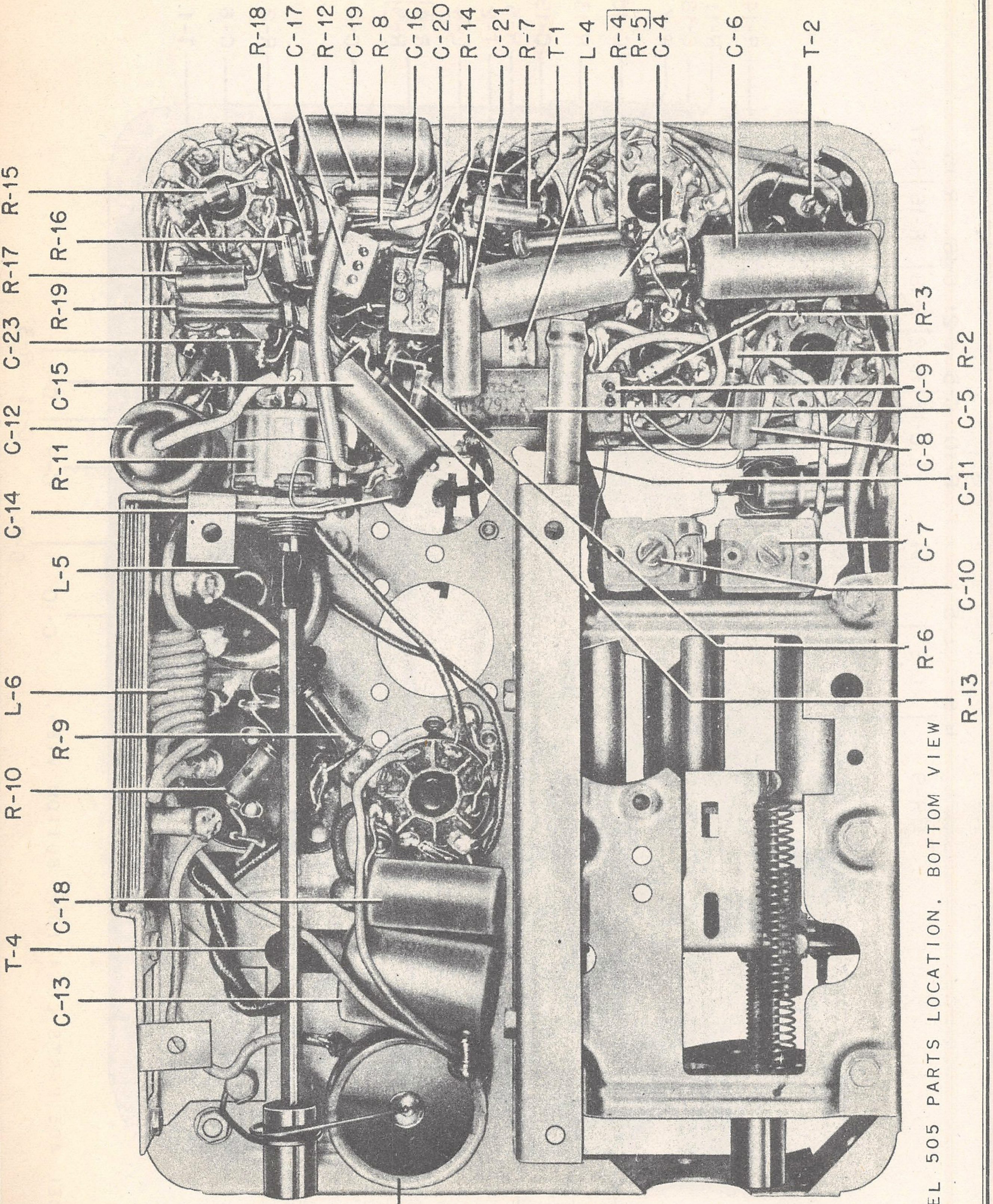
| REF. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| L-2 | 1A71881 | Coil, antenna or R. F. (specify color of paint dots on old coil when ordering) |
| L-3 | 1A71879 | Coil, oscillator (specify color of paint dots on old coil when ordering) |
| L-4 | 24A70227 | Coil, oscillator padder: includes mounting clip and adjustable iron core |
| L-5 | 24K70840 | Coil, "A" choke |
| L-6 | 24K73535 | Coil, choke: dial light and speaker field; 9 turns #16 yellow wire |
| L-7 | 24A70199 | Coil, "A" choke: with mounting bracket |
| R-1 | 6R6032 | Resistor, fixed: carbon; 470,000-1/2W Ins. |
| R-2 | 6R6075 | Resistor, fixed: carbon; 100,000-1/2W Ins. |
| R-3 | 6R6056 | Resistor, fixed: carbon; 47,000-1/2W; Ins. |
| R-4 | 6R6106 | Resistor, fixed: carbon; 10,000-1W; N. I. |
| R-5 | 6R6028 | Resistor, fixed: carbon; 22,000-1/2W: Ins. |
| R-6 | 6R6147 | Resistor, fixed: carbon; 330-1W; Ins. |
| R-7 | 6R6004 | Resistor, fixed: carbon; 1 meg-1/2W; Ins. |
| R-8 | 6R6005 | Resistor, fixed: carbon; 50-1/2W; N. I. |
| R-9 | 6R6005 | Resistor, fixed: carbon; 50-1/2W; N. I. |
| R-10 | 18A71925 or<br>18A70172 | Resistor, variable: carbon; .5 meg; with S.P.S.T. switch; tapped at 50,000 ohms; less shaft |
| R-11 | 6R6056 | Resistor, fixed: carbon; 47,000-1/2W; Ins. |
| R-12 | 6R2118 | Resistor, fixed: carbon; 3.3 meg 1/2W; Ins. |
| R-13 | 6R3927 | Resistor, fixed: carbon; 2.2 meg 1/2W Ins. |
| R-14 | 6R6032 | Resistor, fixed: carbon; 470,000-1/2W; Ins. |
| R-15 | 6R6015 | Resistor, fixed: carbon; 220,000-1/2W; Ins. |
| R-16 | 6R6004 | Resistor, fixed: carbon; 1 meg 1/2W; Ins. |
| R-17 | 6R6390 | Resistor, fixed: carbon; 180 10% 1W Ins. |
| R-18 | 6R5550 | Resistor, fixed: carbon; 47 10% 1/2W Ins. |
| R-19 | 6R6184 | Resistor, fixed: carbon; 1000 1W N. I. |

|  | PART NO. | DESCRIPTION |
|---|---|---|
| S-1 |  | ON-OFF switch (part of volume control R-10) |
| S-2 | 1B70944 | Switch, solenoid: with mounting plate |
| S-3 | 40B70952 | Switch, selector |
| S-4 | 40A70931 | Switch, mute |
| S-5 | 1X71470 | Reley, MR-5 Tone Control: complete |
| S-6 | 40B71383 | Switch, tone control |
| S-7 | 1K73625 | Switch Assembly, push button |
| SP-1 | 1X75194 | Spark Plate Assembly |
| T-1 & T-2 | 24B70827 | Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in early sets only) |
|  | or |  |
|  | 24B76553 | Transformer, I.F. or diode: 455 kc; iron core tuned; includes 100 mmf padder across each winding; less shield can (used in late sets only) |
| T-3 | 25A72258 | Transformer, output: with bracket |
| T-4 | 25B70950 | Transformer, power |
|  | 64A4491 | Capacitor, generator |
|  | 1X4895 | Lead Assembly, battery 10" long· insulated bushing and contact eyelet on one end, insulated pin on the other end |
|  | 1X74932 | Lead Assembly: 20" long; fuse retainer on one end. ammeter clip on other end |
|  | 1X76859 | Lead Assembly, speaker; 2 conductor; with black and white insulated pin terminals |
|  | 1X27619 | Lead Assembly, speaker: 3 conductor; with black, white and yellow insulated pin terminals |
|  | 64A24794 | Plate, dial scale retainer |
|  | 1X72011 | Plate, speaker mounting: includes speaker gasket |
|  | 1K75353 | Pointer & Slider Assembly |
|  | 1X74268 | Pulley Assembly, dial ratio: consists of one large and one small pulley assembled together |
|  | 49A73807 | Pulley, cord: 1/2" groove |
|  | 1X75405 | Shaft Assembly, tuning: consists of tuning shaft with gear, "C" washer, miter gear bracket and manual drive bearing |
|  | 1X75328 | Shaft Assembly, volume control; brass: with bakelite washer at one end. |
|  | 47A73635 | Shaft, volume control: hairpin shaped; 29/32" long (fits into volume control) |
|  | 9A6788 | Socket, tube: octal; plain |
|  | 9A70165 | Socket, tube: octal; shielded type |
|  | 9A70208 | Socket, tube: 4 prong |
|  | 50B71900 or<br>50B76589 | Speaker, dynamic: 6"; 3 ohm v.c. |

## MOTOROLA, INC.

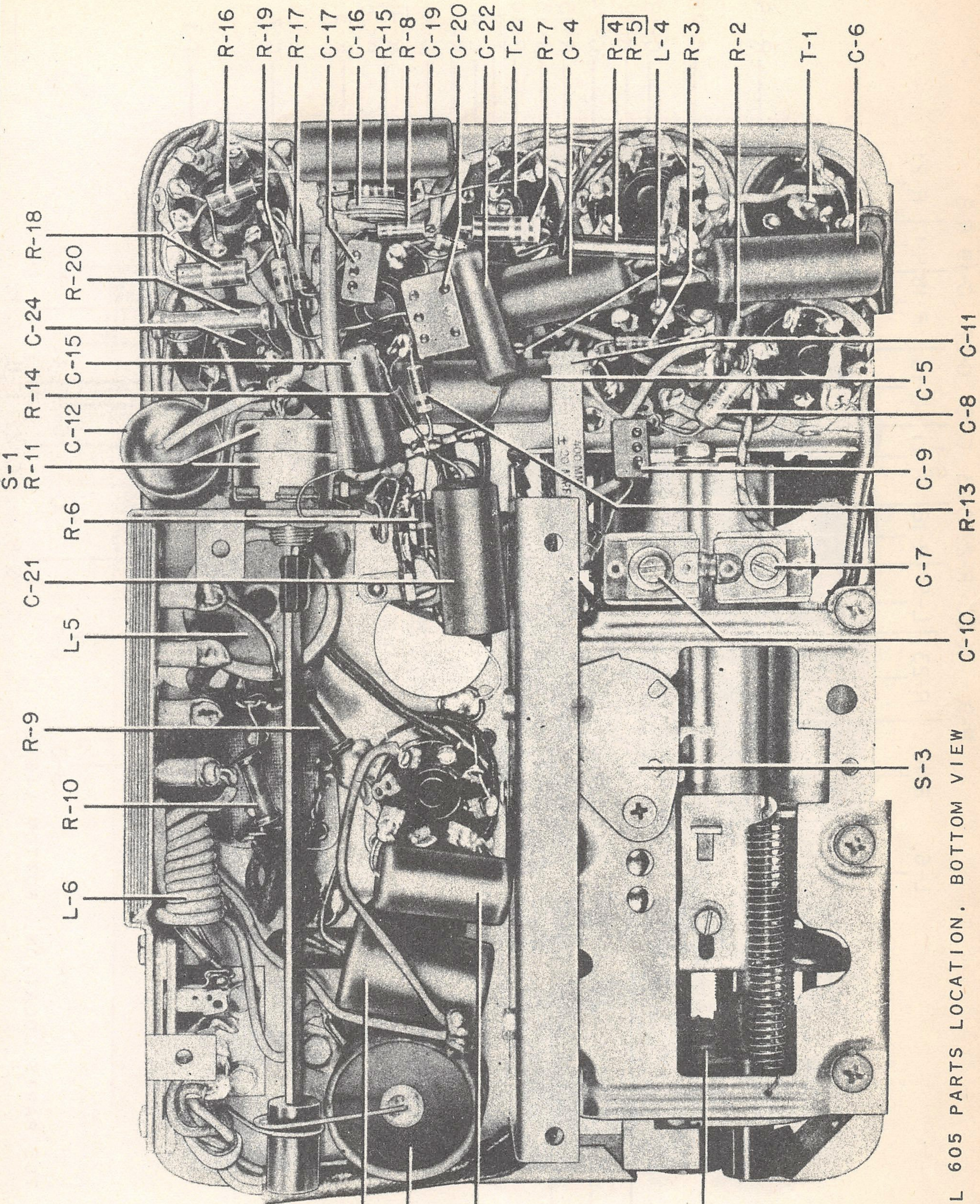

R-14
R-11
C-18
R-7
C-15
R-13
C-19
R-6
T-2
L-4
R-4
R-5
C-4
R-2
C-6
T-1
R-17
R-15
R-16
C-16
R-18
C-21
R-12
C-5
C-12
S-1
R-10
C-14
L-5
L-6
R-8
R-9
R-3
C-8
C-11
C-9
C-7
C-10
C-13
L-5
C-17

MODEL 405 PARTS LOCATION. BOTTOM VIEW.


R-18
C-17
R-12
C-19
R-8
C-16
C-20
R-14
C-21
R-7
T-1
L-4
R-4
R-5
C-4
C-6
T-2
R-15
R-16
R-17
R-19
C-23
C-15
C-12
R-11
C-14
L-5
L-6
R-9
R-10
C-18
T-4
C-13
L-7
R-3
R-2
C-9
C-5
C-8
C-11
C-7
C-10
R-6
R-13

MODEL 505 PARTS LOCATION. BOTTOM VIEW

## MOTOROLA, INC.

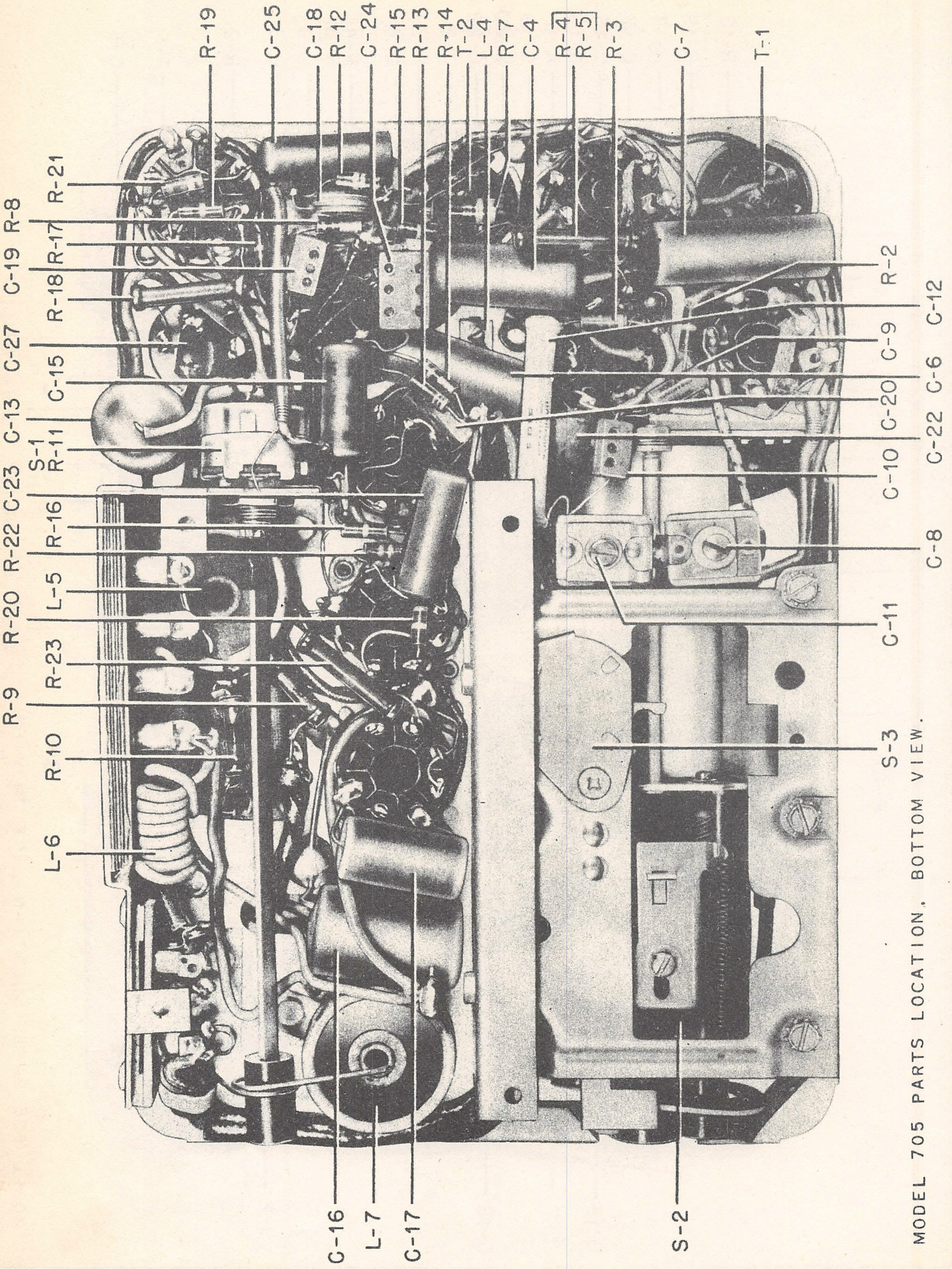

R-16
R-19
R-17
C-17
C-16
R-15
R-8
C-19
C-20
C-22
T-2
R-7
C-4
R-4
R-5
L-4
R-3
R-2
T-1
C-6
R-18
R-20
C-24
C-15
R-14
C-12
S-1
R-11
R-6
C-21
L-5
R-9
R-10
L-6
C-11
C-5
C-8
C-9
R-13
C-7
C-10
S-3
C-13
L-7
C-18
S-2

MODEL 605 PARTS LOCATION. BOTTOM VIEW

For schematic, see P.15-83

MODEL 705

MOTOROLA, INC.

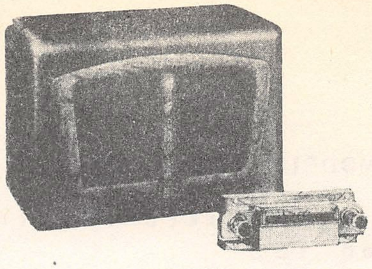

R-19
C-25
C-18
R-12
C-24
R-15
R-13
R-14
T-2
L-4
R-7
C-4
R-4
R-5
R-3
C-7
T-1
R-21
R-8
R-17
C-19
R-18
C-27
C-15
C-13
S-1
R-11
C-23
R-16
R-22
L-5
R-20
R-23
R-9
R-10
L-6
R-2
C-12
C-9
C-6
C-20
C-22
C-10
C-8
C-11
S-3
C-16
L-7
C-17
S-2

MODEL 705 PARTS LOCATION. BOTTOM VIEW.

For schematic, see P.15-84

MODEL 405,MODEL 505
MODEL 605,MODEL 705

# MOTOROLA, INC.



**MODEL 405**

### MODEL 405

Current drain - 7.5 amps at 6.3 volts

Power output - 5.6 watts

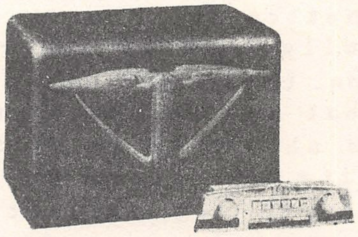
| Frequency | 1400 kc | 1020 kc | 600 kc |
|---|---|---|---|
| Max.Sensitivity | 1.4 uv | 1.3 uv | 1.1 uv |

### MODEL 605

Current drain - 7.5 amps at 6.3 volts

Power output - 5.6 watts

| Frequency | 1400 kc | 1020 kc | 600 kc |
|---|---|---|---|
| Max.Sensitivity | 1.4 uv | 1.6 uv | 1.45 uv |



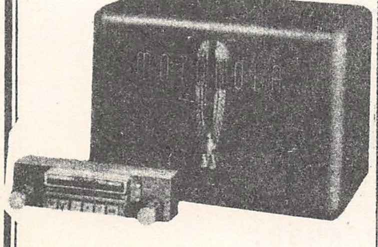
**MODEL 605**

### MODEL 705

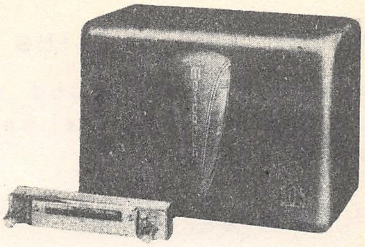
Current drain - 10 amps at 6.3 volts

Power output - 9 watts

| Frequency | 1400 kc | 1000 kc | 600 kc |
|---|---|---|---|
| Max.Sensitivity | 1.5 uv | 1.6 uv | .9 uv |



**MODEL 705**



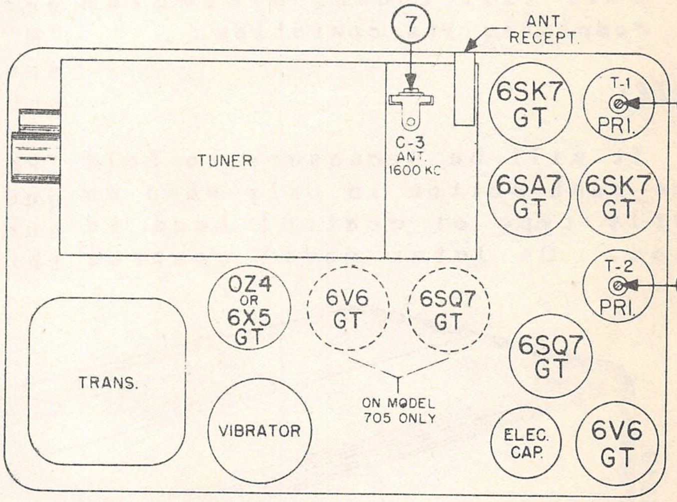
**MODEL 505**

### MODEL 505

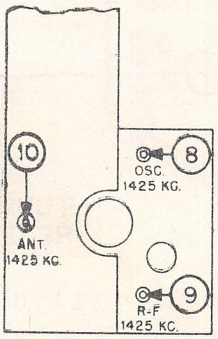
Current drain - 7.5 amps at 6.3 volts

Power output - 5.6 watts

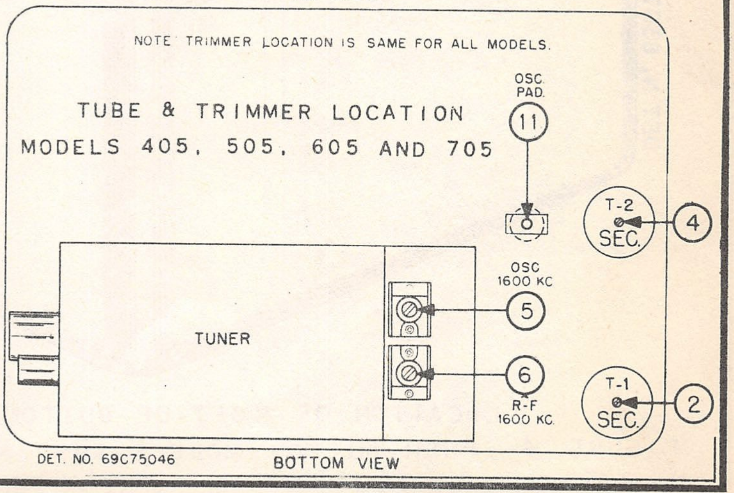
| Frequency | 1400 kc | 1000 kc | 600 kc |
|---|---|---|---|
| Max.Sensitivity | 1.5 uv | 1.4 uv | 1.5 uv |


7
ANT. RECEPT.
TUNER
C-3
ANT.
1600 KC
6SK7 GT
T-1 PRI.
1
6SA7 GT
6SK7 GT
T-2 PRI.
3
OZ4 OR 6X5 GT
6V6 GT
6SQ7 GT
ON MODEL 705 ONLY
6SQ7 GT
TRANS.
VIBRATOR
ELEC. CAP.
6V6 GT

TOP VIEW


10
ANT.
1425 KC.
8
OSC.
1425 KC.
9
R-F
1425 KC.

END VIEW



NOTE: TRIMMER LOCATION IS SAME FOR ALL MODELS.

TUBE & TRIMMER LOCATION
MODELS 405, 505, 605 AND 705

OSC. PAD.
11
T-2 SEC.
4
OSC 1600 KC
5
TUNER
6
R-F 1600 KC.
T-1 SEC.
2
DET. NO. 69C75046

BOTTOM VIEW

For alignment, see P.16-16
For I-F transformer notes, see P.16-7

MOTOROLA, INC.

## PROCEDURE FOR SETTING UP PUSH BUTTONS (MODELS 605 & 705)

1. Receiver must be turned on for a few minutes before setting up push-buttons.

2. Extend antenna fully.

3. Press manual button "M" on the control head till tuner in the receiver stops cycling.

4. Turn tuning knob on the control head till the desired station is heard. (Make mental note of the program).

5. Keep volume low, so that you can tell when a station is tuned in correctly.

6. Press desired button in and hold till tuning mechanism completes its operation.

***NOTE:***

It will be necessary to hold the push-button in only when an early type of control head is used. On later model control heads, the push-buttons latch when pressed in.

7. Press "set-up button" in till click is heard (see Figure 4 )

8. Turn "set-up knob" till previously noted program is heard. See Figure 4

9. Press the "M" button and that station is set.

10. Repeat the above procedure for each additional station desired.

***IMPORTANT:***

To check whether push-buttons were set accurately, press the "M" button in, tune in a station manually that is set to a push-button, then press the push-button in that was set to that station. There should be no difference in quality or volume when a push-button is set correctly. Make this check for each push-button.

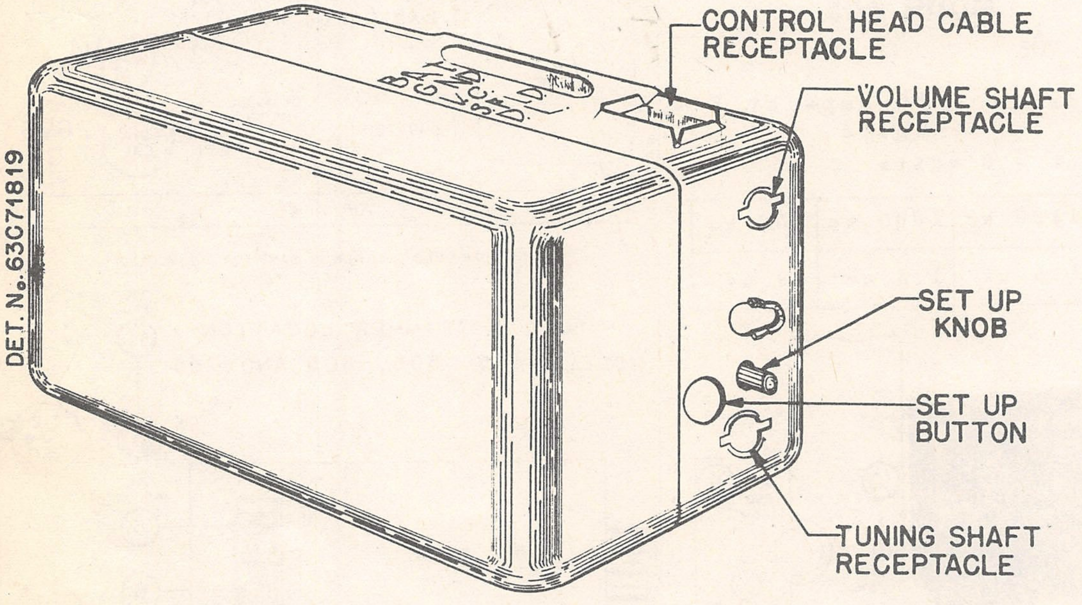
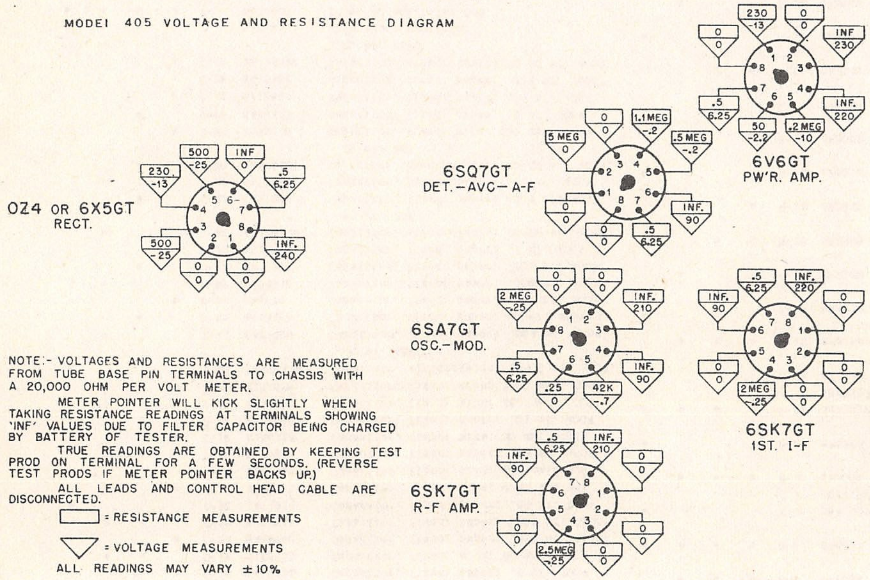


FIGURE 4 LOCATION OF "SET-UP BUTTON" AND "SET-UP KNOB." PUSH-BUTTON MODELS 605, AND 705.

# MOTOROLA, INC.

## MODEL 405, MODEL 505
## MODEL 605, MODEL 705

MODEl 405 VOLTAGE AND RESISTANCE DIAGRAM


OZ4 OR 6X5GT
RECT.
6SQ7GT
DET.-AVC-A-F
6V6GT
PW'R. AMP.
6SA7GT
OSC.-MOD.
6SK7GT
1ST. I-F
6SK7GT
R-F AMP.

NOTE:- VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.

METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.

TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON TERMINAL FOR A FEW SECONDS. (REVERSE TEST PRODS IF METER POINTER BACKS UP.)

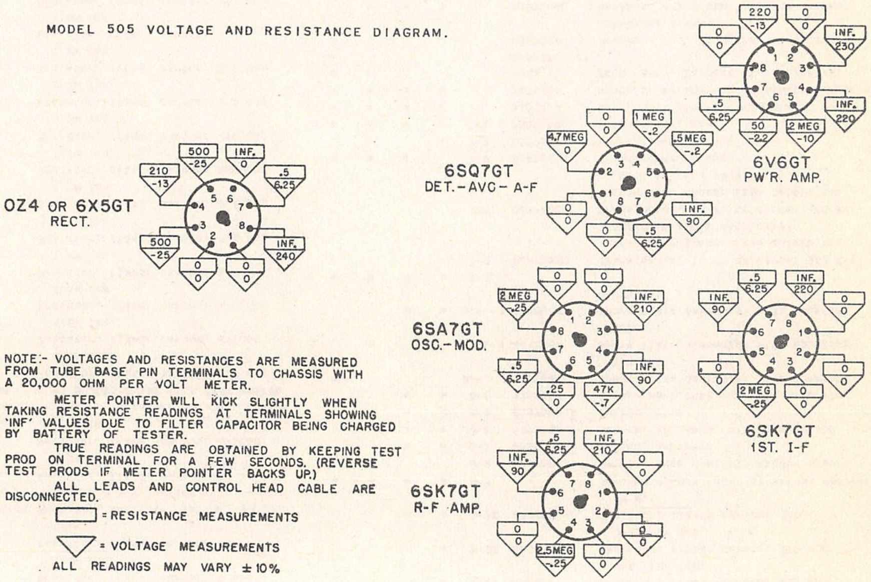
ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ±10%

MODEL 505 VOLTAGE AND RESISTANCE DIAGRAM.


OZ4 OR 6X5GT
RECT.
6SQ7GT
DET.-AVC-A-F
6V6GT
PW'R. AMP.
6SA7GT
OSC.-MOD.
6SK7GT
1ST. I-F
6SK7GT
R-F AMP.

NOTE:- VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.

METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.

TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON TERMINAL FOR A FEW SECONDS. (REVERSE TEST PRODS IF METER POINTER BACKS UP.)

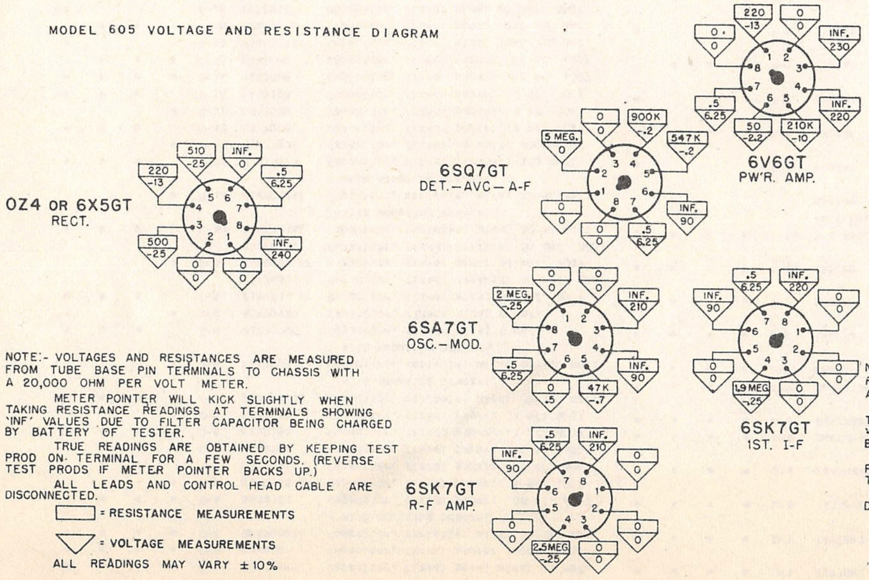
ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ±10%

MODEL 605 VOLTAGE AND RESISTANCE DIAGRAM


OZ4 OR 6X5GT
RECT.
6SQ7GT
DET.-AVC-A-F
6V6GT
PW'R. AMP.
6SA7GT
OSC.-MOD.
6SK7GT
1ST. I-F
6SK7GT
R-F AMP.

NOTE:- VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.

METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.

TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON- TERMINAL FOR A FEW SECONDS. (REVERSE TEST PRODS IF METER POINTER BACKS UP.)

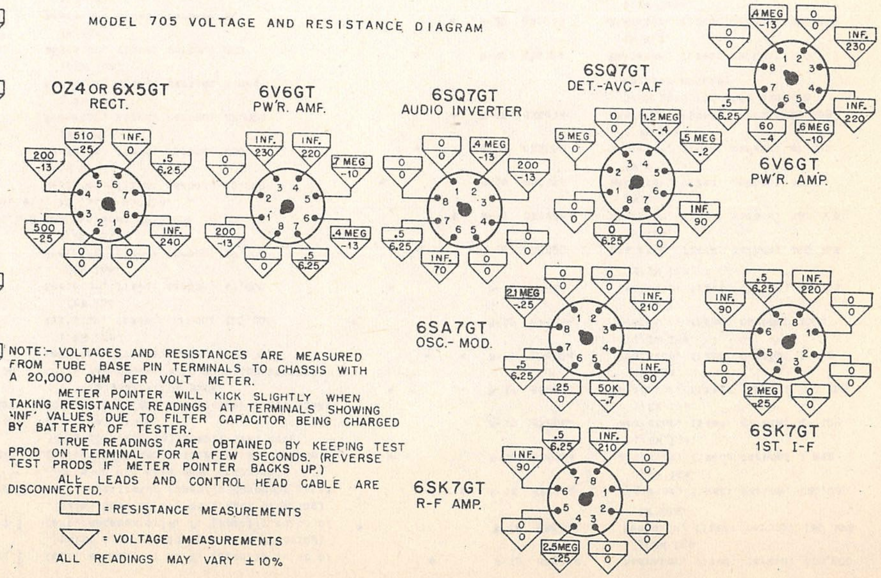
ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ±10%

MODEL 705 VOLTAGE AND RESISTANCE DIAGRAM


OZ4 OR 6X5GT
RECT.
6V6GT
PW'R. AMF.
6SQ7GT
AUDIO INVERTER
6SQ7GT
DET.-AVC-A.F
6V6GT
PW'R. AMP.
6SA7GT
OSC.-MOD.
6SK7GT
1ST. I-F
6SK7GT
R-F AMP.

NOTE:- VOLTAGES AND RESISTANCES ARE MEASURED FROM TUBE BASE PIN TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT METER.

METER POINTER WILL KICK SLIGHTLY WHEN TAKING RESISTANCE READINGS AT TERMINALS SHOWING 'INF' VALUES DUE TO FILTER CAPACITOR BEING CHARGED BY BATTERY OF TESTER.

TRUE READINGS ARE OBTAINED BY KEEPING TEST PROD ON TERMINAL FOR A FEW SECONDS. (REVERSE TEST PRODS IF METER POINTER BACKS UP.)

ALL LEADS AND CONTROL HEAD CABLE ARE DISCONNECTED.

▭ = RESISTANCE MEASUREMENTS

▽ = VOLTAGE MEASUREMENTS

ALL READINGS MAY VARY ±10%

## MODEL 405,MODEL 505, MODEL 605,MODEL 705

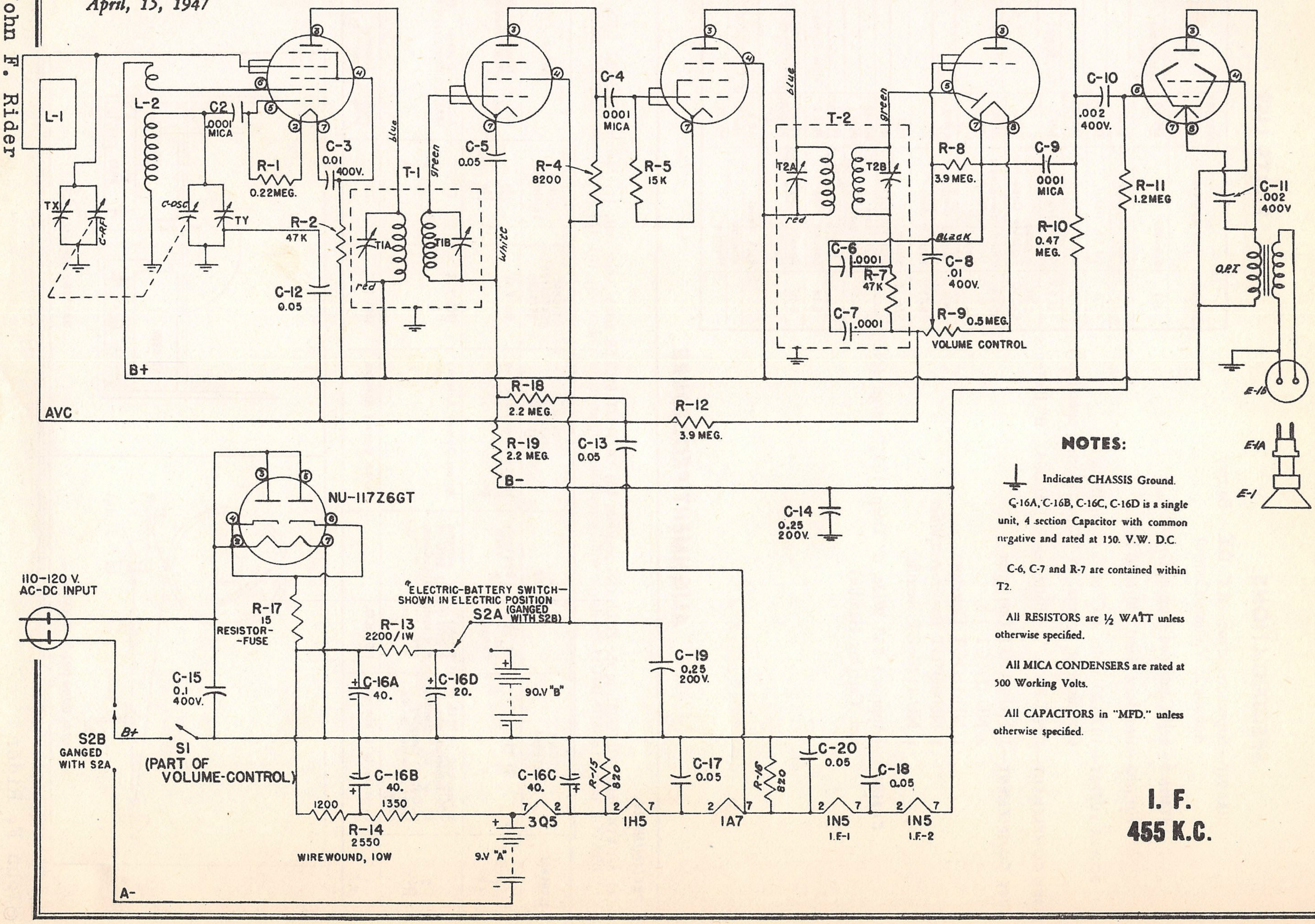
# MOTOROLA, INC.

| MODELS USED ON | | | | REF. NO. | PART NO. | DESCRIPTION |
|---|---|---|---|---|---|---|
| 405 | 505 | 605 | 705 | | | |
| * | * | * | * | C-1 | 21A20877 | Capacitor, fixed: metal mica; 90 mmf. |
| * | * | * | * | C-2 | 8A4529 | Capacitor, fixed: paper; .006 mf. 100V |
| * | * | * | * | C-3 | 20A70601‡ | Capacitor, variable: mica; 50-180 mmf; with mounting bracket |
| * | * | * | * | C-4 | 8A14791 | Capacitor, fixed: paper; .05 mf. 400V |
| | | | * | C-5 | 8A19133 ‡ | Capacitor, fixed: paper; .5 mf. 100V |
| * | * | * | | C-5 | 8A14791 | Capacitor, fixed: paper; .05 mf. 400V |
| | | | * | C-6 | 8A14791 | Capacitor, fixed: paper; .05 mf. 400V |
| * | * | * | | C-6 | 8A13166 | Capacitor, fixed: paper; .1 mf. 400V |
| | | | * | C-7 | 8A13166 | Capacitor, fixed: paper; .1 mf. 400V |
| * | * | * | | C-7 | 20A70601‡ | Capacitor, variable: mica; 50-180 mmf; with mounting bracket |
| | | | * | C-8 | 20A70601‡ | Capacitor, variable: mica; 50-180 mmf; with mounting bracket |
| * | * | * | | C-8 | 21K70720 | Capacitor, fixed: mica; 5 mmf. |
| | | | * | C-9 | 21K70720 | Capacitor, fixed: mica; 5 mmf. |
| * | * | * | | C-9 | 21R6513 or<br>21A74661 | Capacitor, fixed: mica; 50 mmf. 300V<br>Capacitor, fixed: ceramic; 50 mmf. 300V |
| | | | * | C-10 | 21R6513 or<br>21A74661 | Capacitor, fixed: mica; 50 mmf. 300V<br>Capacitor, fixed: ceramic; 50 mmf. 300V |
| * | * | * | | C-10 | 20A70214‡ | Capacitor, variable: mica; 30-60 mmf; with mounting bracket |
| | | | * | C-11 | 20A70214‡ | Capacitor, variable: mica; 30-60 mmf; with mounting bracket |
| * | * | * | | C-11 | 21A71872 | Capacitor, fixed: ceramic; 400 mmf. |
| | | | * | C-12 | 21A71872 | Capacitor, fixed: ceramic; 400 mmf. |
| * | * | * | | C-12 | 8A17028 | Capacitor, fixed: paper; .5 mf. 100V |
| | | | * | C-13 | 8A17028 | Capacitor, fixed: paper; .5 mf. 100V |
| * | * | * | | C-13 | 8A19133 | Capacitor, fixed: paper; .5 mf. 100V |
| * | * | * | * | C-14 | 8A23690 | Capacitor, fixed: paper; .01 mf. 400V |
| | * | * | * | C-15 | 8A23690 | Capacitor, fixed: paper; .01 mf. 400V |
| * | | | | C-15 | 21A70176 | Capacitor, fixed: mica; dual 120 mmf. |
| | * | * | | C-16 | 21A70176 | Capacitor, fixed: mica; dual 120 mmf. |
| * | | | | C-16 | 21R6513 | Capacitor, fixed: mica; 50 mmf. 300V |
| | | | * | C-16 | 8A19133 | Capacitor, fixed: paper; .5 mf. 100V |
| | * | * | | C-17 | 21R6513 | Capacitor, fixed: mica; 50 mmf. 300V |
| * | | | * | C-17 | 8A12840 | Capacitor, fixed: paper; .006 mf. 1600V |
| | * | * | | C-18 | 8A12840 | Capacitor, fixed: paper; .006 mf. 1600V |
| * | | | | C-18 | 8A71911 | Capacitor, fixed: paper; .03 mf. 400V |
| | | | * | C-18 | 21A70176 | Capacitor, fixed: mica; dual 120 mmf. |
| * | | | | C-19 | 21R6648 | Capacitor, fixed: mica; 250 mmf. 500V |
| | * | * | | C-19 | 8A71911 | Capacitor, fixed: paper; .03 mf. 400V |
| | | | * | C-19 | 21R6513 | Capacitor, fixed: mica; 50 mmf. 300V |
| * | | | | C-20 | 8A23690 | Capacitor, fixed: paper; .01 mf. 400V |
| | * | * | | C-20 | 21R6648 | Capacitor, fixed: mica; 250 mmf. 500V |
| | | | * | C-20 | 21R6638 | Capacitor, fixed: mica; 1000 mmf. 500V |
| * | | | | C-21 | 23A75429 | Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V |
| | * | | | C-21 | 8A71909 | Capacitor, fixed: paper: .004 mf. 400V |
| | | * | | C-21 | 8K13166 | Capacitor, fixed: paper; .1 mf. 400V |
| | | | * | C-21 | 8A4736 | Capacitor, fixed: paper; .002 mf. 400V |
| | * | | | C-22 | 8A71910 | Capacitor, fixed: paper; .006 mf. 400V |
| | | * | | C-22 | 8A71909 | Capacitor, fixed: paper; .004 mf. 400V |
| | | | * | C-22 | 8K13166 | Capacitor, fixed: paper; .1 mf. 400V |
| | * | | | C-23 | 23A75429 | Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V |
| | | * | | C-23 | 8A71910 | Capacitor, fixed: paper; .006 mf. 400V |
| | | | * | C-23 | 8K23690 | Capacitor, fixed: paper; .01 mf. 400V |
| | | * | | C-24 | 23A75429 | Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V |
| | | | * | C-24 | 21R6648 | Capacitor, fixed: mica; 250 mmf. 500V |
| | | * | | C-25 | 8A19133 ‡ | Capacitor, fixed: paper; .5 mf. 100V |
| | | | * | C-25 | 8A23690 | Capacitor, fixed: paper; .01 mf. 400V |
| | | | * | C-26 | 8K13165 | Capacitor, fixed: paper; .003 mf. 1000V |
| | | | * | C-27 | 23A75429 | Capacitor, electrolytic: 20-20 mf. 400V, 20 mf. 25V |
| * | * | * | * | | 8A4491 | Capacitor, generator |
| * | * | * | * | F-1 | 65X4637 | Fuse: 20 Amp; type 3AG |
| * | * | * | * | G-1 | 48A3333 | Vibrator: full wave; non-sync. |
| * | * | * | * | L-1 | 1A71881 ‡ | Coil, antenna or R. F. (specify color of paint dots on old coil when ordering) |
| * | * | * | * | L-2 | 1A71881 ‡ | Coil, antenna or R. F. (specify color of paint dots on old coil when ordering) |
| * | * | * | * | L-3 | 1A71879 ‡ | Coil, oscillator (specify color of paint dots on old coil when ordering) |
| * | * | * | * | L-4 | 24A70227 | Coil, oscillator padder: includes mounting clip and adjustable iron core |
| * | * | * | * | L-5 | 24K70840 | Coil, "A" choke |
| * | * | * | * | L-6 | 24K73535 | Coil, dial light and speaker field choke: 9 turn #16 yellow wire |
| * | * | * | * | L-7 | 24A70199 | Coil, "A" choke: with mounting bracket |
| * | * | * | * | R-1 | 6R6032 | Resistor, fixed: carbon; 470,000 1/2W Ins. |
| * | * | * | * | R-2 | 6R6075 | Resistor, fixed: carbon; 100,000 1/2W Ins. |
| * | * | * | * | R-3 | 6R6056 | Resistor, fixed: carbon; 47,000 1/2W Ins. |
| * | * | * | * | R-4& R-5 | 6R6028 | Resistor, fixed: carbon; 22,000 1/2W Ins. |
| * | * | * | * | Note: | R-4 and R-5 are replaced with one 10,000, 1 watt resistor in later models. | |
| | | | | | 6R6106 | Resistor, fixed: carbon; 10,000 1W N.I. |
| * | | | | R-6 | 6R6147 | Resistor, fixed: carbon; 330 1W Ins. |
| | * | * | * | R-6 | 6R6028 | Resistor, fixed: carbon; 22,000 1/2W Ins. |
| * | | | | R-7 | 6R6004 | Resistor, fixed: carbon; 1 meg 1/2W Ins. |
| | * | * | * | R-7 | 6R6147 | Resistor, fixed: carbon; 330 1W Ins. |
| * | | | | R-8 | 6R6005 | Resistor, fixed: carbon; 50 1/2W N.I. |
| | * | * | * | R-8 | 6R6004 | Resistor, fixed: carbon; 1 meg 1/2W Ins. |
| * | * | * | * | R-9 | 6R6005 | Resistor, fixed: carbon; 50 1/2W N.I. |
| * | | | | R-10 | 18A70170 or<br>18A71920 | Resistor, variable: carbon; 500,000; with S.P.S.T. switch |
| | * | * | * | R-10 | 6R6005 | Resistor, fixed: carbon; 50 1/2W N.I. |
| * | | | | R-11 | 6R6056 | Resistor, fixed: carbon; 47,000 1/2W Ins. |
| | * | * | * | R-11 | 18A70172 or<br>18A71925 | Resistor, variable: 500,000; tapped at 50,000 ohms; with SPST switch |
| * | | | | R-12 | 6R2122 | Resistor, fixed: carbon; 4.7 meg 1/2W Ins. |
| | * | * | * | R-12 | 6R6056 | Resistor, fixed: carbon; 47,000 1/2W Ins. |
| * | | | | R-13 | 6R6032 | Resistor, fixed: carbon; 470,000 1/2W Ins. |
| | * | | | R-13 | 6R2122 | Resistor, fixed: carbon; 4.7 meg 1/2W Ins. |
| | | * | | R-13 | 6R2118 | Resistor, fixed: carbon; 3.3 meg 1/2W Ins. |
| | | | * | R-13 | 6R3927 | Resistor, fixed: carbon; 2.2 meg 1/2W Ins. |
| * | | | | R-14 | 6R6015 | Resistor, fixed: carbon; 220,000 1/2W Ins. |
| | * | | | R-14 | 6R6032 | Resistor, fixed: carbon; 470,000 1/2W Ins. |
| | | * | | R-14 | 6R3927 | Resistor, fixed: carbon; 2.2 meg 1/2W Ins. |
| | | | * | R-14 | 6R2118 | Resistor, fixed: carbon; 3.3 meg 1/2W Ins. |
| * | | | | R-15 | 6R6004 | Resistor, fixed: carbon; 1 meg 1/2W Ins. |
| | * | | * | R-15 | 6R6015 | Resistor, fixed: carbon; 220,000 1/2W Ins. |
| | | * | | R-15 | 6R6032 | Resistor, fixed: carbon; 470,000 1/2W Ins. |
| * | | | | R-16 | 6R6390 | Resistor, fixed: carbon; 180 10% 1W Ins. |
| | | * | * | R-16 | 6R6015 | Resistor, fixed: carbon; 220,000 1/2W Ins. |
| | * | | | R-16 | 6R6004 | Resistor, fixed: carbon; 1 meg 1/2W Ins. |
| * | | | | R-17 | 6R5550 | Resistor, fixed: carbon; 47 10% 1/2W Ins. |
| | * | | | R-17 | 6R6390 | Resistor, fixed: carbon; 180 10% 1W Ins. |
| | | * | * | R-17 | 6R6004 | Resistor, fixed: carbon; 1 meg 1/2W Ins. |
| * | | | | R-18 | 6R6184 | Resistor, fixed: carbon; 1000 1W N.I. |
| | * | | | R-18 | 6R5550 | Resistor, fixed: carbon; 47 10% 1/2W Ins. |
| | | * | | R-18 | 6R6390 | Resistor, fixed: carbon; 180 10% 1W Ins. |
| | | | * | R-18 | 6R6253 | Resistor, fixed: carbon; 150 10% 1W N.I. |
| | * | | | R-19 | 6R6184 | Resistor, fixed: carbon; 1000 1W N.I. |
| | | * | | R-19 | 6R5550 | Resistor, fixed: carbon; 47 10% 1/2W Ins. |
| | | | * | R-19 | 6R5614 | Resistor, fixed: carbon; 56 10% 1/2W Ins. (62 ohms used in earlier models) |
| | | * | | R-20 | 6R6184 | Resistor, fixed: carbon; 1000 1W N.I. |
| | | | * | R-20 | 6R6015 | Resistor, fixed: carbon; 220,000 1/2W Ins. |
| | | | * | R-21 | 6R6407 | Resistor, fixed: carbon; 220,000 10% 1/2W Ins. |
| | | | * | R-22 | 6R6414 | Resistor, fixed: carbon; 270,000 10% 1/2W Ins. |
| | | | * | R-23 | 6R6184 | Resistor, fixed: carbon; 1000 1W N.I. |
| * | * | * | * | S-1 | | Switch; On-Off (part of volume control |
| | * | | | S-2 | 40A70872 | Switch, tone control: slider type |
| | | * | * | S-2 | 40B70952‡ | Switch, selector |
| | | * | * | S-3 | 1B70944 ‡ | Switch, solenoid: with mtg. plate |
| | | * | * | S-4 | 40A70931‡ | Switch, mute |
| | | * | * | S-5 | 1X71470 | Relay, MR-5 tone control: complete |
| * | | | | S.P.-1 | 1B70841 | Spark Plate Assembly: with mounting bracket |
| | * | | | S.P.-1 | 1X72084 | Spark Plate Assembly: with mounting bracket |
| | | * | * | S.P.-1 | 1X73047 | Spark Plate Assembly: with mounting bracket |
| * | * | * | * | T-1, T-2 | 24B70827 | Transformer, I. F. or diode: 455 Kc; iron core tuned; less shield can (used in early sets only) |
| | | | | or | 24B76553 | Transformer, I. F. or diode: 455 Kc; iron core tuned; less shield can (used in late sets only) |
| * | * | * | | T-3 | 25B70171 | Transformer, output |
| | | | * | T-3 | 25B70619 | Transformer, output |
| * | * | * | * | T-4 | 25B70950 | Transformer, power |
| * | * | * | * | | 3A51494 | Bolt, "J" (receiver mounting) |
| * | * | * | * | | 7A76565 | Bracket, volume control shaft alignment |
| * | * | | | | 65X4151 | Bulb: 6-8V, bayonet base; type #51 |
| * | | | | | 50B73997 or<br>50B75631 | Speaker: 5-1/4"; 3 ohm VC; with connecting leads |
| | * | * | * | | 50B71900 | Speaker: 6"; 3 ohm VC; less connecting leads |

# NATIONAL UNION RADIO CORP.

**MODEL G-613**

*April, 15, 1947*


NU-1A7GT/G
NU-1N5GT/G
NU-1N5GT/G
NU-1H5GT/G
NU-3Q5GT/G
NU-117Z6GT
L-1
L-2
TX
C-RF
C-OSC
TY
C2 .0001 MICA
R-1 0.22MEG.
C-3 0.01 400V.
R-2 47K
C-12 0.05
T-1
T1A
T1B
blue
green
white
red
C-5 0.05
R-4 8200
C-4 .0001 MICA
R-5 15K
T-2
T2A
T2B
C-6 .0001
R-7 47K
C-7 .0001
black
R-8 3.9 MEG.
C-8 .01 400V.
R-9 0.5 MEG. VOLUME CONTROL
C-9 .0001 MICA
R-10 0.47 MEG.
C-10 .002 400V.
R-11 1.2 MEG
C-11 .002 400V
O.P.T.
E-1B
E-1A
E-1
B+
AVC
R-18 2.2 MEG.
R-19 2.2 MEG.
B-
R-12 3.9 MEG.
C-13 0.05
C-14 0.25 200V.
110-120 V. AC-DC INPUT
R-17 15 RESISTOR-FUSE
"ELECTRIC-BATTERY SWITCH- SHOWN IN ELECTRIC POSITION
S2A (GANGED WITH S2B)
R-13 2200/1W
C-16A 40.
C-16D 20.
90.V "B"
C-19 0.25 200V.
C-15 0.1 400V.
S2B GANGED WITH S2A
S1 (PART OF VOLUME-CONTROL)
C-16B 40.
1200
1350
R-14 2550 WIREWOUND, 10W
9.V "A"
A-
C-16C 40.
3Q5
R-15 820
1H5
C-17 0.05
1A7
R-16 820
C-20 0.05
C-18 0.05
1N5 I.F-1
1N5 I.F-2

## NOTES:

⏚ Indicates CHASSIS Ground.

C-16A, C-16B, C-16C, C-16D is a single unit, 4 section Capacitor with common negative and rated at 150. V.W. D.C.

C-6, C-7 and R-7 are contained within T2.

All RESISTORS are ½ WATT unless otherwise specified.

All MICA CONDENSERS are rated at 500 Working Volts.

All CAPACITORS in "MFD." unless otherwise specified.

**I. F.**
**455 K.C.**

MODEL G-613

# NATIONAL UNION RADIO CORP.

## SPECIFICATIONS:

**CIRCUIT**—Superheterodyne—A.C.-D.C.—Battery
Automatic Volume Control

**ANTENNA**—Self-Contained plug-in Loop

**TUNING**—Broadcast Band 540-1650 K.C.

**POWER SUPPLY**—105-120 Volts A.C. or D.C. or Batteries
Consumption approx. 25 Watts (Electric operation)

**BATTERY COMPLEMENT**—2 NU-A835 "A" Batteries—2 NU-B862 "B" Batteries

**TUBE COMPLEMENT**—1 NU-1A7GT Converter
2 NU-1N5GT I.F.
1 NU-1H5GT Detector
1 NU-3Q5GT Power Amplifier
1 NU-117Z6GT Rectifier

**CABINET**—(Approx.) 13″ Wide, 6″ Deep, 10⅝″ High (Not incl. Carrying Handle)

## PARTS LIST

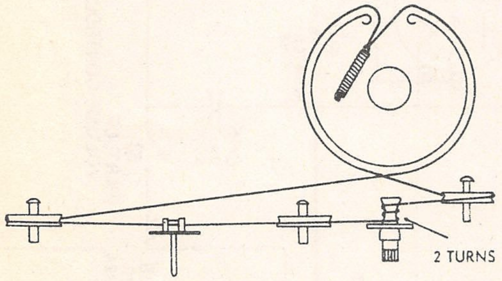
| SYMBOL | DESCRIPTION | FACTORY PART NO. | NOTES |
|---|---|---|---|
| E-1 | Speaker | EH-6-3 | Less Ouput Transf. |
| L-1 | Loop Antenna | LL-3 | |
| T-1 | 1st I.F. Transf. | TM2-12 | |
| T-2 | 2nd I.F. Transf. | TM2-13 | |
| O.P.T. | Output Transf. | TA7-1 | For 3Q5GT |
| C-RF<br>C-OSC | 2 gang Variable Capacitor | CV-6 | |
| C16A, B, C, D | Quadruple—Single Unit Eectrolytic Capacitor | CE1-4A81 | |
| R-9 | Volume Control | RP5-2 | |
| R-17 | Resistor Fuse | | |
| S2A, B | Switch | SS-1 | |
| | Dial Pointer | NP-3 | |
| | Dial Scale | ND-12 | |
| | "A" Battery Plug | PM2-1 | |
| | "B" Battery Plug | PM2-2 | |
| E-1a | Speaker Plug | PM1-2 | Male Section |
| E-1b | Speaker Plug | PM1-1 | Female Section |
| | Cabinet | CCCD-613 | |
| | Back Panel | AP-8 | |
| | Window | NW-1 | |
| | Handle | HK-27 | |

## ALIGNMENT PROCEDURE

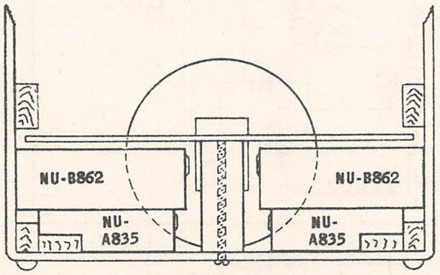
**PRELIMINARY.**

(a) Set VOLUME CONTROL to the FULL ON position; (b) OUTPUT METER across voice coil; (c) Maintain SIGNAL GENERATOR output at MINIMUM consistent with a readable Output meter indication; (d) Follow sequence indicated below.

| SEQUENCE | DUMMY ANTENNA | DIAL SETTING | SIGNAL GENERATOR CONNECTIONS | SIGNAL GENERATOR SETTING | ADJUST TRIMMERS | NOTES |
|---|---|---|---|---|---|---|
| 1 I.F. | .01 mfd. | At HIGH frequency end of scale. (Min. Capacity) | High side to stator lug of C-RF. Low side to B— | 455 K.C. | T2a<br>T2b<br>T1a<br>T1b | Adjust Trimmers for MAX. output reading |
| 2 OSC. | 3 turn coil of #18 or #20 insulated wire on 7" or 8" diameter LOOSELY Coupled to loop Antenna in Receiver. | Pointer at extreme RIGHT HAND END of dial scale (Min. Capacity) | Across Dummy Antenna | 1700 K.C. | TY | Adjust Trimmer for MAX. output reading |
| 3 R.F. | Same as in 2 above | 1550 K.C. | Across Dummy Antenna | 1550 K.C. | TX | Adjust Trimmer for MAX. output reading |

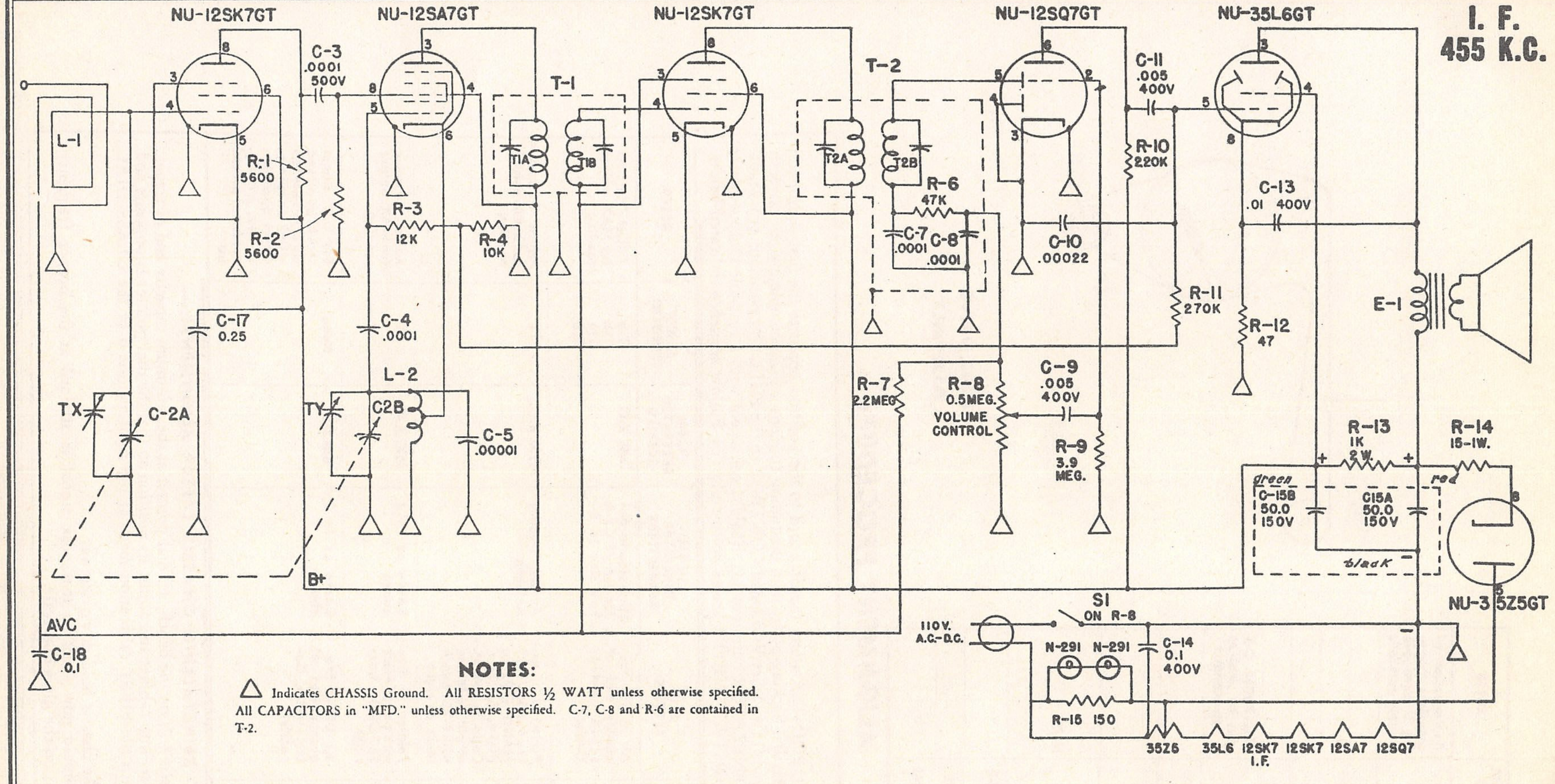


DIAL CORD DRIVE ASSEMBLY



BATTERY INSTALLATION

# NATIONAL UNION RADIO CORP.



NU-12SK7GT
NU-12SA7GT
NU-12SK7GT
NU-12SQ7GT
NU-35L6GT
I. F.
455 K.C.
L-1
C-3 .0001 500V
R-1 5600
R-2 5600
R-3 12K
R-4 10K
T-1
T1A
T1B
T-2
T2A
T2B
R-6 47K
C-7 .0001
C-8 .0001
C-10 .00022
C-11 .005 400V
R-10 220K
C-13 .01 400V
R-11 270K
R-12 47
E-1
C-17 0.25
C-4 .0001
L-2
TX
C-2A
TY
C2B
C-5 .00001
B+
AVC
C-18 .01
R-7 2.2MEG
R-8 0.5MEG. VOLUME CONTROL
C-9 .005 400V
R-9 3.9 MEG.
R-13 1K 2W.
R-14 15-1W.
green
red
black
C-15B 50.0 150V
C15A 50.0 150V
NU-35Z5GT
S1 ON R-8
110V. A.C.-D.C.
N-291
N-291
C-14 0.1 400V
R-15 150
35Z5
35L6
12SK7 I.F.
12SK7
12SA7
12SQ7

**NOTES:**

△ Indicates CHASSIS Ground. All RESISTORS ½ WATT unless otherwise specified. All CAPACITORS in "MFD." unless otherwise specified. C-7, C-8 and R-6 are contained in T-2.

## SPECIFICATIONS:

**CIRCUIT**—A.C.-D.C. Superheterodyne—Tuned R.F. Stage—Automatic Volume Control

**ANTENNA**—Self-contained Loop—Coupling for External Antenna

**TUNING**—Broadcast Band—535 K.C. to 1620 K.C.—2 Gang Variable Capacitor

**POWER SUPPLY**—105-125 Volts, 60 cycles A.C.—105-125 Volts, Direct Current—Approx. 30 Watts Consumption

**TUBE COMPLEMENT**—1 NU-12SK7GT R.F. Amp.
1 NU-12SA7GT Converter
1 NU-12SK7GT I.F. Amp.
1 NU-12SQ7GT Det-AVC-AF
1 NU-35L6GT Power Output
1 NU-35Z5GT Rectifier

**PANEL LAMP**—2 N-291 (2.9V/.17A) Bayonet

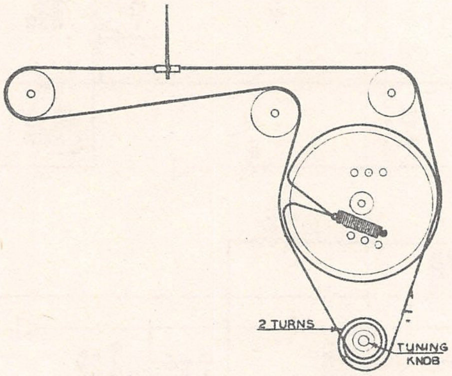
**CABINET**—Approximate Dimensions 13¾" Wide, 8⅝" High, 6½" Deep

MODEL G-615

## NATIONAL UNION RADIO CORP.

## PARTS LIST

| SYMBOL | DESCRIPTION | FACTORY PART NO. | NOTES |
|---|---|---|---|
| E-1 | Complete Assembly (O.P. Transf. and P.M. Speaker) | EH6-2 | Replacement of complete assembly is advisable if either part fails |
| Loop | Loop Antenna | LL-15 | |
| L-2 | Oscillator Coil | LO-2 | |
| T-1 | 1st I.F. Trans. | TM2-1 | |
| T-2 | 2nd I.F. Trans. | TM2-3 | |
| R-8 | Vol. Control With Switch (S-1) | RP5-2 | NU-500M-C8 may be used as a replacement |
| C2-A<br>C2-B | 2 Gang Variable Capacitor | CV-16 | |
| C15A<br>C15B | Electrolytic Capacitor 50-50/150 | CE-85 | |
| | Dial Lamps 2.9 Volt .170 Amp. | | N 291 |
| | Dial Scale (Glass) | ND-17-2 | |
| | Dial Pointer | ND-1-2 | |
| | Dial Lamp Socket | JS13-163 | |



DIAL DRIVE ASSEMBLY

## ALIGNMENT PROCEDURE

***PRELIMINARY.***

(a) Adjust the DIAL POINTER along the dial cord to the position opposite the first right-hand *punch mark* on the dial backing-plate, with the tuning condenser gang completely out of mesh (Minimum Capacity); (b) Set VOLUME CONTROL to the FULL ON position; (c) Maintain SIGNAL GENERATOR output at MINIMUM consistent with a readable Output Meter indication; (d) OUTPUT METER across voice coil; (e) Follow sequence indicated below.

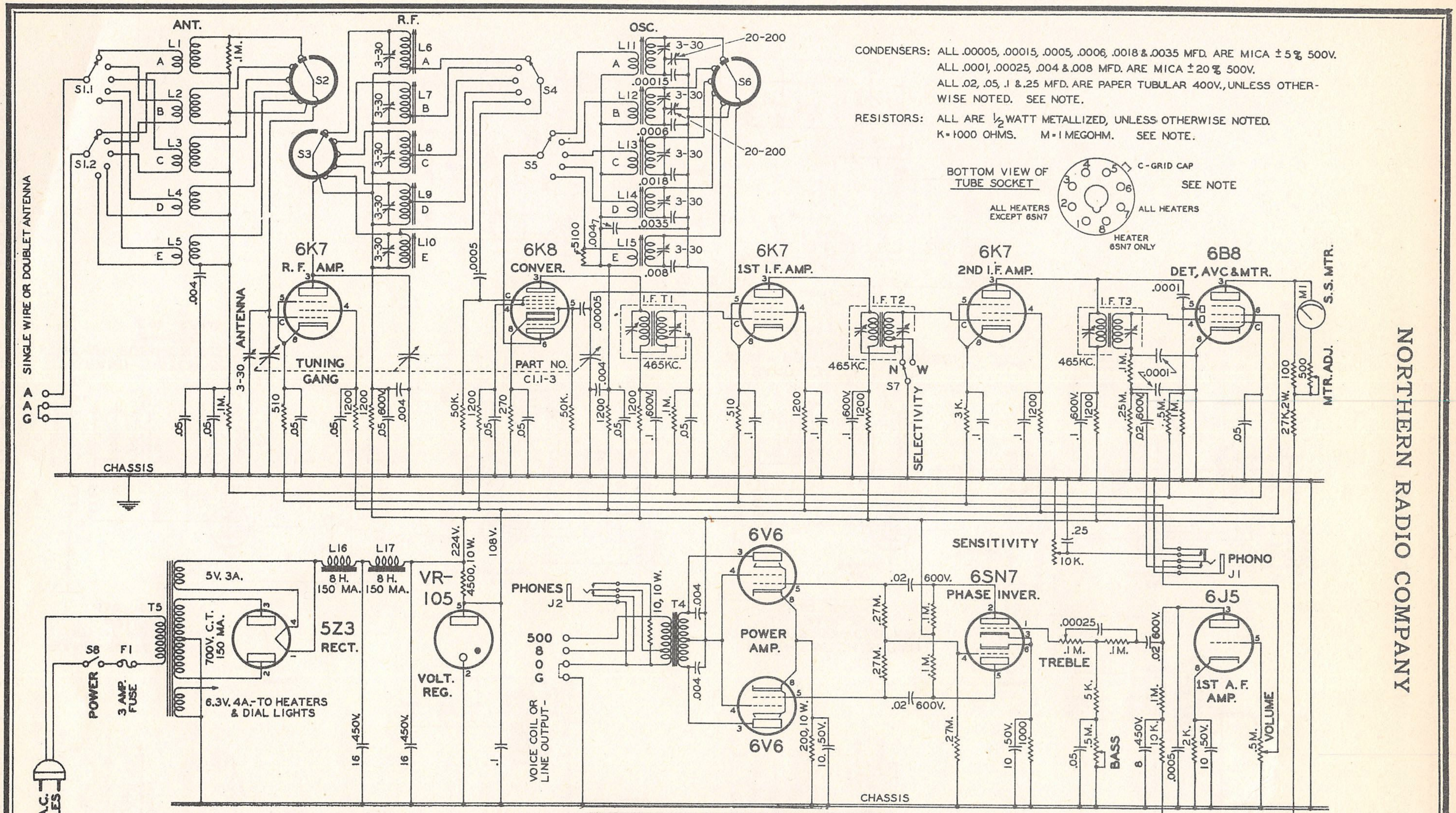
| SEQUENCE | DUMMY ANTENNA | DIAL SETTING | SIGNAL GENERATOR CONNECTIONS | SIGNAL GENERATOR SETTING | ADJUST TRIMMERS | NOTES |
|---|---|---|---|---|---|---|
| 1<br>I.F. | .01 mfd. | At HIGH frequency end of scale. (Min. Capacity) | High side to stator lug of C2-A Low side to B— | 455 K.C. | T2a<br>T2b<br>T1a<br>T1b | Adjust Trimmers for MAX. output reading |
| 2<br>OSC. | 3 turn coil of #18 or #20 insulated wire on 7" or 8" diameter LOOSELY Coupled to loop Antenna in Receiver | Pointer at extreme RIGHT HAND END of dial scale (Min. Capacity) Pointer will be in line with FIRST punch mark at right | Across Dummy Antenna | 1700 K.C. | TY | Adjust Trimmer for MAX. output reading |
| 3<br>R.F. | Same as in 2 above | Pointer in line with punch mark SECOND from right | Same as in 2 above | 1520 K.C. | TX | Adjust Trimmer for MAX. output reading |
| 4 | Same as in 2 above | At LOW frequency end of scale (Max. Capacity) | Same as in 2 above | 530 K.C. | None | 530 K.C. signal should be picked up at or near this dial setting. Check operation in Seq. 2 if signal is not picked up |
| 5 | ***REINSTALLING CHASSIS (AFTER ALIGNMENT):—***<br>(a) With chassis still on the bench, set dial pointer at the minimum capacity end of travel.<br>(b) Slide chassis into cabinet and adjust its position so that the dial pointer is opposite and in line with the FIRST calibration mark at the right-hand end of the GLASS DIAL SCALE.<br>(c) Tighten the chassis hold down screws.<br>(d) Tuning should now track so that peak signal is attained at the proper frequency calibration on the glass dial scale. | | | | | |

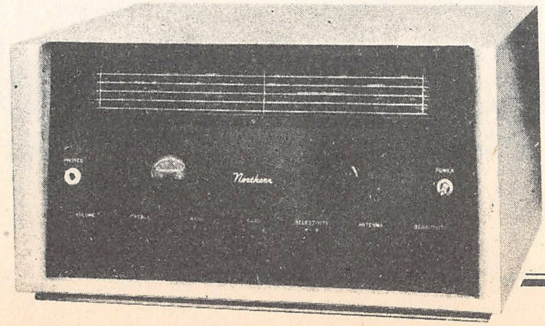
MODEL N605-E

# NORTHERN RADIO COMPANY

CONDENSERS: ALL .00005, .00015, .0005, .0006, .0018 & .0035 MFD. ARE MICA ± 5% 500V.
ALL .0001, .00025, .004 & .008 MFD. ARE MICA ± 20% 500V.
ALL .02, .05, .1 & .25 MFD. ARE PAPER TUBULAR 400V., UNLESS OTHERWISE NOTED. SEE NOTE.

RESISTORS: ALL ARE ½ WATT METALLIZED, UNLESS OTHERWISE NOTED.
K = 1000 OHMS. M = 1 MEGOHM. SEE NOTE.


BOTTOM VIEW OF TUBE SOCKET
C-GRID CAP
SEE NOTE
ALL HEATERS EXCEPT 6SN7
ALL HEATERS
HEATER 6SN7 ONLY
ANT.
L1 A
L2 B
L3 C
L4 D
L5 E
S1.1
S1.2
S2
S3
R.F.
L6 A
L7 B
L8 C
L9 D
L10 E
3-30
S4
S5
OSC.
L11 A
L12 B
L13 C
L14 D
L15 E
.00015
.0006
.0018
.0035
.008
S6
20-200
.0047
5100
SINGLE WIRE OR DOUBLET ANTENNA
A
A
G
.004
ANTENNA
6K7 R.F. AMP.
TUNING GANG
6K8 CONVER.
PART NO. C1.1-3
.0005
.00005
I.F.T1
465KC.
6K7 1ST I.F. AMP.
I.F.T2
465KC.
N W S7
SELECTIVITY
6K7 2ND I.F. AMP.
I.F.T3
465KC.
6B8 DET, AVC & MTR.
.0001
M1
S.S. MTR.
MTR. ADJ.
500
100
27K, 2W.
.1M.
.05
510
1200
600V.
50K.
270
.004
3K.
.25M.
.02
.5M.
.1
CHASSIS
T5
S8 POWER
F1 3 AMP. FUSE
105-125 V.A.C. 50-60 CYCLES
5V. 3A.
700V. C.T. 150 MA.
6.3V. 4A.-TO HEATERS & DIAL LIGHTS
5Z3 RECT.
L16 8 H. 150 MA.
L17 8 H. 150 MA.
16 450V.
VR-105
VOLT. REG.
224V.
4500, 10W.
108V.
PHONES J2
500
8
0
G
VOICE COIL OR LINE OUTPUT-
T4
10, 10 W.
6V6
6V6
POWER AMP.
200, 10 W.
10, 50V.
.27M.
.02 600V.
6SN7 PHASE INVER.
.00025
TREBLE
.1M.
1000
5K.
BASS
SENSITIVITY
.25
10K.
PHONO J1
6J5 1ST A.F. AMP.
2K.
10K.
8 450V.
.0005
VOLUME
CHASSIS

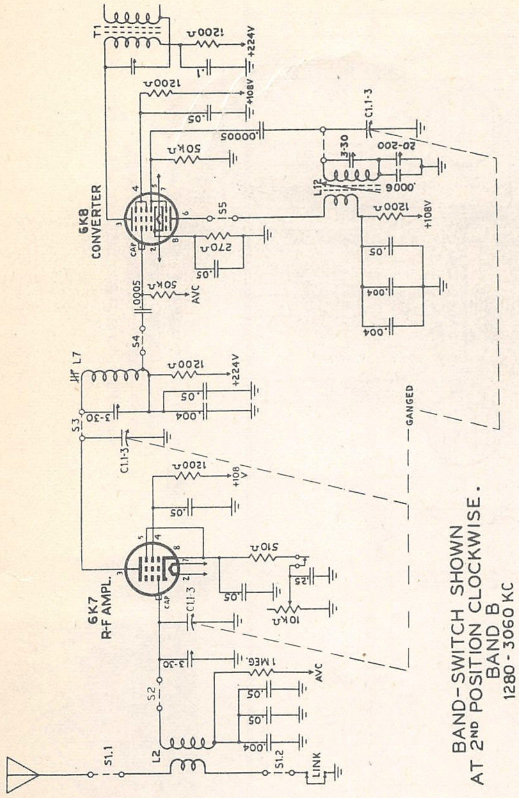


FREQUENCY RANGES:
BAND A 550 - 1310 KC.
BAND B 1280 - 3060 KC.
BAND C 2.92 - 6.8 MC.
BAND D 6.45 - 15.1 MC.
BAND E 14.7 - 33.5 MC.

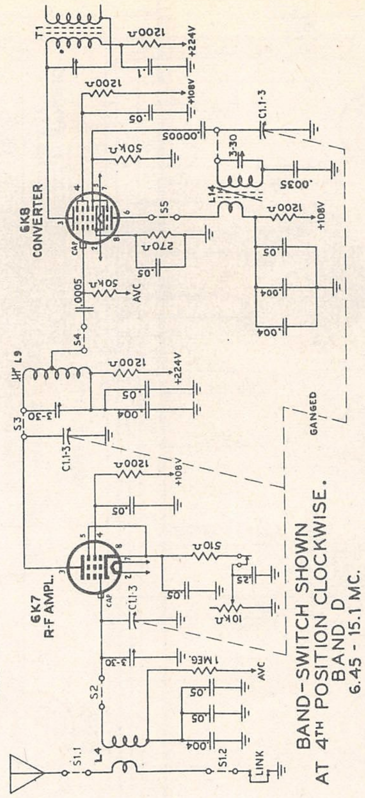
NOTE: PLAIN WHOLE NUMBERS - OHMS OR MICROFARADS.
DECIMAL NUMBERS - MICROFARAD.
DASHED NUMBERS - MICROMICROFARADS.
NUMBERS AROUND TUBES INDICATE BASING DESIGNATION.

**MODEL N605-E**

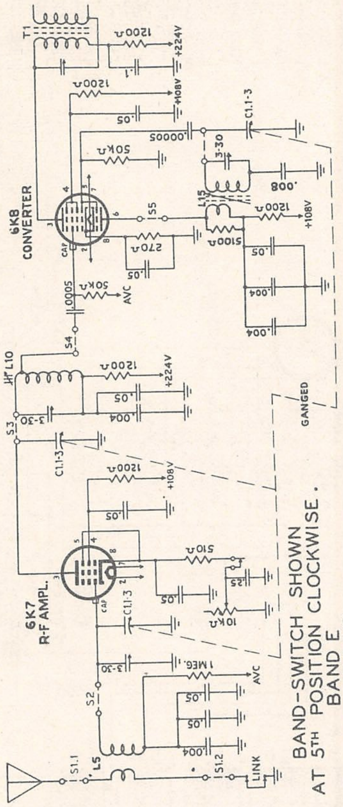
## NORTHERN RADIO COMPANY


T1
1200Ω
+224V
.1
1200Ω
+108V
.05
.00005
C1.1-3
3-30
20-200
.0006
L12
50KΩ
6K8 CONVERTER
S5
1200Ω
+108V
270Ω
.05
.004
.004
CAP
.0005
50KΩ
AVC
S4
L7
1200Ω
+224V
.05
.004
3-30
S3
C1.1-3
GANGED
1200Ω
+108V
.05
6K7 R-F AMPL.
510Ω
S2.5
10KΩ
C1.1-3
3-30
1 MEG.
AVC
S2
.05
.05
.004
S1.1
L2
S1.2
LINK

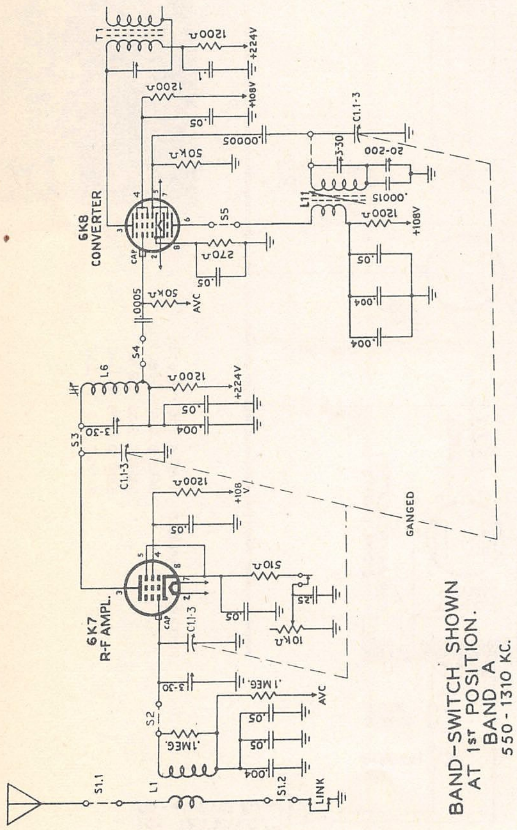
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE.
BAND B
1280-3060 KC


T1
1200Ω
+224V
.1
1200Ω
+108V
.05
.00005
C1.1-3
3-30
.0035
L14
50KΩ
6K8 CONVERTER
S5
1200Ω
+108V
270Ω
.05
.004
.004
CAP
.0005
50KΩ
AVC
S4
L9
1200Ω
+224V
.05
.004
3-30
S3
C1.1-3
GANGED
1200Ω
+108V
.05
6K7 R-F AMPL.
510Ω
S2.5
10KΩ
C1.1-3
3-30
1 MEG.
AVC
S2
.05
.05
.004
S1.1
L4
S1.2
LINK

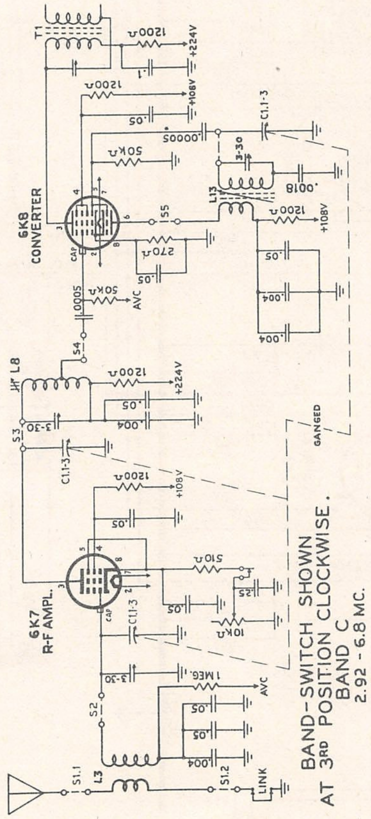
BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE.
BAND D
6.45 - 15.1 MC.


T1
1200Ω
+224V
.1
1200Ω
+108V
.05
.00005
C1.1-3
3-30
.008
L15
5100Ω
50KΩ
6K8 CONVERTER
S5
1200Ω
+108V
270Ω
.05
.004
.004
CAP
.0005
50KΩ
AVC
S4
L10
1200Ω
+224V
.05
.004
3-30
S3
C1.1-3
GANGED
1200Ω
+108V
.05
6K7 R-F AMPL.
510Ω
S2.5
10KΩ
C1.1-3
3-30
1 MEG.
AVC
S2
.05
.05
.004
S1.1
L5
S1.2
LINK

BAND-SWITCH SHOWN AT 5TH POSITION CLOCKWISE.
BAND E
14.7 - 33.5 MC.


T1
1200Ω
+224V
.1
1200Ω
+108V
.05
.00005
C1.1-3
3-30
20-200
.00015
L11
50KΩ
6K8 CONVERTER
S5
1200Ω
+108V
270Ω
.05
.004
.004
CAP
.0005
50KΩ
AVC
S4
L6
1200Ω
+224V
.05
.004
3-30
S3
C1.1-3
GANGED
1200Ω
+108V
.05
6K7 R-F AMPL.
510Ω
S2.5
10KΩ
C1.1-3
3-30
.1 MEG.
AVC
S2
.1 MEG.
.05
.05
.004
S1.1
L1
S1.2
LINK

BAND-SWITCH SHOWN AT 1ST POSITION.
BAND A
550-1310 KC.


T1
1200Ω
+224V
.1
1200Ω
+108V
.05
.00005
C1.1-3
3-30
.0018
L13
50KΩ
6K8 CONVERTER
S5
1200Ω
+108V
270Ω
.05
.004
.004
CAP
.0005
50KΩ
AVC
S4
L8
1200Ω
+224V
.05
.004
3-30
S3
C1.1-3
GANGED
1200Ω
+108V
.05
6K7 R-F AMPL.
510Ω
S2.5
10KΩ
C1.1-3
3-30
1 MEG.
AVC
S2
.05
.05
.004
S1.1
L3
S1.2
LINK

BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE.
BAND C
2.92 - 6.8 MC.

# NORTHERN RADIO COMPANY

ALIGNMENT: Alignment of this receiver will not be necessary unless a component part of the tuned circuits is replaced or the adjustments have been tampered with. When alignment is necessary, the following conditions must be observed before proceeding:

A. SENSITIVITY control full on—clockwise.

B. SELECTIVITY control in W (wide) position.

C. BASS and TREBLE controls off—counterclockwise.

D. Receiver chassis effectively grounded.

E. Antenna terminals strapped for single-wire antenna.

F. Dial pointer must center on vertical line at low frequency end of scale when tuning condenser is at maximum capacity.

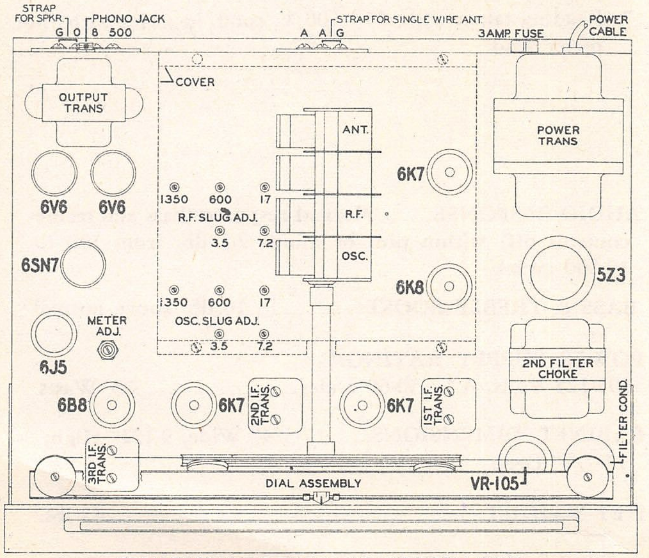
G. A dummy antenna consisting of a 400 ohm non-inductive resistor and .01 uf. mica condenser should be connected in series with the "hot" lead from the signal generator.

FILE NO. 605E-12-1 ALIGNMENT CHART 12-46

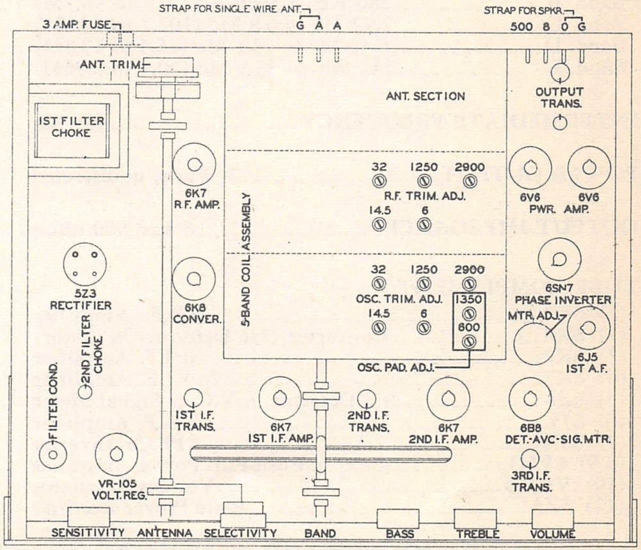
| STEP | CONNECT DUMMY ANT. TO- | SET SIG. GEN. TO- | SET BAND SW. TO- | SET DIAL TO- | ADJUST FOR MAXIMUM S.S. METER READING | SEE NOTE |
|---|---|---|---|---|---|---|
| 1 | CONV. 6K8 GRID CAP | 465 KC | A | QUIET POINT | ALL I. F. TRIMMERS | 1,2&6 |
| 2 | "A" TERM. | 600 KC | A | 600 KC | OSC. 600 PAD, ANT. TRIM & RF 600 SLUG | 1&3 |
| 3 | "A" TERM. | 1250 KC | A | 1250 KC | OSC. 1250 TRIM, ANT. TRIM & RF 1250 TRIM | |
| 4 | "A" TERM. | 1350 KC | B | 1350 KC | OSC. 1350 PAD, ANT. TRIM & RF 1350 SLUG | 1&3 |
| 5 | "A" TERM. | 2900 KC | B | 2900 KC | OSC. 2900 TRIM, ANT. TRIM & RF 2900 TRIM | |
| 6 | "A" TERM. | 3.5 MC | C | 3.5 MC | OSC. 3.5 SLUG, ANT. TRIM & RF 3.5 SLUG | 1&4 |
| 7 | "A" TERM. | 6.0 MC | C | 6.0 MC | OSC. 6.0 TRIM, ANT. TRIM & RF 6.0 TRIM | 1&4 |
| 8 | "A" TERM. | 7.2 MC | D | 7.2 MC | OSC. 7.2 SLUG, ANT. TRIM & RF 7.2 SLUG | 1&4 |
| 9 | "A" TERM. | 14.5 MC | D | 14.5 MC | OSC. 14.5 TRIM, ANT. TRIM & RF 14.5 TRIM | 1&4 |
| 10 | "A" TERM. | 17 MC | E | 17 MC | OSC. 17 SLUG, ANT. TRIM & RF 17 SLUG | 1&4 |
| 11 | "A" TERM. | 32 MC | E | 32 MC | OSC. 32 TRIM, ANT. TRIM & RF 32 TRIM | 1,4&5 |

*Notes:*

1. Trimming and padding steps for each band should be repeated several times as each adjustment affects the other a small percentage. The SIGNAL STRENGTH (S.S.) meter is used as a tuning indicator, with a signal input sufficient to give one-half scale deflection.
2. A very large input, 100,000 microvolts or more, may be required to force a signal through the I.F. stages if seriously detuned. The dummy antenna can be connected to the I.F. grids as an alternative if sufficient signal is not available.
3. *Do not adjust A and B band oscillator coil slugs.* Use padding condensers only for dial calibration.
4. Above 3.5 mc. care must be taken to avoid image frequencies. When two signals are heard in the range of an oscillator trimming or padding adjustment the one tuned with minimum C or L is correct.
5. A small amount of interlock between Osc. and RF stages is present above 30 mc. Use a strong signal for aligning, rock the tuning condenser slightly while making the "RF-32 trim" adjustment and set this adjustment approx. 1/4 turn towards maximum C past the apparent optimum setting.
6. One trimmer of the 3rd I.F. transformer will be found to give maximum output at minimum meter reading and should be adjusted correspondingly.


STRAP FOR SPKR.
PHONO JACK
G 0 8 500
STRAP FOR SINGLE WIRE ANT.
A A G
3AMP. FUSE
POWER CABLE
COVER
OUTPUT TRANS
POWER TRANS
ANT.
R.F.
OSC.
6K7
6K8
5Z3
6V6
6V6
6SN7
1350
600
17
R.F. SLUG ADJ.
3.5
7.2
1350
600
17
OSC. SLUG ADJ.
3.5
7.2
METER ADJ.
6J5
2ND FILTER CHOKE
6B8
6K7
2ND I.F. TRANS.
6K7
1ST I.F. TRANS.
FILTER COND.
3RD I.F. TRANS.
DIAL ASSEMBLY
VR-105

TOP VIEW OF N605-E CHASSIS SHOWING PARTS LAYOUT


STRAP FOR SINGLE WIRE ANT.
G A A
STRAP FOR SPKR.
500 8 0 G
3 AMP. FUSE
ANT. TRIM
ANT. SECTION
OUTPUT TRANS.
1ST FILTER CHOKE
6K7
R.F. AMP.
32
1250
2900
R.F. TRIM. ADJ.
14.5
6
6V6
6V6
PWR. AMP.
5-BAND COIL ASSEMBLY
5Z3
RECTIFIER
6K8
CONVER.
32
1250
2900
OSC. TRIM. ADJ.
14.5
6
1350
600
6SN7
PHASE INVERTER
MTR. ADJ.
6J5
1ST A.F.
OSC. PAD. ADJ.
FILTER COND.
2ND FILTER CHOKE
1ST I.F. TRANS.
6K7
1ST I.F. AMP.
2ND I.F. TRANS.
6K7
2ND I.F. AMP.
6B8
DET.-AVC-SIG. MTR.
VR-105
VOLT. REG.
3RD I.F. TRANS.
SENSITIVITY
ANTENNA
SELECTIVITY
BAND
BASS
TREBLE
VOLUME

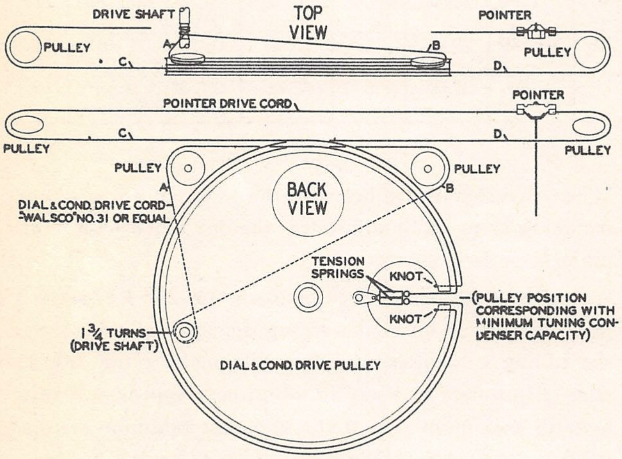
BOTTOM VIEW OF N605-E CHASSIS SHOWING PARTS LAYOUT

**MODEL N605-E**

# NORTHERN RADIO COMPANY

Before attempting any maintenance disconnect the power cable (cord), remove the four screws holding the back plate, remove three screws in the back lip of the chassis and slide the chassis out of the cabinet.

All tubes should be checked in a mutual-conductance type tester and replacements made accordingly. Regardless of test results, tubes having been in service more than two years should be replaced to avoid unnecessary maintenance expense. Tube sockets are stamped for quick identification. Dial lights are Mazda type 47 and should be replaced whenever other maintenance work is done. Ready access to the center pilot light may be had by rotating the dial until the hole in the pulley is behind the light. Whenever the type 6B8 is replaced it will be necessary to reset the tuning meter as follows: set BAND switch on "C", SENSITIVITY control at minimum, disconnect antenna, set mechanical zero on meter, turn on POWER switch and after warm-up set METER ADJ. control for zero.


DRIVE SHAFT
TOP VIEW
POINTER
PULLEY
PULLEY
A
B
C
D
POINTER DRIVE CORD
POINTER
PULLEY
PULLEY
C
D
PULLEY
PULLEY
A
B
BACK VIEW
DIAL & COND. DRIVE CORD- "WALSCO" NO. 31 OR EQUAL
TENSION SPRINGS
KNOT
KNOT
(PULLEY POSITION CORRESPONDING WITH MINIMUM TUNING CONDENSER CAPACITY)
1 3/4 TURNS (DRIVE SHAFT)
DIAL & COND. DRIVE PULLEY

DIAL AND TUNING CONDENSER DRIVE MECHANISM

TEST READINGS: Test readings are taken under the following conditions:

A. SENSITIVITY (R.F. Gain) control full on—clockwise.
B. SELECTIVITY switch in W (Wide) position.
C. BASS and TREBLE controls off—counterclockwise.
D. Antenna disconnected—no signal tuned in.
E. Band switch in Band B position for voltage readings.
F. A.C. line voltage—117 volts.

FILE NO. 605E-13-1 — TEST READINGS — 12-46

| TUBE | STAGE | PLATE VOLTAGE | SCREEN VOLTAGE | CATHODE VOLTAGE | GRID VOLTAGE | SEE NOTE |
|---|---|---|---|---|---|---|
| 6K7 | R.F. AMP. | 216 | 106 | 3.5 | .6 | 1,2&3 |
| 6K8 | CONVERTER.<br>OSC. SECTION | 220<br>104 | 100<br>-- | 2.8<br>-- | .6<br>1.8-8.0 | 1,2&3<br>1,2,3&4 |
| 6K7 | 1ST I.F. AMP. | 220 | 106 | 7 | .6 | 1,2&3 |
| 6K7 | 2ND I.F. AMP. | 215 | 106 | 3.7 | 0 | 1&2 |
| 6B8 | 2ND DET. & A.V.C. SECTION.<br>SIG. STRENGTH METER SECTION | --<br>43 | --<br>108 | --<br>0 | 0<br>6 | <br>1,2,3&5 |
| 6J5 | 1ST A.F. AMP. | 75 | -- | 2.9 | 0 | 1&2 |
| 6SN7 | PHASE INVERTER | 82 | -- | 3.1 | 0 | 1&2 |
| 6V6 | POWER OUTPUT | 219 | 224 | 12.5 | 0 | 1,2&6 |
| VR-105 | VOLTAGE REG. | 108 | -- | 0 | -- | 1&2 |
| 5Z3 | RECTIFIER | 350 | -- | -- | -- | 1,2&7 |

*Notes:*

1. All voltages shown are in respect to chassis.
2. Plate, screen and cathode voltages read with 20,000 ohm/volt meter.
3. Control grid voltage read with VTVM having a d.c. input resistance of 11 megohms.
4. Oscillator grid voltage varies between limits over various bands.
5. Grid of 6B8 (AVC bus) varies from .5 to .9 V. over all bands.
6. Readings shown are applicable to either tube or section of dual tube.
7. Reading taken with .05—600 V. cond. in series with "hot" meter lead.

# SPECIFICATIONS

**FREQUENCY RANGES:**

| | |
|---|---|
| Overall | 550 Kc to 33.5 Mc (546 to 8.96M) |
| Band A | 550 Kc to 1310 Kc (546 to 228.8M) |
| Band B | 1280 Kc to 3060 Kc (234 to 98.1M) |
| Band C | 2.92 Mc to 6.8 Mc (102.7 to 44.1M) |
| Band D | 6.45 Mc to 15.1 Mc (46.5 to 19.8M) |
| Band E | 14.7 Mc to 33.5 Mc (20.4 to 8.96M) |

INTERMEDIATE FREQUENCY________________465 Kc.

POWER OUTPUT________________7 Watts, undistorted

OUTPUT IMPEDANCE________________8 and 500 ohms

**TUBE COMPLEMENT:**

| | |
|---|---|
| (1) 6K7 | R.F. Amplifier |
| (2) 6K8 | Converter (1st Detector-Oscillator) |
| (3) 6K7 | 1st I.F. Amplifier |
| (4) 6K7 | 2nd I.F. Amplifier |
| (5) 6B8 | 2nd Detector, A.V.C. & Signal Meter |
| (6) 6J5 | 1st A.F. Amplifier |
| (7) 6SN7 | Phase Inverter |
| (8-9) 6V6G | Push-Pull Power Amplifier |
| (10) VR105 | Voltage Regulator |
| (11) 5Z3 | Plate Power Rectifier |

AUDIO RESPONSE_____Normal response (bass and treble controls off) within plus or minus 2.5 db. from 100 to 10,000 cycles.

BASS & TREBLE BOOST__________10 db. above normal

POWER SUPPLY RATING:*
105-125 Volts, A.C., 50-60 cycles______________85 Watts

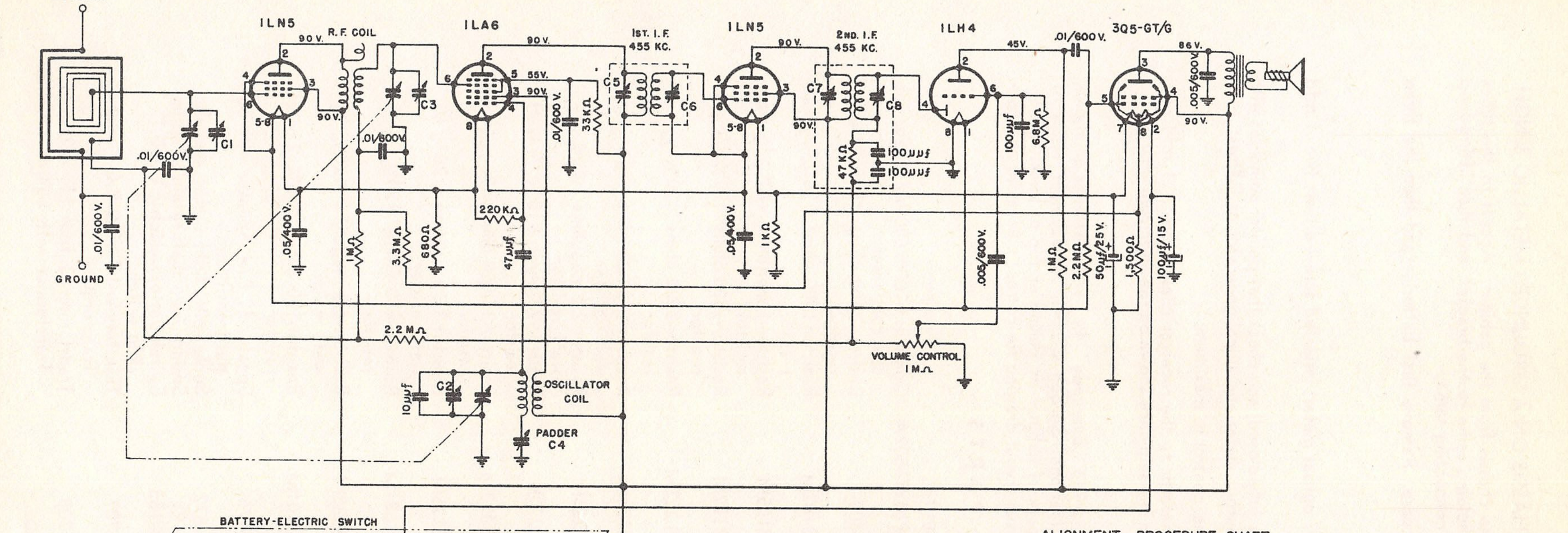
CABINET DIMENSIONS____17-3/4" Wide; 9-1/2" High; 14-7/8" Deep

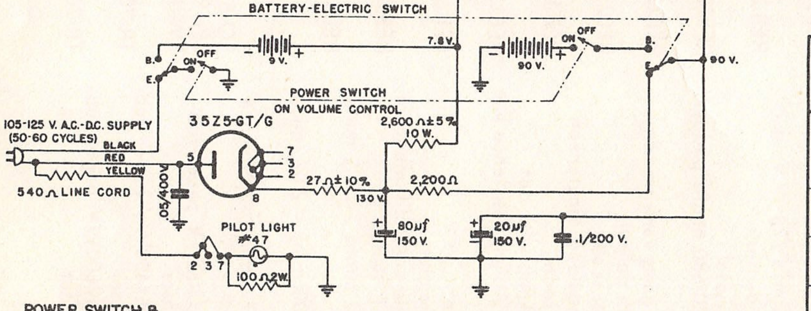
NET WEIGHT________________________________45 lbs.

*On special order, the N605-E Receiver can be supplied for 115-230 volt, A.C. operation.

# OLYMPIC RADIO & TELEV. INC.

## MODEL 6A-606

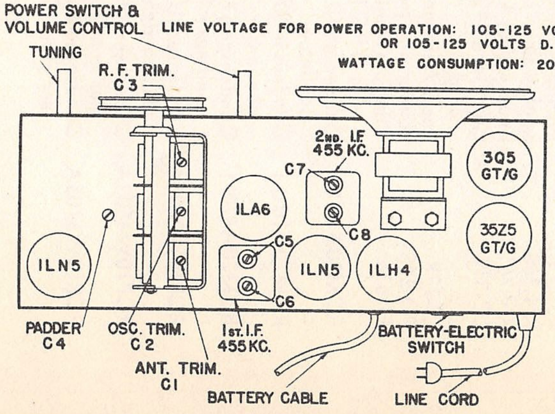

ANTENNA
GROUND
ILN5
R.F. COIL
ILA6
IST. I.F. 455 KC.
ILN5
2ND. I.F. 455 KC.
ILH4
3Q5-GT/G
90 V.
55V.
45V.
86 V.
.01/600V.
.05/400V.
.005/600V.
C1
C2
C3
C5
C6
C7
C8
33KΩ
1MΩ
3.3MΩ
680Ω
220KΩ
47μμf
1KΩ
47KΩ
100μμf
6.8MΩ
2.2MΩ
50μf/25V.
1,500Ω
100μf/15V.
2.2 MΩ
10μμf
OSCILLATOR COIL
PADDER C4
VOLUME CONTROL 1MΩ

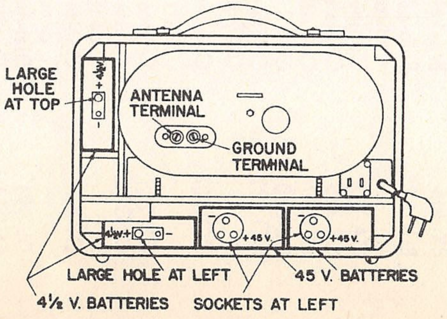

BATTERY-ELECTRIC SWITCH
7.8V.
9V.
90V.
OFF
ON
B.
E.
90 V.
POWER SWITCH ON VOLUME CONTROL
105-125 V. A.C.-D.C. SUPPLY (50-60 CYCLES)
BLACK
RED
YELLOW
540Ω LINE CORD
35Z5-GT/G
2,600Ω±5% 10 W.
27Ω±10%
2,200Ω
130V.
.05/400V.
PILOT LIGHT #47
100Ω 2W.
80μf 150V.
20μf 150 V.
.1/200 V.

LINE VOLTAGE FOR POWER OPERATION: 105-125 VOLTS A.C., 50 TO 60 CYCLES OR 105-125 VOLTS D.C.
WATTAGE CONSUMPTION: 20 WATTS.

ALIGNMENT PROCEDURE CHART

| STEP | CONNECT HIGH SIDE OF SIGNAL GENERATOR TO- | SET SIGNAL GENERATOR TO- | SET POINTER TO- | ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE) |
|---|---|---|---|---|
| 1 | R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD. COND. | 455 KC. | EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN) | C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS) |
| 2 | ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND. | 1500 KC. | 1500 KC. (150 ON DIAL) | C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS) |
| 3 | | 600 KC. | 600 KC. (APPROX. 60 ON DIAL) | C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL |
| 4 | | REPEAT STEPS 2 AND 3 | | |


POWER SWITCH & VOLUME CONTROL
TUNING
R.F. TRIM. C3
2ND. I.F. 455 KC.
C7
C8
3Q5 GT/G
35Z5 GT/G
ILA6
C5
C6
ILN5
ILN5
ILH4
PADDER C4
OSC. TRIM. C2
ANT. TRIM. C1
IST. I.F. 455KC.
BATTERY-ELECTRIC SWITCH
BATTERY CABLE
LINE CORD


LARGE HOLE AT TOP
ANTENNA TERMINAL
GROUND TERMINAL
+4½V.
+45V.
LARGE HOLE AT LEFT
45 V. BATTERIES
4½ V. BATTERIES
SOCKETS AT LEFT

NOTES:

1. ALL RESISTORS ± 20 % TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20 % TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10 %, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%.
   ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.

**Frequency Range** **530 - 1700 kc.**

## OLYMPIC RADIO & TELEV. INC.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

### ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

### BATTERIES

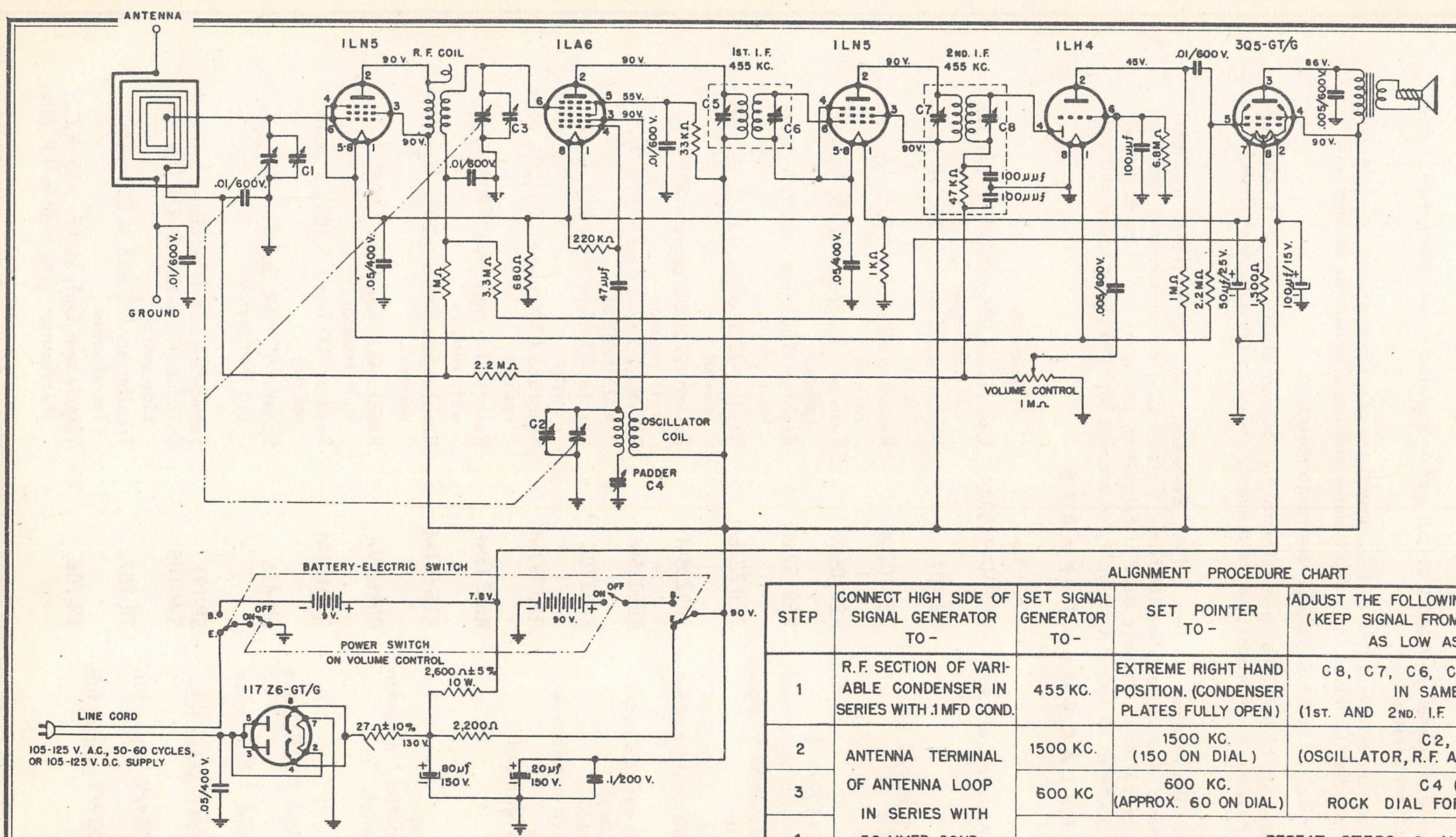
The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

### REPLACEMENT PARTS

| Part No. | Description |
|---|---|
| BK-405 | Bracket-Resistor mounting bracket |
| BU-187 | Bulb-pilot light bulb 6.3v (#47 Mazda) |
| CA-229 | Cabinet-portable cabinet |
| CB-335 | Cable-battery cable |
| CL-177 | Coil-oscillator coil |
| CL-630 | Coil-R.F. coil |
| CO-182 | Condenser-80/20/150WV & 100/15WV electrolytic condenser |
| CO 808 | Condenser-50 mfd /25 W.V. electrolytic condenser |
| CR-299 | Crystal-dial crystal |
| CT-388 | Condenser-220-680 mmfd padder condenser |
| CV-146 | Condenser-3 gang variable condenser (with pulley) |
| DL-391 | Dial-metal dial scale |
| ES-274-1 | Escutcheon-moulded escutcheon |
| KN-260 | Knob-walnut knob |
| KN-261 | Knob-walnut knob with dot |
| LC-315 | Line Cord-540 ohms resistance line cord |
| LP-178 | Loop-Antenna |
| PO-395 | Pointer-dial pointer |
| PT-576 | Control-volume control 1 megohm with D.P.S.T. switch |
| RCM20A100M | Condenser-10 mmfd ±20% mica condenser |
| RCM20A101M | Condenser-100 mmf ±20% mica condenser |
| RCM20A470M | Condenser-47 mmfd ±20% mica condenser |
| RCP10W2104A | Condenser-.1/200WV paper tubular condenser |
| RCP10W4503A | Condenser-.05/400WV paper tubular condenser |
| RCP10W6103A | Condenser-.01/600WV paper tubular condenser |
| RCP10W6502A | Condenser-.005/600WV paper tubular condenser |
| RE-407 | Resistor-2600 ohms ±5% 10 watt resistor |
| REB102M | Resistor-1000 ohms ±20% ½ watt resistor |
| REB105M | Resistor-1 megohm ±20% ½ watt resistor |
| REB152M | Resistor-1500 ohms ±20% ½ watt resistor |
| REB 222M | Resistor-2200 ohms ±20% ½ watt resistor |
| REB224M | Resistor-220,000 ohms ±20% ½ watt resistor |
| REB225M | Resistor-2.2 megohms ±20% ½ watt resistor |
| REB270K | Resistor-27 ohms ±10% ½ watt resistor |
| REB 333M | Resistor-33,000 ohms ±20% ½ watt resistor |
| REB335M | Resistor-3.3 megohms ±20% ½ watt resistor |
| REB 681M | Resistor-680 Ohms ±20% ½ watt resistor |
| REB685M | Resistor-6.8 megohms ±20% ½ watt resistor |
| RED101M | Resistor-100 ohms ±20% 2 watt resistor |
| SK-476 | Speaker-5" P.M. Speaker with output transformer |
| SO-572 | Socket-pilot light socket assembly |
| SP-191 | Spring-Drive shaft retaining spring |
| SW-185 | Switch-battery-electric D.P.D.T. slide switch |
| TR-707 | Transformer-I.F. 455 K.C. input-Transformer |
| TR-708 | Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter |

# OLYMPIC RADIO & TELEV. INC.

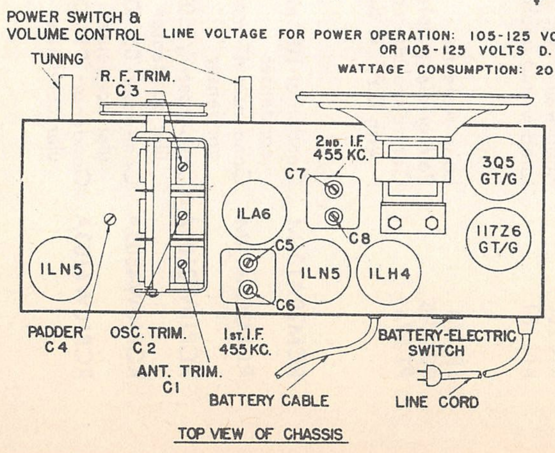
## MODEL 6B-606


ANTENNA
GROUND
ILN5
R.F. COIL
ILA6
IST. I.F. 455 KC.
ILN5
2ND. I.F. 455 KC.
ILH4
3Q5-GT/G
C1
C3
C5
C6
C7
C8
C2
OSCILLATOR COIL
PADDER C4
VOLUME CONTROL 1 MΩ
BATTERY-ELECTRIC SWITCH
POWER SWITCH ON VOLUME CONTROL
117 Z6-GT/G
LINE CORD
105-125 V. A.C., 50-60 CYCLES, OR 105-125 V. D.C. SUPPLY
90 V.
55V.
45V.
86 V.
7.8V.
130 V.
9 V.
.01/600 V.
.05/400 V.
.005/600 V.
33 KΩ
220 KΩ
47 µµf
1 MΩ
3.3 MΩ
680Ω
2.2 MΩ
1 KΩ
47 KΩ
100 µµf
6.8 MΩ
2.2 MΩ
50µf/25V.
1,500Ω
100µf/15V.
2,600Ω ±5% 10 W.
27Ω ±10%
2,200Ω
80µf 150 V.
20µf 150 V.
.1/200 V.

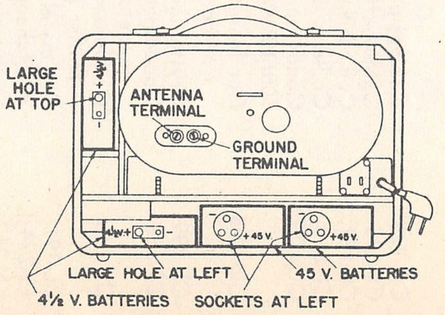
LINE VOLTAGE FOR POWER OPERATION: 105-125 VOLTS A.C., 50 TO 60 CYCLES, OR 105-125 VOLTS D.C.
WATTAGE CONSUMPTION: 20 WATTS.

### ALIGNMENT PROCEDURE CHART

| STEP | CONNECT HIGH SIDE OF SIGNAL GENERATOR TO- | SET SIGNAL GENERATOR TO- | SET POINTER TO- | ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.) |
|---|---|---|---|---|
| 1 | R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD COND. | 455 KC. | EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN) | C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS) |
| 2 | ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND. | 1500 KC. | 1500 KC. (150 ON DIAL) | C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS) |
| 3 | | 600 KC | 600 KC. (APPROX. 60 ON DIAL) | C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL |
| 4 | | REPEAT STEPS 2 AND 3 | | |


POWER SWITCH & VOLUME CONTROL
TUNING
R.F. TRIM. C3
2ND. I.F. 455 KC.
C7
C8
3Q5 GT/G
117Z6 GT/G
ILA6
C5
C6
ILN5
ILN5
ILH4
PADDER C4
OSC. TRIM. C2
ANT. TRIM. C1
1ST. I.F. 455 KC.
BATTERY-ELECTRIC SWITCH
BATTERY CABLE
LINE CORD

TOP VIEW OF CHASSIS


LARGE HOLE AT TOP
ANTENNA TERMINAL
GROUND TERMINAL
+45V.
+45V.
LARGE HOLE AT LEFT
45 V. BATTERIES
4½ V. BATTERIES
SOCKETS AT LEFT

REAR VIEW OF CABINET
SHOWING PLACEMENT OF BATTERIES

NOTES:

1. ALL RESISTORS ± 20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%.
   ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.

**Frequency Range** 530 - 1700 kc.

MODEL 6B-606

## OLYMPIC RADIO & TELEV. INC.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

### ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

### BATTERIES

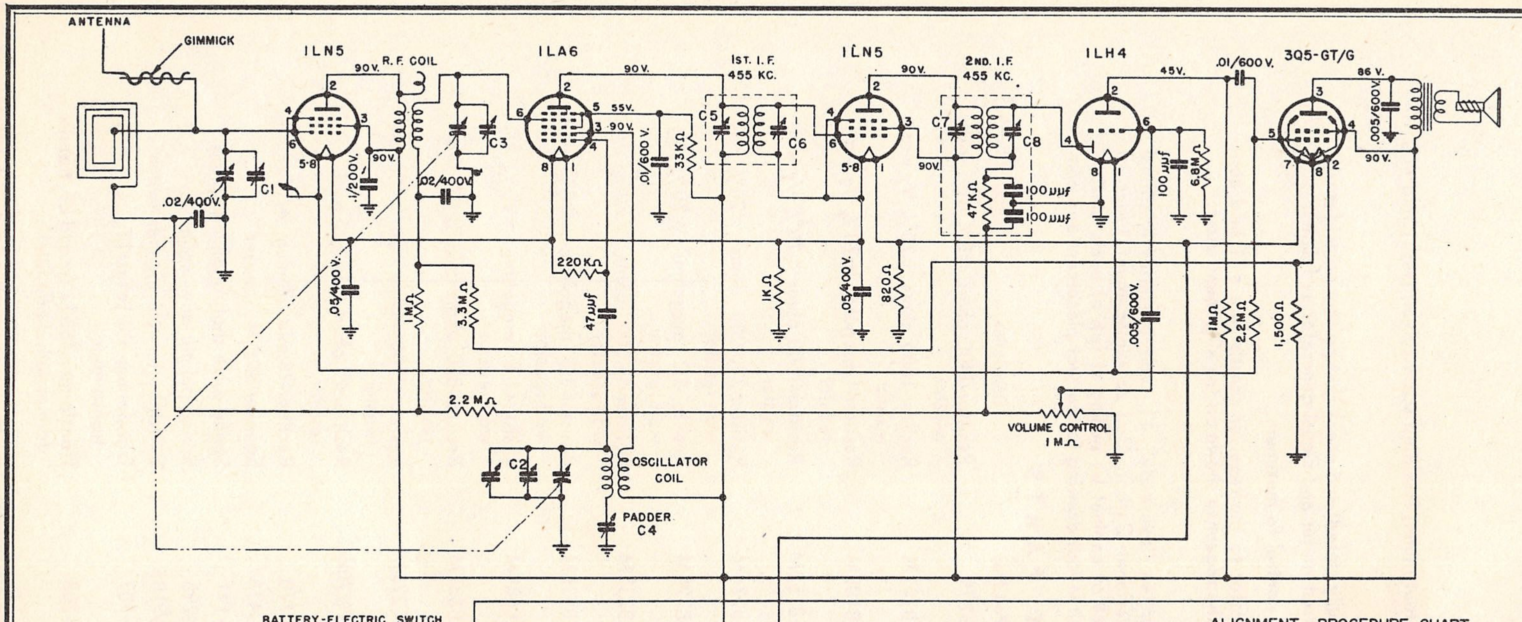
The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

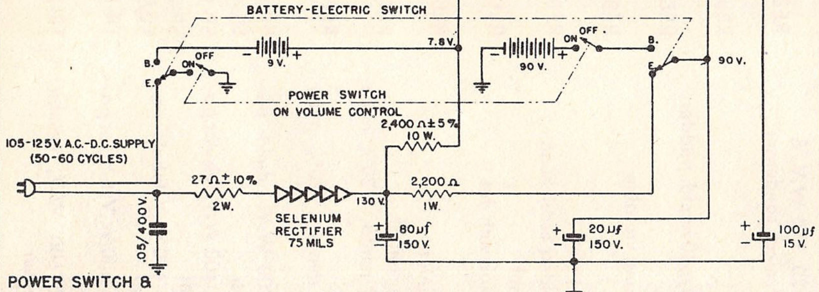
### REPLACEMENT PARTS

| Part No. | Description | Part No. | Description |
|---|---|---|---|
| BK-405 | Bracket-Resistor mounting bracket | RCP10W6502A | Condenser-.005/600WV paper tubular condenser |
| | | RE-407 | Resistor-2600 ohms ±5% 10 watt resistor |
| CA-229 | Cabinet-portable cabinet | | |
| CB-335 | Cable-battery cable | REB102M | Resistor-1000 ohms ±20% ½ watt resistor |
| CL-177 | Coil-oscillator coil | | |
| CL-630 | Coil-R.F. coil | REB105M | Resistor-1 megohm ±20% ½ watt resistor |
| CO-182 | Condenser-80/20/150WV & 100/15WV electrolytic condenser | REB152M | Resistor-1500 ohms ±20% ½ watt resistor |
| CO 808 | Condenser-50 mfd /25 W.V. electrolytic condenser | REB 222M | Resistor-2200 ohms ±20% ½ watt resistor |
| CR-299 | Crystal-dial crystal | | |
| CT-388 | Condenser-220-680 mmfd padder condenser | REB224M | Resistor-220,000 ohms ±20% ½ watt resistor |
| CV-146 | Condenser-3 gang variable condenser (with pulley) | REB225M | Resistor-2.2 megohms ±20% ½ watt resistor |
| DL-391 | Dial-metal dial scale | REB270K | Resistor-27 ohms ±10% ½ watt resistor |
| ES-274-1 | Escutcheon-moulded escutcheon | | |
| KN-260 | Knob-walnut knob | REB333M | Resistor-33,000 ohms ±20% ½ watt resistor |
| KN-261 | Knob-walnut knob with dot | | |
| | | REB335M | Resistor-3.3 megohms ±20% ½ watt resistor |
| LP-178 | Loop-Antenna | REB681M | Resistor-680 Ohms ±20% ½ watt resistor |
| PO-395 | Pointer-dial pointer | | |
| PT-576 | Control-volume control 1 megohm with D.P.S.T. switch | REB685M | Resistor-6.8 megohms ±20% ½ watt resistor |
| | | RED101M | Resistor-100 ohms ±20% 2 watt resistor |
| RCM20A101M | Condenser-100 mmf ±20% mica condenser | SK-476 | Speaker-5" P.M. Speaker with output transformer |
| RCM20A470M | Condenser-47 mmfd ±20% mica condenser | | |
| RCP10W2104A | Condenser-.1/200WV paper tubular condenser | SP-191 | Spring-Drive shaft retaining spring |
| | | SW-185 | Switch-battery-electric D.P.D.T. slide switch |
| RCP10W4503A | Condenser-.05/400WV paper tubular condenser | TR-707 | Transformer-I.F. 455 K.C. input-Transformer |
| RCP10W6103A | Condenser-.01/600WV paper tubular condenser | TR-708 | Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter |

# OLYMPIC RADIO & TELEV. INC.

## MODEL 7-526


ANTENNA
GIMMICK
ILN5
R.F. COIL
90V.
ILA6
90V.
55V.
1st. I.F. 455 KC.
C5
C6
ILN5
90V.
2nd. I.F. 455 KC.
C7
C8
ILH4
45V.
.01/600V.
3Q5-GT/G
86 V.
.005/600V.
90 V.
C1
C3
.02/400V.
.1/200V.
.05/400V.
1MΩ
3.3MΩ
220KΩ
47µµf
.01/600V.
33KΩ
1KΩ
.05/400V.
820Ω
47KΩ
100µµf
100µµf
100µµf
6.8MΩ
.005/600V.
1MΩ
2.2MΩ
1,500Ω
2.2MΩ
VOLUME CONTROL 1MΩ
C2
OSCILLATOR COIL
PADDER C4


BATTERY-ELECTRIC SWITCH
7.8V.
9V.
90V.
OFF
ON
B.
E.
90V.
POWER SWITCH ON VOLUME CONTROL
2,400Ω±5% 10W.
105-125V. A.C.-D.C. SUPPLY (50-60 CYCLES)
27Ω±10% 2W.
SELENIUM RECTIFIER 75 MILS
130V.
2,200Ω 1W.
80µf 150V.
20µf 150V.
100µf 15V.
.05/400V.

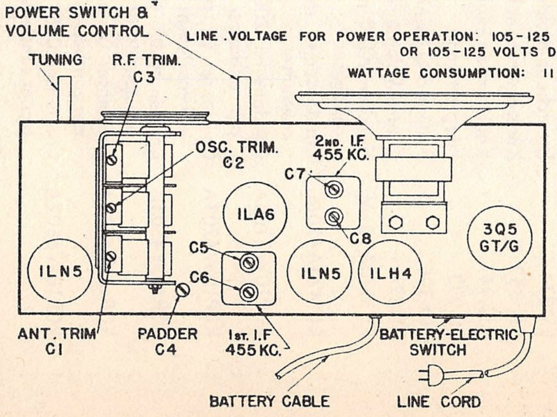
LINE VOLTAGE FOR POWER OPERATION: 105-125 VOLTS A.C., 50 TO 60 CYCLES
OR 105-125 VOLTS D.C.
WATTAGE CONSUMPTION: 11 WATTS

### ALIGNMENT PROCEDURE CHART

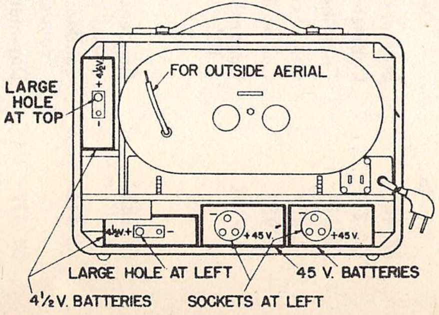
| STEP | CONNECT HIGH SIDE OF SIGNAL GENERATOR TO- | SET SIGNAL GENERATOR TO- | SET POINTER TO- | ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.) |
|---|---|---|---|---|
| 1 | R.F. SECTION OF VARIABLE' CONDENSER IN SERIES WITH .1 MFD. COND. | 455 KC. | EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN.) | C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1st. AND 2nd. I.F. TRANSFORMERS.) |
| 2 | USE RADIATED SIGNAL (CONNECT BOTH SIDES OF SIGNAL GENERATOR TO RADIATION LOOP). | 1500 KC. | 1500 KC. (150 ON DIAL) | C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS) |
| 3 | | 600 KC. | 600 KC. (APPROX. 60 ON DIAL) | C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL |
| 4 | | REPEAT STEPS 2 AND 3 | | |

NOTES:

1. ALL RESISTORS ± 20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%.
   ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.


POWER SWITCH & VOLUME CONTROL
TUNING
R.F. TRIM. C3
OSC. TRIM. C2
2nd. I.F. 455 KC.
C7
C8
ILA6
3Q5 GT/G
C5
C6
ILN5
ILN5
ILH4
ANT. TRIM C1
PADDER C4
1st. I.F 455 KC.
BATTERY-ELECTRIC SWITCH
BATTERY CABLE
LINE CORD

TOP VIEW OF CHASSIS


LARGE HOLE AT TOP
FOR OUTSIDE AERIAL
+45V.
+45V.
LARGE HOLE AT LEFT
45 V. BATTERIES
4½V. BATTERIES
SOCKETS AT LEFT

REAR VIEW OF CABINET-
SHOWING PLACEMENT OF BATTERIES

**Frequency Range** 535 - 1650 kc.

# OLYMPIC RADIO & TELEV. INC.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

To insure proper alignment, it is suggested to use a radiated signal. To radiate a signal connect a loop of about 6″ to 8″ diameter 1 turn of #14 or #12 wire across the output of the signal generator and place this loop parallel to the loop of the receiver to be aligned at a distance of about 8″ or 10″.

## ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

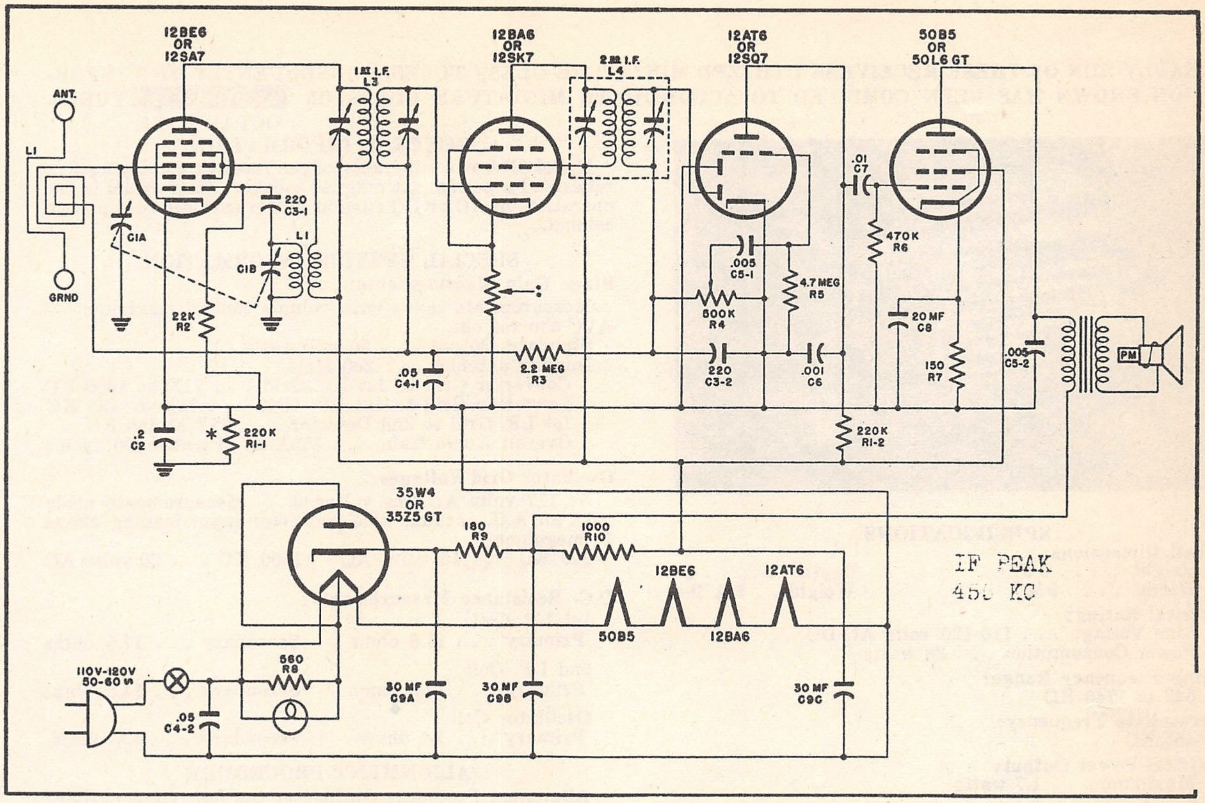
Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

## BATTERIES

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

## REPLACEMENT PARTS

| Part No. | Description |
|---|---|
| BK-405 | Bracket-resistor mounting bracket |
| CA-229 | Cabinet-portable cabinet |
| CB-335 | Cable-battery cable |
| CL-954 | Coil-r-f coil |
| CL-957 | Coil-oscillator coil |
| CO-182 | Condenser-80/20/150 W.V. & 100/15 W.V. elect. condenser |
| CT-388 | Condenser-220/680 mmfd. padder condenser |
| CV-816 | Condenser-3 gang variable condenser |
| DL-872 | Dial-metal dial scale |
| ES-274-1 | Escutcheon-molded escutcheon |
| KN-352 | Knob-walnut knob |
| KN-947 | Knob-walnut knob with dot |
| LP-993 | Loop-antenna |
| PO-395 | Pointer-dial pointer |
| PT-576 | Control-volume control |
| RCM20A101M | Condenser-100 mmfd. ±20% mica condenser |
| RCM20A470M | Condenser-47 mmfd. ±20% mica condenser |
| RCP10W2104A | Condenser-.1/200 W.V. tubular paper condenser |
| RCP10W4203A | Condenser-.02/400 W.V. tubular paper condenser |
| RCP10W4503A | Condenser-.05/400 W.V. tubular paper condenser |
| RCP10W6103A | Condenser-.01/600 W.V. tubular paper condenser |
| RCP10W6502A | Condenser-.005/600 W.V. tubular paper condenser |
| RE-879 | Resistor-2400 ohms ±5% 10 watt resistor |
| REB102M | Resistor-1000 ohms ±20% ½ watt resistor |
| REB105M | Resistor-1 megohm ±20% ½ watt resistor |
| REB152M | Resistor-1500 ohms ±20% ½ watt resistor |
| REB224M | Resistor-220,000 ohms ±20% ½ watt resistor |
| REB225M | Resistor-2.2 megohms ±20% ½ watt resistor |
| REB333M | Resistor-33,000 ohms ±20% ½ watt resistor |
| REB335M | Resistor-3.3 megohms ±20% ½ watt resistor |
| REB685M | Resistor-6.8 megohms ±20% ½ watt resistor |
| REB821M | Resistor-820 ohms ±20% ½ watt resistor |
| REC222M | Resistor-2200 ohms ±20% 1 watt resistor |
| RED270K | Resistor-27 ohms ±10% 2 watt resistor |
| RF-770 | Rectifier-75 mils selenium rectifier |
| SK-476 | Speaker-5″ P.M. speaker |
| SP-191 | Spring-drive shaft retaining spring |
| SP-295 | Spring-pointer drive spring |
| SW-185 | Switch-battery electric slide switch |
| TR-707 | Transformer-455 kc first I.F. transformer |
| TR-708 | Transformer-455 kc second I.F. transformer with diode filter |


12BE6
OR
12SA7
12BA6
OR
12SK7
12AT6
OR
12SQ7
50B5
OR
50L6 GT
1st I.F.
L3
2nd I.F.
L4
ANT.
L1
GRND
C1A
C1B
220
C3-1
L1
22K
R2
.05
C4-1
2.2 MEG
R3
.2
C2
*
220K
R1-1
.01
C7
470K
R6
.005
C5-1
4.7 MEG
R5
500K
R4
220
C3-2
.001
C6
20 MF
C8
150
R7
.005
C5-2
PM
220K
R1-2
35W4
OR
35Z5 GT
180
R9
1000
R10
12BE6
12AT6
50B5
12BA6
110V-120V
50-60 ∿
560
R8
.05
C4-2
30 MF
C9A
30 MF
C9B
30 MF
C9C
IF PEAK
455 KC

*R1-1, 220,000 ohm resistor, is used only in sets utilizing metal, octal base tubes.

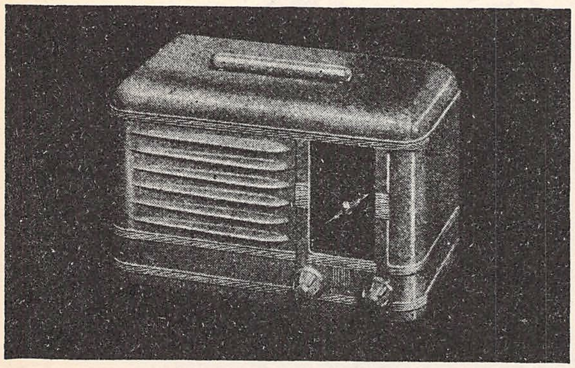
:180 ohm ½ watt resistor used for sets employing miniature glass tubes.

## TABLE OF REPLACEABLE PARTS

| PART NO. | REF. SYMBOL | DESCRIPTION |
|---|---|---|
| 21004-AL | | Cabinet, plastic: ivory |
| 21004-BG | | Cabinet, plastic: walnut |
| 23503 | C1A,B | Capacitor, variable |
| 23018 | C2 | Capacitor, paper: .2 Mfd., 200 volt |
| 23228 | C3-1<br>C3-2 | Capacitor, mica: 220 Mmf., 20% |
| 23009 | C4-1<br>C4-2 | Capacitor, paper: .05 Mfd., 400 volt |
| 23004 | C5-1<br>C5-2 | Capacitor, paper: .005 Mfd., 600 volt |
| 23001 | C6 | Capacitor, paper: .001 Mfd., 600 volt |
| 23006 | C7 | Capacitor, paper: .01 Mfd., 600 volt |
| 24032 | C8<br>C9A,B&C | Capacitor, electrolytic: 3 X 30 Mfd. 150 volt & 20 Mfd., 25 volt |
| 28013 | | Clip, electrolytic |
| 29308 | L1 | Loop, antenna |
| 29203 | L2 | Coil, oscillator |
| 29002 | L3 | Coil, 1st I.F.: 455 KC |
| 29004D | L4 | Coil, 2nd I.F.: 455 KC |
| 32012-AB | | Cord, AC:6' brown rubber |
| 32011-AL | | Cord, AC:6' white plastic |
| 38032 | | Dial scale, stationized |
| 38047 | | Dial scale, export |
| 49009-AL | | Handle, ivory |
| 49009-AG | | Handle, walnut |
| 52027A-AL | | Knob, plastic: ivory |
| 52021A-BG | | Knob, plastic: walnut |
| 54002 | | Dial, lamp, bayonet base: T-47 |
| 55003 | | Crystal, dial |
| 62000B | | Panel, loop |
| 68126 | | Instruction label |
| 73049 | R1-1<br>R1-2 | Resistor, carbon: 220,000 ohms, 20%, ½ watt |
| 73041 | R2 | Resistor, carbon: 22,000 ohms, 10%, ½ watt |
| 73055 | R3 | Resistor, carbon: 2.2 megohms, 20%, ½ watt |
| 25001A | R4 | Control, volume: 500,000 ohms, with AC switch |
| 73057 | R5 | Resistor, carbon: 4.7 megohms, 20%, ½ watt |
| 73051 | R6 | Resistor, carbon: 470,000 ohms, 20%, ½ watt |
| 73081 | R7 | Resistor, carbon: 150 ohms, 10%, 1 watt |
| 73022 | R8 | Resistor, carbon: 560 ohms, 10%, ½ watt |
| 73077 | R9 | Resistor, carbon: 180 ohms, 10%, 1 watt |
| 73071 | R10 | Resistor, carbon: 1000 ohms, 10%, 1 watt |
| 77015 | | Shaft, dial drive |
| 79002 | | Socket, tube: octal base, 8 prong wafer type |
| 79012 | | Socket, tube: 8 prong miniature |
| 79033 | | Socket, dial lamp: bayonet base |
| 78029B | | Shield, cabinet: paper |
| 83004 | | Speaker, permanent magnet: 4" |
| 84001 | | Spring, dial drive |
| 84016 | | Spring, handle |
| 89411 | | Transformer, output |

**AN EARLY RUN OF THESE RECEIVERS UTILIZED MINIATURE GLASS TUBES, CONSEQUENTLY THE INFORMATION SHOWN HAS BEEN COMPILED TO ACCOMODATE MINIATURE GLASS OR [redacted] TUBES.**

**OCTAL BASE**



## SPECIFICATIONS

**Overall Dimensions:**

| | | | |
|---|---|---|---|
| Height | . . . . . 6" | Depth | . . . . . 5" |
| Width | . . . . 9¼" | Weight | . . 5¾ lbs. |

**Electrical Rating:**
Line Voltage . . . 110-120 volts AC-DC
Power Consumption . . . 28 watts

**Tuning Frequency Range:**
540 to 1740 KC

**Intermediate Frequency:**
455 KC

**Electrical Power Output:**
Maximum . . . 1.7 watts

**Loudspeaker:**
Type . . . Permanent Magnet
Outside Cone Diameter . . . 4"
Voice Coil Impedance . . . 3.2 ohms at 400 cycles
Magnet Rating . . . 1.0 Oz. Alnico 5

**Tubes:**

| Tube | | Function |
|---|---|---|
| No. 1 | 12BE6 or 12SA7 | Frequency Converter |
| No. 2 | 12BA6 or 12SK7 | I. F. Amplifier |
| No. 3 | 12AT6 or 12SQ7 | Detector Amplifier |
| No. 4 | 50B5 or 50L6-GT | Power Amplifier |
| No. 5 | 35W4 or 35Z5-GT | Rectifier |

All D.C. voltages measured with a vacuum tube voltmeter from socket contacts to ground buss.—A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to ground buss.*—Volume Control maximum.—No signal.—117 volts A.C. line voltage.—All voltages shown are positive D.C. unless otherwise noted.

*NOTE: Filament voltages should be measured across the filament of the tube.

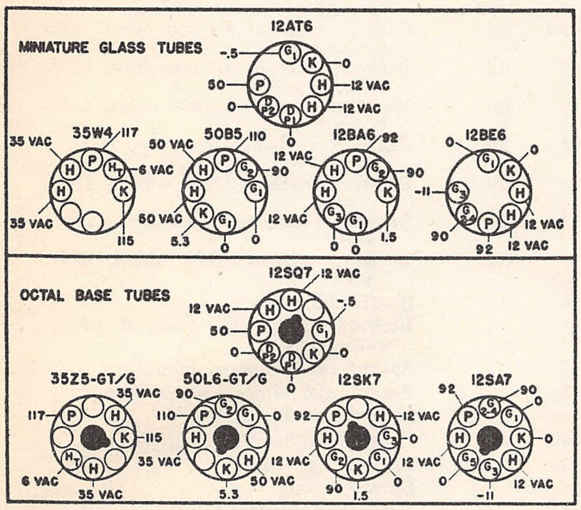

MINIATURE GLASS TUBES
12AT6
-.5
G1
K
0
50
P
H
12 VAC
0
DP2
DP1
H
12 VAC
0
35W4
117
35 VAC
H
P
HT
6 VAC
H
K
35 VAC
115
50B5
110
50 VAC
H
P
G2
90
H
G1
50 VAC
K
G1
5.3
0
0
12BA6
92
12 VAC
H
P
G2
90
H
K
12 VAC
G3
G1
0
0
1.5
12BE6
0
G1
0
K
-11
G3
H
G2-4
P
H
12 VAC
90
92
12 VAC
OCTAL BASE TUBES
12SQ7
12 VAC
12 VAC
H
H
-.5
50
P
G1
0
DP2
DP1
K
0
0
35Z5-GT/G
35 VAC
117
P
H
K
115
HT
H
6 VAC
35 VAC
50L6-GT/G
90
G2
110
P
G1
0
H
35 VAC
K
H
12 VAC
5.3
50 VAC
12SK7
92
P
H
12 VAC
H
G3
0
G2
K
G1
12 VAC
90
1.5
0
12SA7
92
90
P
G2-4
G1
0
H
K
0
G5
G3
H
0
-11
12 VAC

FIGURE 1—SOCKET VOLTAGES

## GENERAL INFORMATION

Model 5DA is a superheterodyne receiver employing five tubes and a permanent magnet speaker. This model is for operation on AC or DC current and is enclosed in a plastic cabinet.

## SPECIAL SERVICE INFORMATION

**Stage Gain Measurements:**

Measurements taken with volume control maximum. — AVC shorted out.
Standard Output . . . 50 milliwatts
Dummy antenna . . . 200 Mmf.
Converter Grid to 1st I.F. Grid . . . 71X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 78X at 455 KC
1st I.F. Grid to 2nd Detector . . . 77X at 455 KC
Overall Audio Gain . . . 375X at .5 watts 400 cycles

**Oscillator Grid Voltages:**

At 117 volts AC line voltages. — Measurements made with an A.C. vacuum tube voltmeter input loading above 10 megohms.

600 KC . . . 15 volts AC    1500 KC . . . 20 volts AC

**D.C. Resistance Measurements:**

| | | |
|---|---|---|
| 1st I.F. Coil | | |
| Primary | . . . 17.5 ohms | Secondary . . . 17.5 ohms |
| 2nd I.F. Coil | | |
| Primary | . . . 14.5 ohms | Secondary . . . 14.5 ohms |
| Oscillator Coil | | |
| Primary | . . . 1.2 ohms | Secondary . . . 4.5 ohms |

## ALIGNMENT PROCEDURE

Alignment Procedure consists of the four steps outlined in the Alignment Procedure Chart.

For Step No. 1, I.F. Alignment, connect the leads of a test oscillator to the mixer grid and the ground buss through an .01 Mfd. capacitor (dummy load). Upon completion of this step "Rock" the variable condenser to assure that the I.F.s have been aligned to the correct frequency. Output should remain constant at any setting of the variable condenser.

Steps 2 to 4 employ a Hazeltine Standard Test Loop No. 1150, or a reasonable substitute. Connect the test oscillator leads across this loop and place it in a vertical position about two feet from the receiver loop.

IMPORTANT NOTICE: Make certain that each step is done with a minimum input signal.

### ALIGNMENT CHART

| STEP | CONNECT TEST OSC. TO | TEST OSC. SETTING | POINTER SETTING | ADJUST FOR MAX. OUTPUT |
|---|---|---|---|---|
| 1 | Mixer Grid & Grd. .01 Mfd. Cap. | 455 KC | 540 KC | Trimmers A, B, C, & D |
| 2 | Standard* Test Loop | 1740 KC | 1740 KC | Trimmer E to 1740 KC |
| 3 | Standard* Test Loop | 1500 KC | 1500 KC | Trimmer F |
| 4 | Standard* Test Loop | 600 KC | 600 KC | Loop |

*NOTE: Hazeltine Standard Test Loop No. 1150 or a reasonable substitute.

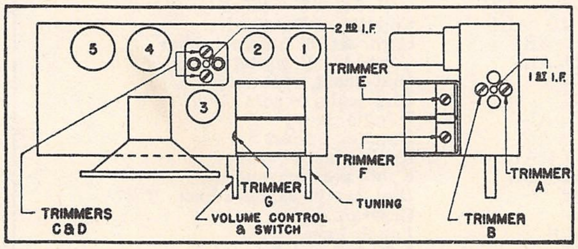
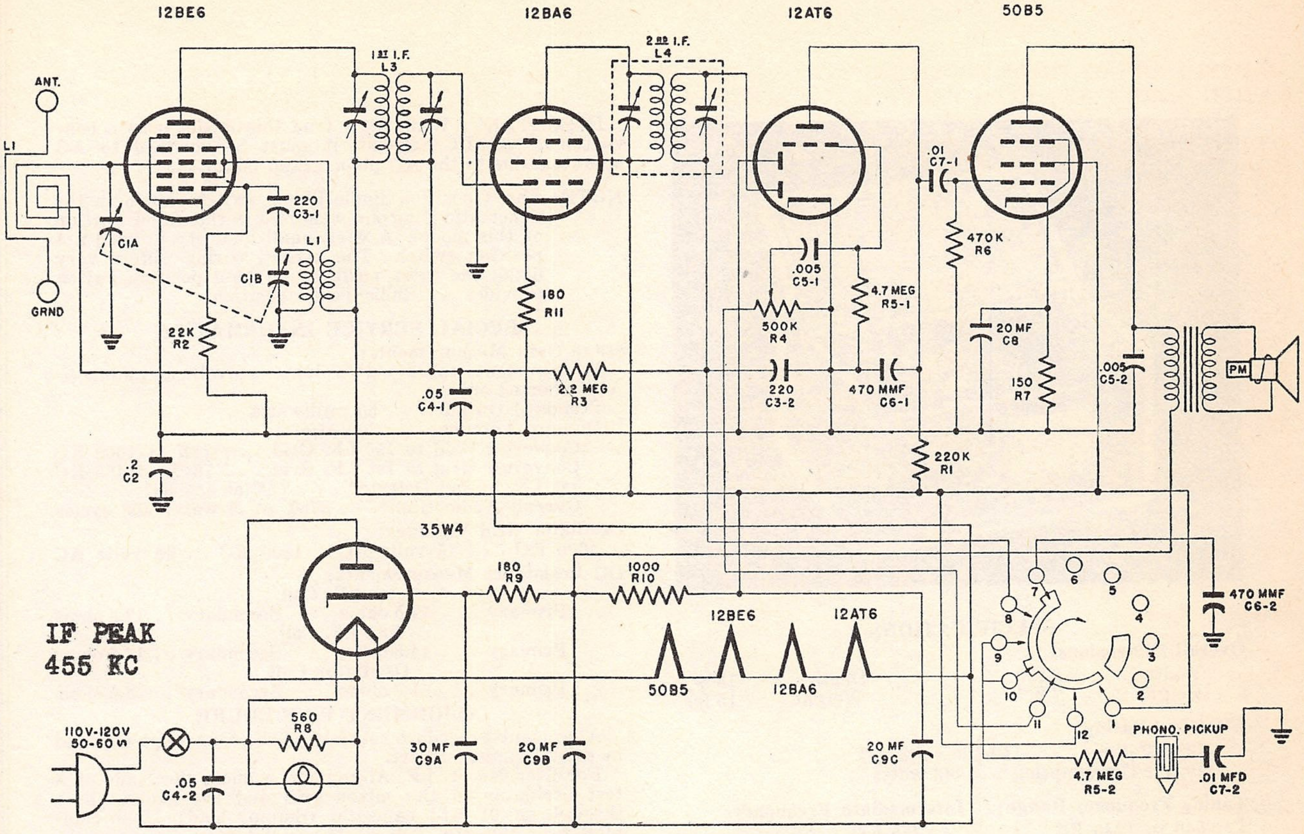

5
4
2
1
3
2ND I.F.
TRIMMER E
1ST I.F.
TRIMMER F
TRIMMER A
TRIMMER G
TUNING
TRIMMERS C&D
VOLUME CONTROL & SWITCH
TRIMMER B

FIGURE 2—TRIMMER LOCATION

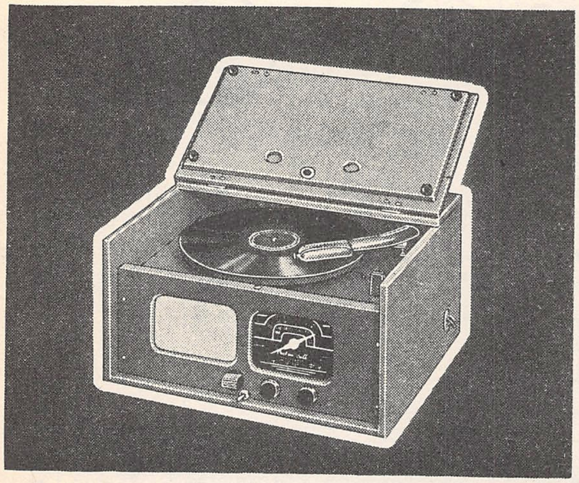
# PACKARD BELL CO.

## MODEL 568


12BE6
12BA6
12AT6
50B5
ANT.
L1
GRND
C1A
C1B
22K
R2
220
C3-1
L1
1st I.F.
L3
2nd I.F.
L4
.05
C4-1
180
R11
2.2 MEG
R3
.005
C5-1
4.7 MEG
R5-1
500K
R4
220
C3-2
470 MMF
C6-1
.01
C7-1
470K
R6
20 MF
C8
150
R7
.005
C5-2
PM
220K
R1
.2
C2
35W4
180
R9
1000
R10
12BE6
12AT6
50B5
12BA6
IF PEAK
455 KC
110V-120V
50-60 ∿
.05
C4-2
560
R8
30 MF
C9A
20 MF
C9B
20 MF
C9C
470 MMF
C6-2
PHONO. PICKUP
4.7 MEG
R5-2
.01 MFD
C7-2
1
2
3
4
5
6
7
8
9
10
11
12

| PART NO. | REF. SYMBOL | DESCRIPTION |
|---|---|---|
| 18004A | | Bracket, pilot light |
| 18012 | | Pick-up rest |
| 20001B | | Button plug |
| 21027B | | Cabinet, power cord holder |
| 21046C | | Cabinet, wood: fabricoid covered |
| 23503 | C1A & B | Capacitor, variable: two gang with pulley |
| 23018 | C2 | Capacitor, paper: .2 Mfd., 200 volt |
| 23228 | C3-1<br>C3-2 | Capacitor, mica: 220 Mmf., 20% |
| 23009 | C4-1<br>C4-2 | Capacitor, paper: .05 Mfd., 400 volt |
| 23004 | C5-1<br>C5-2 | Capacitor, paper: .005 Mfd., 600 volt |
| 23916 | C6-1<br>C6-2 | Capacitor, mica: 470 Mmf., 20% |
| 23006 | C7-1<br>C7-2 | Capacitor, paper: .01 Mfd., 600 volt |
| 24032 | C8<br>C9 A,B&C | Capacitor, electrolytic: 30 Mfd., 2 x 20 Mfd., 150 WV & 25 Mfd., 25 WV |
| 28013 | | Clip, electrolytic |
| 29320 | L1 | Loop antenna |
| 29203 | L2 | Coil, oscillator |
| 29002 | L3 | Coil, 1st I.F.: 455 KC |
| 29004D | L4 | Coil, 2nd I.F.: 455 KC |
| 32012-AB | | Cord, AC: 6' brown rubber |
| 38044B | | Dial scale, stationized |
| 38053 | | Dial scale, export |
| 41002 | | Escutcheon, AC switch |
| 52014 | | Knob, bar |
| 54002 | | Lamp, dial: bayonet base |
| 55008 | | Crystal, dial |
| 58012 | | Motor, phono |
| 59003 | | Needle, phono: permanent, osmium tip |
| 62030A | | Panel, cabinet |
| 62031A | | Panel, motor |
| 63023 | | Pick-up arm |
| 63024 | | Pick-up cartridge |
| 65042A | | Plate, paper: dial |
| 66013 | | Plug, phono |
| 66008 | | Plug, phono motor |
| 67005 | | Pointer, dial |
| 73049 | R1 | Resistor, carbon: 220,000 ohms, 20%, ½ watt |
| 73041 | R2 | Resistor, carbon: 22,000 ohms, 10%, ½ watt |
| 73055 | R3 | Resistor, carbon: 2.2 megohms, 20%, ½ watt |
| 25001A | R4 | Control, volume: 500,000 ohms, with AC switch |
| 73057 | R5-1<br>R5-2 | Resistor, carbon: 4.7 megohms, 20%, ½ watt |
| 73051 | R6 | Resistor, carbon: 470,000 ohms, 20%, ½ watt |
| 73081 | R7 | Resistor, carbon: 150 ohms, 10%, 1 watt |
| 73022 | R8 | Resistor, carbon: 560 ohms, 10%, ½ watt |
| 73077 | R9 | Resistor, carbon: 180 ohms, 10%, 1 watt |
| 73071 | R10 | Resistor, carbon: 1000 ohms, 10%, 1 watt |
| 73016 | R11 | Resistor, carbon: 180 ohms, 10%, ½ watt |
| 77017 | | Shaft, dial drive |
| 78019 | | Shield, AC switch |
| 78026 | | Shield, phono plug |
| 79004 | | Socket, phono |
| 79007 | | Socket, phono motor |
| 79012 | | Socket, tube: 7 prong miniature |
| 79033 | | Socket, dial lamp: bayonet base |
| 83004 | | Speaker, permanent magnet: 4" |
| 84001 | | Spring, dial drive |
| 86005B | | Switch, rotary: radio-phono |
| 86701A | | Switch, slide: AC phono motor |
| 89411 | | Transformer, output |

# PACKARD BELL CO.



## SPECIFICATIONS

**Overall Dimensions:**

Width . . . . . 15"
Height . . . 7¾"
Depth . . . 13⅛"
Weight . . 15 lbs.

**Electrical Rating:**

Line Voltage . . . 110-120 volts AC
Power Consumption . . . 43 watts

**Tuning Frequency Range:**
540 to 1740 KC

**Intermediate Frequency:**
455 KC

**Electrical Power Output:**

Maximum . . . 1.7 watts

**Loudspeaker:**

Type . . . Permanent Magnet
Outside Cone Diameter . . . 4"
Voice Coil Impedance . . . 3.2 ohms at 400 cycles
Magnet Rating . . . 1.0 Oz. Alnico 5

**Tubes:**

| | |
|---|---|
| 12BE6 | Frequency Converter |
| 12BA6 | I. F. Amplifier |
| 12AT6 | Detector Amplifier |
| 50B5 | Power Amplifier |
| 35W4 | Rectifier |

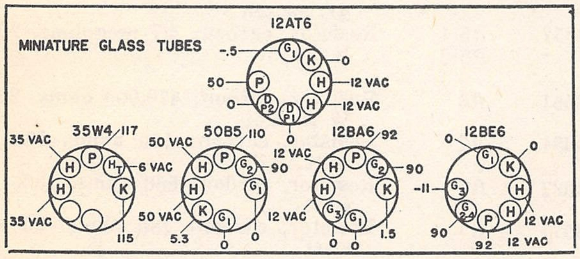


FIGURE 1—SOCKET VOLTAGES

All D.C. voltages measured from socket contacts to ground buss with a vacuum tube voltmeter. — A.C. voltages measured with a 1000 ohms per volt A.C. meter from socket contacts to ground buss.* — volume control maximum. — No Signal. — 117 A.C. line voltage. — All voltages shown are positive D.C. unless otherwise noted.

*NOTE: Filament voltages should be measured across the filament of the tube.

## GENERAL INFORMATION

Model 568 is a combination superheterodyne receiver and phonograph. This model employs a permanent magnet speaker and a specially designed "Hi-Q" loop antenna. The model is capable of playing ten or twelve-inch records and is enclosed in a fabricoid covered carrying case.

IMPORTANT: While it is true this model uses a conventional "AC-DC" circuit, it must be confined to AC operation due to the AC phonograph motor.

NOTE: The 3 position Radio-Phono switch shown in the Schematic Diagram was used in the major portion of this model. A very small quantity utilized a 4 position switch. The overall wiring differs very little; the extra position on the 4 position switch provides a "Radio-Tone" position.

## SPECIAL SERVICE INFORMATION

**Stage Gain Measurements:**

Measurements taken with volume control maximum. — AVC shorted out.

Standard Output . . . 50 milliwatts
Dummy Antenna . . . 200 Mmf.
Converter Grid to 1st I.F. Grid . . . 71X at 1000 KC
Converter Grid to 1st I.F. Grid . . . 78 X at 455 KC
1st I.F. to 2nd Detector . . . 77X at 455 KC
Overall Audio Gain . . . 375X at .5 watts 400 cycles

**Oscillator Grid Voltages:**

600 KC . . . 15 volts AC
1500 KC . . 20 volts AC

**DC Resistance Measurements:**

**1st I.F. Coil**
Primary . . . 17.5 ohms
Secondary . . 17.5 ohms

**2nd I.F. Coil**
Primary . . . 14.5 ohms
Secondary . . 14.5 ohms

**Oscillator Coil**
Primary . . . 1.2 ohms
Secondary . . 4.5 ohms

## ALIGNMENT PROCEDURE

Alignment Procedure consists of the four steps outlined in the Alignment Chart.

For Step No. 1, I.F. Alignment, connect the leads of a test oscillator to the mixer grid and the ground buss through an .01 Mfd. capacitor (dummy load). Upon completion of this step "Rock" the variable condenser to assure that the I.F.s have been aligned to the correct frequency. Output should remain constant at any setting of the variable condenser.

Steps 2 to 4 employ a Hazeltine Standard Test Loop No. 1150 or a reasonable substitute. Connect the test oscillator leads across this loop and place it in a vertical position about two feet from the receiver loop.

IMPORTANT NOTICE: Make certain that each step is done with a minimum input signal.

### ALIGNMENT CHART

| STEP | CONNECT TEST OSC. TO | TEST OSC. SETTING | POINTER SETTING | ADJUST FOR MAX. OUTPUT |
|---|---|---|---|---|
| 1 | Mixer Grid & Grd. .01 Mfd. Cap. | 455 KC | 540 KC | Trimmers A, B, C & D |
| 2 | Standard* Test Loop | 1740 KC | 1740 KC | Trimmer E to 1740 KC |
| 3 | Standard* Test Loop | 1500 KC | 1500 KC | Trimmer F |
| 4 | Standard* Test Loop | 600 KC | 600 KC | Loop |

*NOTE: Hazeltine Standard Test Loop or a reasonable substitute.

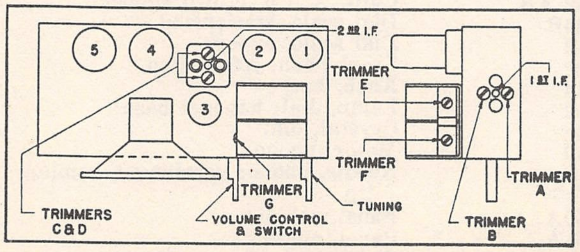
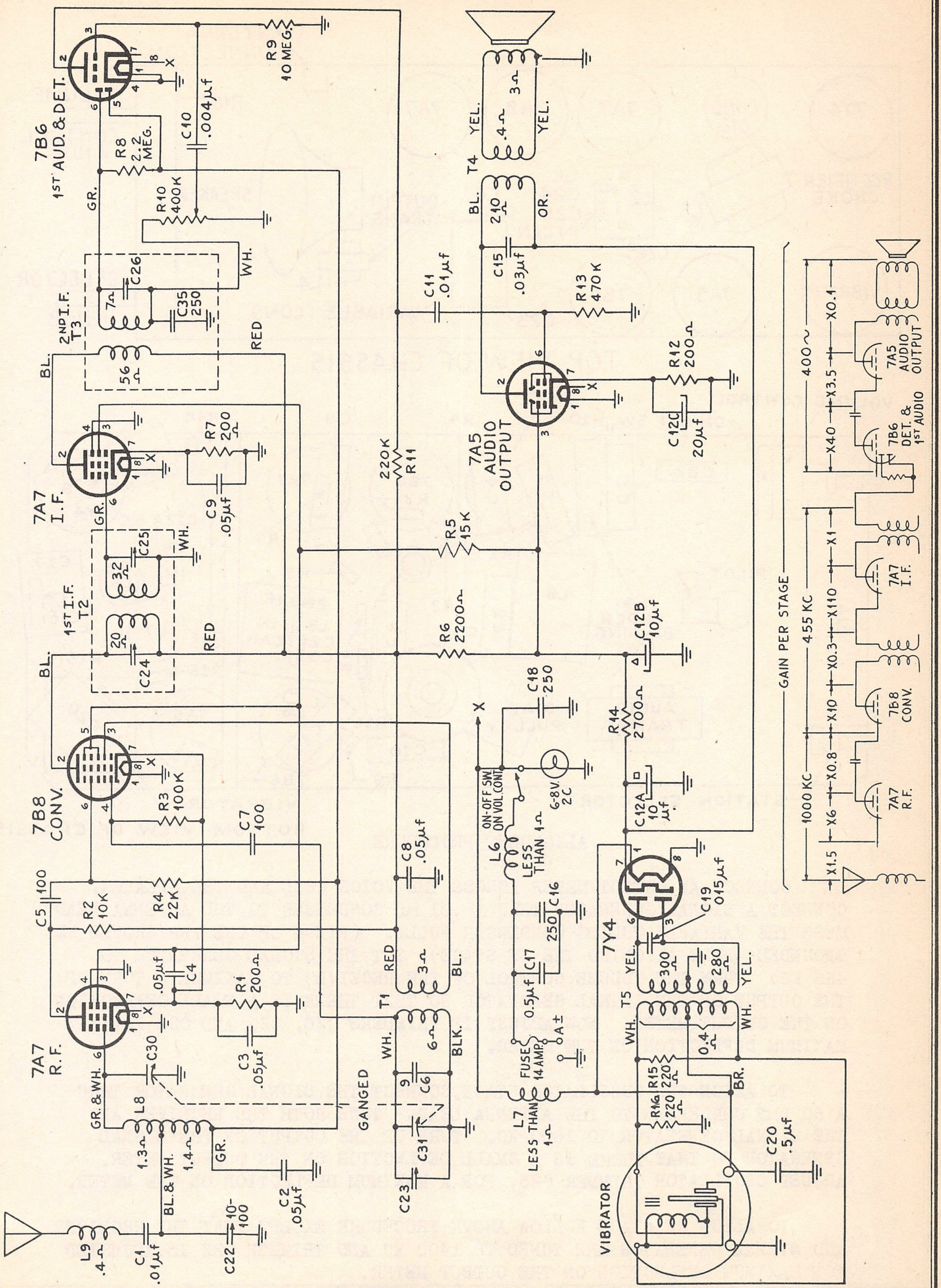
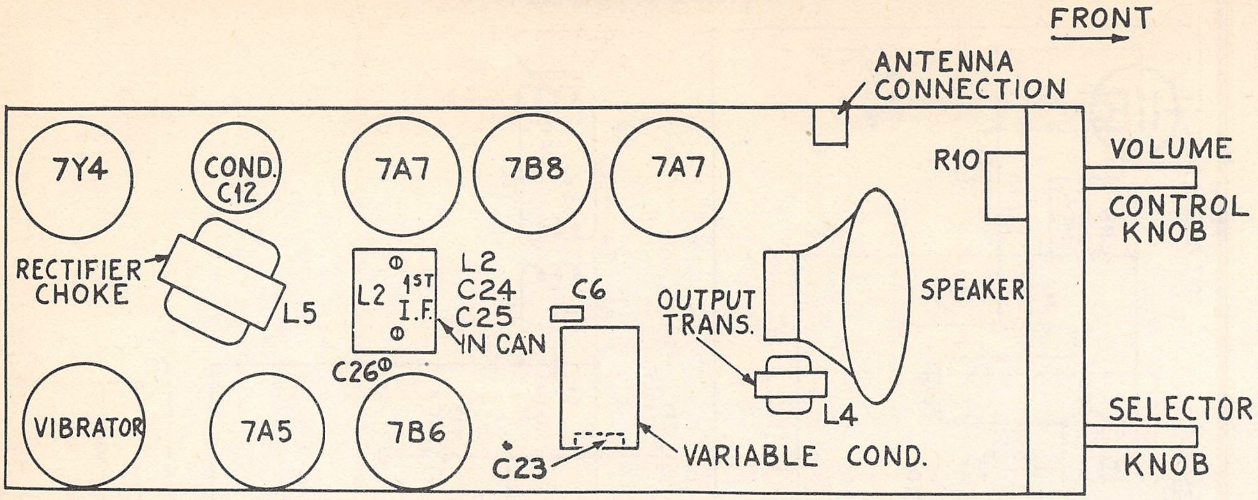


FIGURE 2—TRIMMER LOCATION

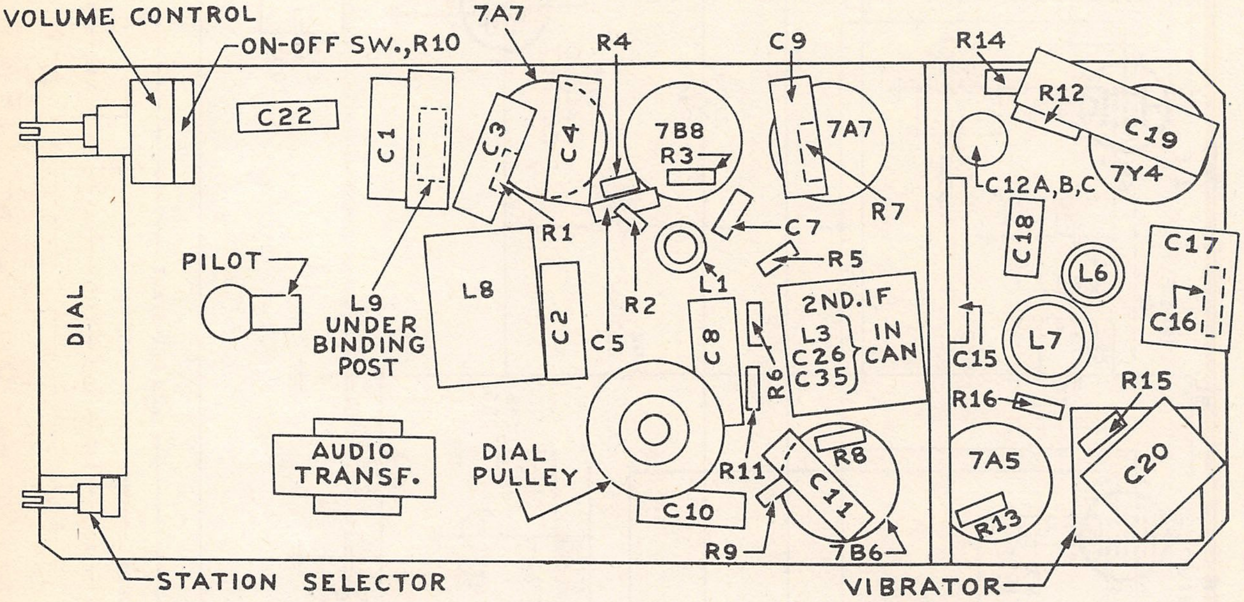
## PHILCO CORP.


7B6
1ST AUD. & DET.
R9 10 MEG.
R8 2.2 MEG.
C10 .004µf
R10 400K
GR.
WH.
2ND I.F. T3
C26 7Ω
C35 250
56 Ω
BL.
RED
7A7 I.F.
R7 200 Ω
C9 .05µf
1ST I.F. T2
32 Ω C25
20 Ω C24
7B8 CONV.
R3 100K
C7 400
C5 100
R2 10K
R4 22K
7A7 R.F.
C4 .05µf
R1 200Ω
C3 .05µf
C30
GR. & WH.
L8 1.3Ω 1.4Ω
BL. & WH.
GANGED
L9 .4Ω
C1 .01µf
C22 40-100
C2 .05µf
T1 RED 3Ω BL. WH. 6Ω BLK.
C8 .05µf
C6 9
C31
C23
R11 220K
R5 15K
R6 2200Ω
C11 .01µf
T4 YEL. .4Ω 3Ω YEL.
BL. 210Ω OR.
C15 .03µf
R13 470K
7A5 AUDIO OUTPUT
R12 200Ω
C12C 20µf
C12B 10µf
C48 250
R14 2700Ω
C12A 10µf
X
ON-OFF SW. ON VOL. CONT.
6-8V 2C
L6 LESS THAN 1Ω
C16 250
C17 0.5µf
A±
FUSE 14 AMP.
L7 LESS THAN 1Ω
7Y4
C19 .015µf
T5 YEL. 300Ω 280Ω YEL.
WH. 0.4Ω WH.
BR.
R15 220Ω
R16 220Ω
C20 .5µf
VIBRATOR
GAIN PER STAGE
1000 KC
455 KC
400~
X1.5 X6 X0.8 X10 X0.3 X110 X1 X40 X3.5 X0.1
7A7 R.F.
7B8 CONV.
7A7 I.F.
7B6 DET. & 1ST AUDIO
7A5 AUDIO OUTPUT

# PHILCO CORP.


FRONT
ANTENNA CONNECTION
7Y4
COND. C12
7A7
7B8
7A7
R10
VOLUME CONTROL KNOB
RECTIFIER CHOKE
L5
L2
1ST I.F.
L2 C24 C25 IN CAN
C6
C26
OUTPUT TRANS.
SPEAKER
L4
VIBRATOR
7A5
7B6
C23
VARIABLE COND.
SELECTOR KNOB

TOP VIEW OF CHASSIS


VOLUME CONTROL
ON-OFF SW., R10
7A7
R4
C9
R14
R12
C19
7Y4
C22
C1
C3
C4
7B8
R3
7A7
R7
C12A,B,C
R1
C7
R5
C18
C17
PILOT
L1
L6
DIAL
L8
L9 UNDER BINDING POST
C2
C5
R2
C8
R6
2ND.IF
L3 C26 C35 IN CAN
C15
L7
C16
R16
R15
AUDIO TRANSF.
DIAL PULLEY
R11
R8
C11
7A5
C20
C10
R13
R9
7B6
STATION SELECTOR
VIBRATOR

BOTTOM VIEW OF CHASSIS

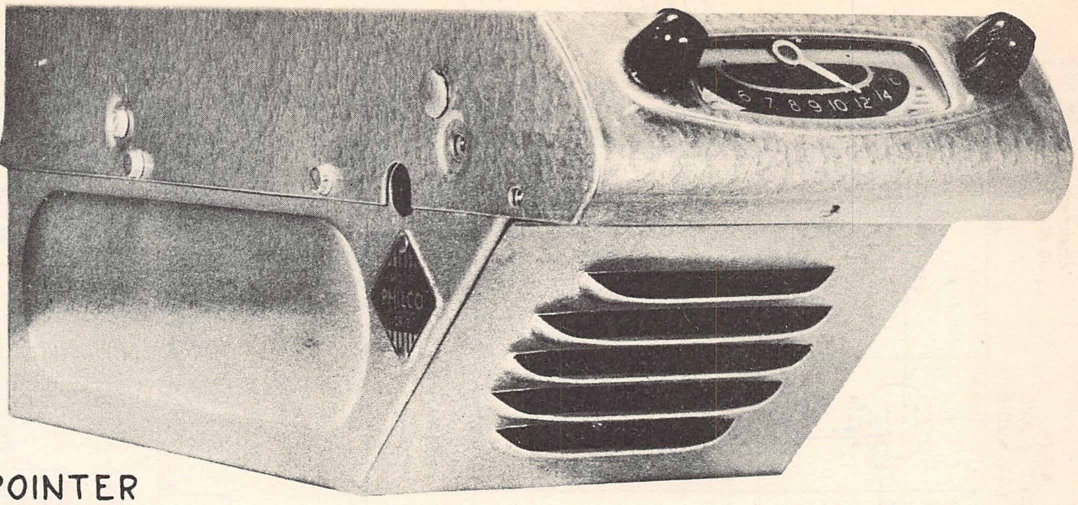
## ALIGNMENT PROCEDURE

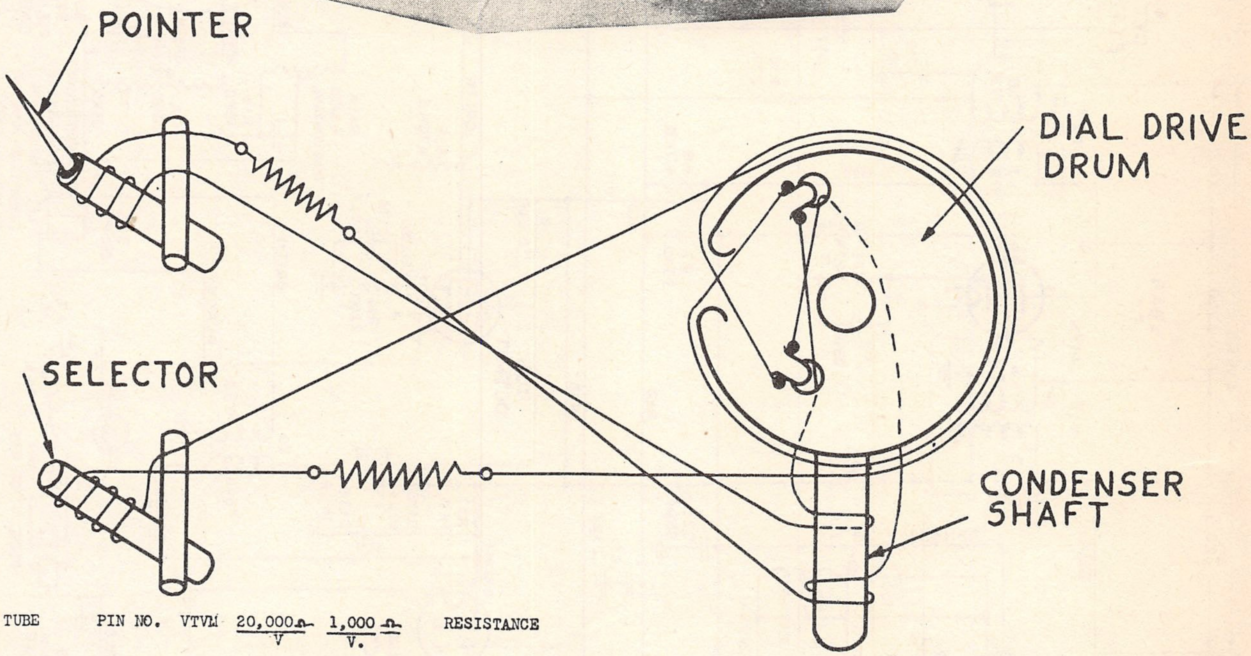
CONNECT AN OUTPUT METER ACROSS THE VOICE COIL AND THE SPEAKER. CONNECT A SIGNAL GENERATOR THRU A .01 mf CONDENSER TO THE ANTENNA LEAD. MESH THE VARIABLE TUNING CONDENSER FULLY. (PIN 4 OF THE 7B8 SHOULD BE GROUNDED WHILE ALIGNING THE IF STAGE) SET THE SIGNAL GENERATOR TO 455 KC. TURN THE VOLUME CONTROL OF THE RECEIVER TO MAXIMUM. TURN UP THE OUTPUT OF THE SIGNAL GENERATOR SO THAT THERE IS A SMALL DEFLECTION ON THE OUTPUT METER. NOW ADJUST IF TRIMMERS C26, C25 AND C24 FOR A MAXIMUM DEFLECTION ON THE METER.

TO ALIGN THE OSCILLATOR STAGE,CONNECT THE SIGNAL GENERATOR THRU A 50 MMF CONDENSER TO THE ANTENNA LEAD. TUNE BOTH THE RECEIVER AND THE SIGNAL GENERATOR TO 1600 KC. TURN UP THE OUTPUT OF THE SIGNAL GENERATOR SO THAT THERE IS A SMALL DEFLECTION ON THE OUTPUT METER. ADJUST OSCILLATOR TRIMMER C23, FOR A MAXIMUM DEFLECTION ON THE METER.

TO ALIGN RF STAGE FOLLOW ABOVE PROCEDURE EXCEPT THAT THE RECEIVER AND SIGNAL GENERATOR ARE TUNED TO 1400 KC AND TRIMMER C22 IS ADJUSTED FOR MAXIMUM DEFLECTION ON THE OUTPUT METER.

# PHILCO CORP.



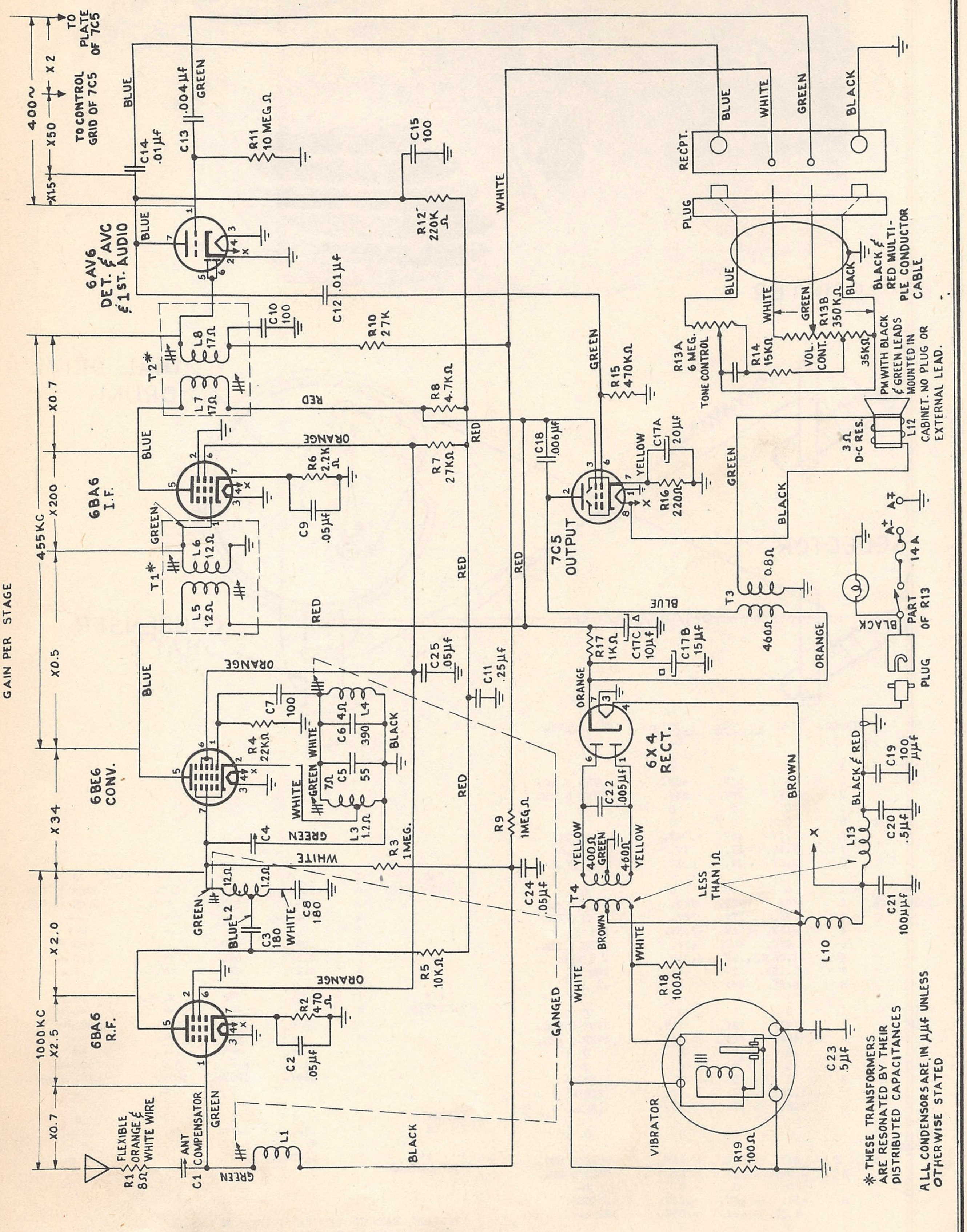


| TUBE | PIN NO. | VTVM | 20,000 Ω/V | 1,000 Ω/V. | RESISTANCE |
|---|---|---|---|---|---|
| 7 A 7<br>RF | 1 | 0 | 0 | 0 | 0 |
| | 2 | 55V. | 51V. | 46V. | OVER 5 MEG. |
| | 3 | 47V. | 46V. | 43V. | OVER 5 MEG. |
| | 4 | 0 | 0 | 0 | 0 |
| | 5 | 0 | 0 | 0 | 0 |
| | 6 | -1.2V. | 35V. | -.04V. | 2.7 MEG. |
| | 7 | 1.1V. | 1V. | 1V. | 200 Ω |
| | 8 | 6.2V. | 6V. | 6.1V. | .3 Ω |
| 7 B 8<br>CONVERTER | 1 | 0 | 0 | 0 | 0 |
| | 2 | 78V. | 77V. | 72V. | OVER 5 MEG. |
| | 3 | 78V. | 77V. | 72V. | OVER 5 MEG. |
| | 4 | -12V. | -8.3V. | -3.3V. | 125 K |
| | 5 | 47V. | 46 V | 48V. | OVER 5 MEG. |
| | 6 | -1.05 V. | .16V. | -.01V. | 2.8 MEG. |
| | 7 | 1.15V. | 1V. | 1V. | 200 Ω |
| | 8 | 6.2V. | 6V. | 6V. | .3 Ω |
| 7 A 7<br>IF | 1 | 0 | 0 | 0 | 0 |
| | 2 | 78V. | 76V. | 71V. | OVER 5 MEG. |
| | 3 | 48V. | 46V. | 43V. | OVER 5 MEG. |
| | 4 | 0 | 0 | 0 | 0 |
| | 5 | 0 | 0 | 0 | 0 |
| | 6 | 0 | 0 | 0 | 30 Ω |
| | 7 | 1.15V. | 1V. | 1V. | 210 Ω |
| | 8 | 6.2V | 6V. | 6V. | .3 Ω |
| 7 B 6 | 1 | 0 | 0 | 0 | 0 |
| DET. & 1st AUDIO | 2 | 57V. | 54V. | 23V. | OVER 5 MEG. |
| | 3 | -.95V. | -.36V. | -.1V. | OVER 5 MEG. |
| | 4 | 0 | 0 | 0 | .2 Ω |
| | 5 | -1V. | -.28V. | -.03V. | 2.7 MEG. |
| | 6 | -1.2V. | -.42V. | -.05V. | 380 K. |
| | 7 | 0 | 0 | 0 | 0 |
| | 8 | 6.2V. | 6V. | 6V. | .3 Ω |
| 7A5<br>AUDIO OUTPUT | 1 | 0 | 0 | 0 | 0 |
| | 2 | 124V. | 124V. | 120V. | OVER 30 MEG. |
| | 3 | 95V. | 97V. | 90V. | OVER 30 MEG. |
| | 4 | — | — | — | — |
| | 5 | — | — | — | — |
| | 6 | .05V. | 0 | 0 | 650 K |
| | 7 | 6.3V. | 6V. | 6V. | 210 Ω |
| | 8 | 6.2V. | 6V. | 6V. | .3 Ω |
| 7Y4<br>RECTIFIER | 1 | 6.2V. | 6V. | 6.1V. | .3 Ω |
| | 2 | — | — | — | — |
| | 3 | A C | A C | A C | 240 Ω |
| | 4 | — | — | — | — |
| | 5 | — | — | — | — |
| | 6 | A C | A C | A C | 260 Ω |
| | 7 | 130V. | 120V. | 120V. | OVER 5 MEG. |
| | 8 | 0 | 0 | 0 | 0 |
| VIBRATOR | 1 | 0 | 0 | 0 | 0 |
| 2 3 | 2 | 6V. | 5.7V. | 6V. | .6 Ω |
| | 3 | 6V. | 5.7V. | 6V. | .6 Ω |
| 1 4<br>Bottom View | 4 | 6.2V. | 5.9V. | 6.2V. | .4 Ω |

VOLTAGE MEASURED WHEN "A" VOLTAGE = 6.4V.,
THE CONDENSER FULLY MESHED AND VOLUME CONTROL AT MINIMUM.

MODEL CR-4

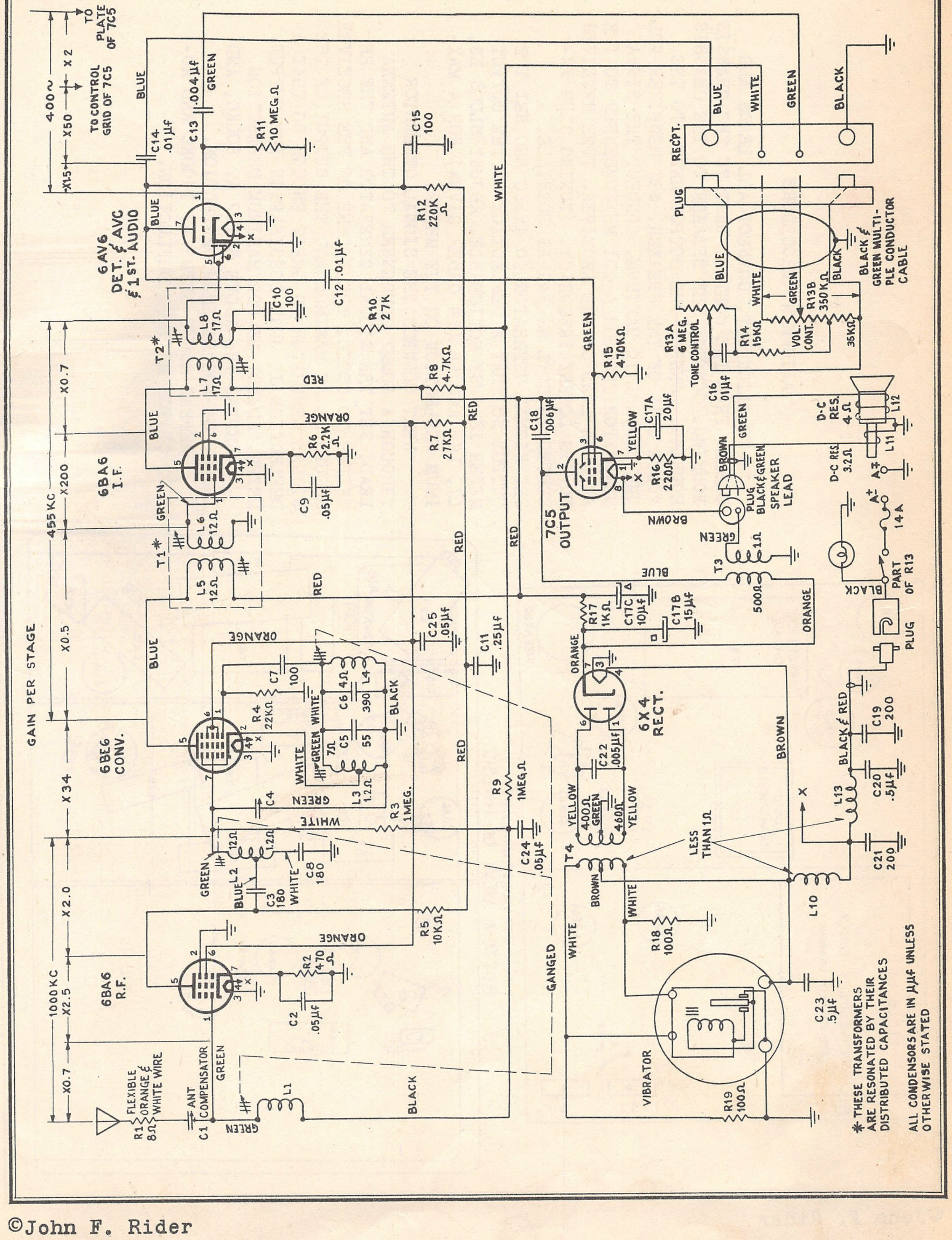
# PHILCO CORP.


GAIN PER STAGE
1000 KC
455 KC
400~
X0.7
X2.5
X2.0
X34
X0.5
X200
X0.7
X15
X50
X2
TO CONTROL GRID OF 7C5
TO PLATE OF 7C5
R1 8Ω
FLEXIBLE ORANGE & WHITE WIRE
ANT COMPENSATOR
C1
L1
6BA6 R.F.
C2 .05µf
R2 470Ω
R5 10KΩ
L2
C3 180
C8 180
R3 1MEG.
C4
6BE6 CONV.
R4 22KΩ
C7 100
C5 55
C6 390
L3 1.2Ω
L4
C25 .05µf
C11 .25µf
R9 1MEG.Ω
C24 .05µf
GANGED
T1*
L5 12Ω
L6 12Ω
6BA6 I.F.
R6 2.2KΩ
C9 .05µf
R7 27KΩ
T2*
L7 17Ω
L8 17Ω
R8 4.7KΩ
C10 100
R10 27K
6AV6 DET. & AVC & 1ST. AUDIO
C12 .01µf
C13 .004µf
C14 .01µf
R11 10 MEG.Ω
C15 100
R12 220K Ω
7C5 OUTPUT
C18 .006µf
R15 470KΩ
C17A 20µf
R16 220Ω
C17B 15µf
C17C 10µf
R17 1KΩ
T3
0.8Ω
460Ω
3Ω D-C RES.
L12
PM WITH BLACK & GREEN LEADS MOUNTED IN CABINET. NO PLUG OR EXTERNAL LEAD.
RECPT.
PLUG
BLACK & RED MULTI-PLE CONDUCTOR CABLE
R13A 6 MEG. TONE CONTROL
R13B 350KΩ VOL. CONT.
R14 15KΩ
35KΩ
6X4 RECT.
C22 .005µf
T4
400Ω
460Ω
LESS THAN 1Ω
R18 100Ω
VIBRATOR
R19 100Ω
C23 .5µf
L10
L13
C21 100µµf
C20 .5µf
C19 100µµf
PLUG
PART OF R13
14A
A+
A+
BLUE
WHITE
GREEN
BLACK
RED
ORANGE
YELLOW
BROWN
BLACK & RED

* THESE TRANSFORMERS ARE RESONATED BY THEIR DISTRIBUTED CAPACITANCES

ALL CONDENSORS ARE IN µµf UNLESS OTHERWISE STATED

# PHILCO CORP.


GAIN PER STAGE
X0.7
1000 KC
X2.5
X2.0
X34
X0.5
455 KC
X200
X0.7
400~
X1.5
X50
X2
TO CONTROL GRID OF 7C5
TO PLATE OF 7C5
R1 8Ω
FLEXIBLE ORANGE & WHITE WIRE
C1
ANT COMPENSATOR
GREEN
L1
BLACK
6BA6 R.F.
C2 .05µf
R2 470 Ω
R5 10KΩ
ORANGE
GANGED
6BE6 CONV.
L2
BLUE
C3 180
WHITE
C8 180
12Ω
1.2Ω
R3 1MEG.
C4
L3 1.2Ω
7Ω
C5 55
C6 390
4Ω
L4
C7 100
R4 22KΩ
GREEN WHITE
C24 .05µf
R9 1MEG.Ω
C25 .05µf
C11 .25µf
RED
T1*
L5 12Ω
L6 12Ω
6BA6 I.F.
R6 2.2K Ω
C9 .05µf
R7 27KΩ
R8 4.7KΩ
T2*
L7 17Ω
L8 17Ω
C10 100
R10 27K
C12 .01µf
6AV6 DET. & AVC & 1ST. AUDIO
R12 220K Ω
C15 100
C14 .01µf
C13 .004µf
R11 10 MEG.Ω
7C5 OUTPUT
C18 .006µf
R15 470KΩ
YELLOW
C17A 20µf
R16 220Ω
BROWN
PLUG BLACK & GREEN SPEAKER LEAD
T3
1Ω
500Ω
R17 1KΩ
C17C 10µf
C17B 15µf
6X4 RECT.
C22 .005µf
T4
400Ω
460Ω
LESS THAN 1Ω
L10
L13
X
C21 200
C20 .5µf
C19 200
BLACK & RED
R18 100Ω
VIBRATOR
R19 100Ω
C23 .5µf
PLUG
PART OF R13
14A
A+
D-C RES. 3.2Ω
L11
D-C RES. 4Ω
L12
C16 .01µf
TONE CONTROL
R13A 6 MEG.
R14 15KΩ
VOL. CONT.
R13B 350 KΩ
35KΩ
BLACK & GREEN MULTI-PLE CONDUCTOR CABLE
PLUG
RECPT.
BLUE
WHITE
GREEN
BLACK

* THESE TRANSFORMERS ARE RESONATED BY THEIR DISTRIBUTED CAPACITANCES

ALL CONDENSORS ARE IN µµf UNLESS OTHERWISE STATED

MODELS CR-4, CR-6

## PHILCO CORP.

### ALIGNMENT PROCEDURE

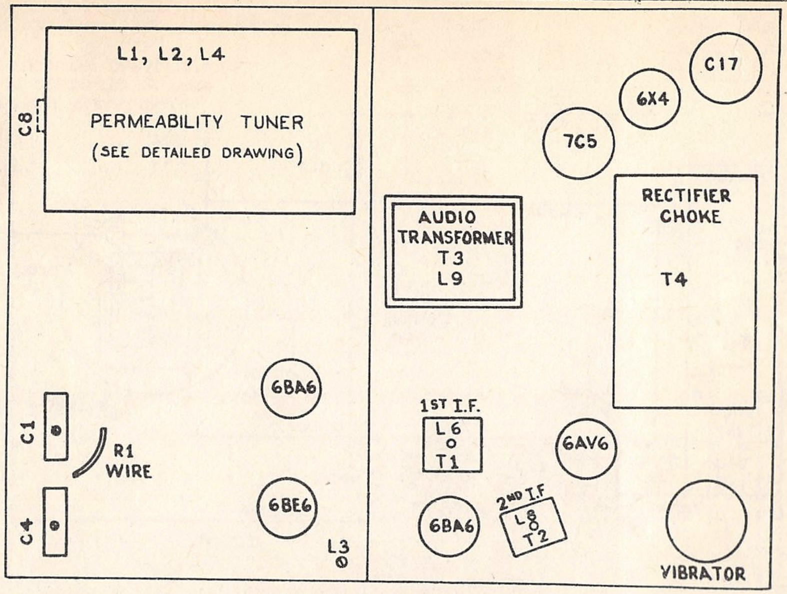
TO ALIGN SET, CONNECT ALL LEADS AND CABLES FROM THE CONTROL UNIT TO THE CHASSIS HOUSING. CONNECT THE SPEAKER TO THE CHASSIS HOUSING. CONNECT THE OUTPUT METER TO THE VOICE COIL OF THE SPEAKER. SET RECEIVER VOLUME CONTROL TO MAXIMUM. CONNECT THE SIGNAL GENERATOR THROUGH A .01 MF CONDENSER TO THE ANTENNA LEAD OF THE RECEIVER. TUNE RECEIVER TO ITS LOWEST FREQUENCY. (TUNING SLUG INSERTED IN COIL AS FAR AS POSSIBLE.

SET SIGNAL GENERATOR TO 455KC AND SET THE OUTPUT SO THAT A DEFLECTION ON THE OUTPUT METER IS JUST NOTICEABLE. ADJUST SLUGS L8, L7, L6, AND L5 (IN ORDER GIVEN) FOR A MAXIMUM DEFLECTION ON THE METER.

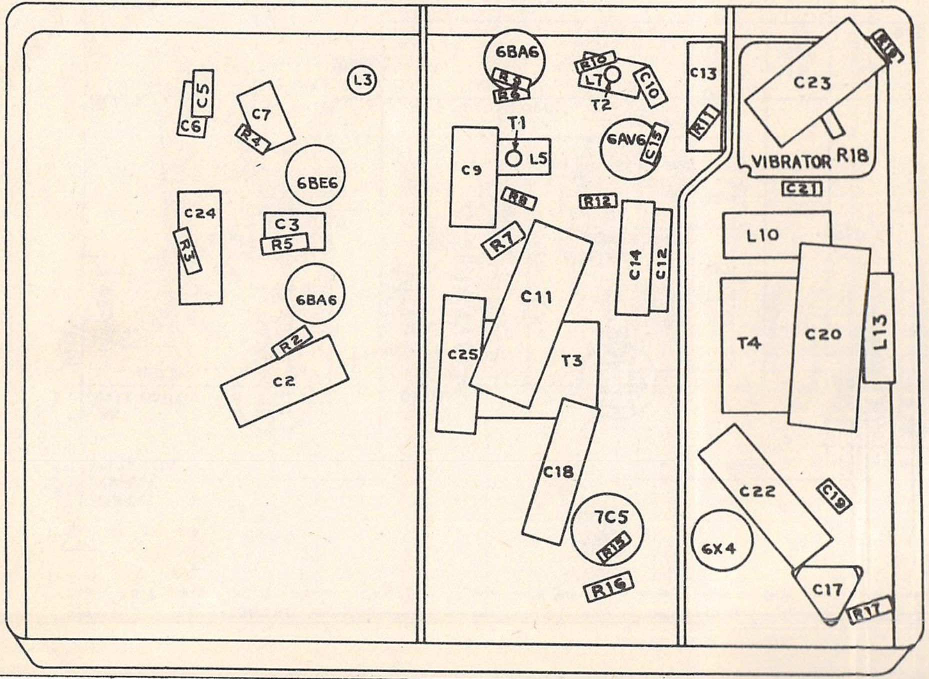
NEXT CONNECT THE SIGNAL GENERATOR THROUGH A 50MMF CONDENSER TO THE ANTENNA LEAD. SET THE SIGNAL GENERATOR AND THE RECEIVER TO 600KC. THE VOLUME OF THE RECEIVER SHOULD BE AT MAXIMUM AND THE OUTPUT OF THE SIGNAL GENERATOR IS GREAT ENOUGH SO THAT A DEFLECTION IS JUST POSSIBLE ON THE OUTPUT METER. ADJUST L3 FOR MAXIMUM DEFLECTION.

REPEAT THE ABOVE SETUP AT 800KC, AND ADJUST C4 FOR MAXIMUM DEFLECTION.

REPEAT ABOVE SETUP AT 1400KC AND ADJUST C1 FOR MAXIMUM DEFLECTION.

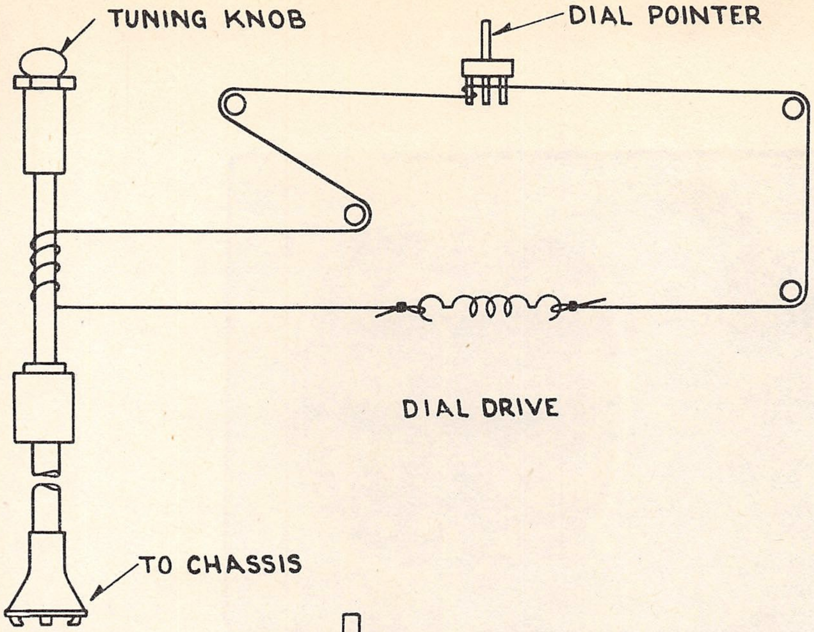

L1, L2, L4
PERMEABILITY TUNER
(SEE DETAILED DRAWING)
C8
AUDIO TRANSFORMER T3 L9
RECTIFIER CHOKE
T4
C17
6X4
7C5
6BA6
C1
R1 WIRE
C4
6BE6
L3
1ST I.F. L6 T1
6AV6
2ND I.F. L8 T2
6BA6
VIBRATOR

TOP VIEW OF CHASSIS

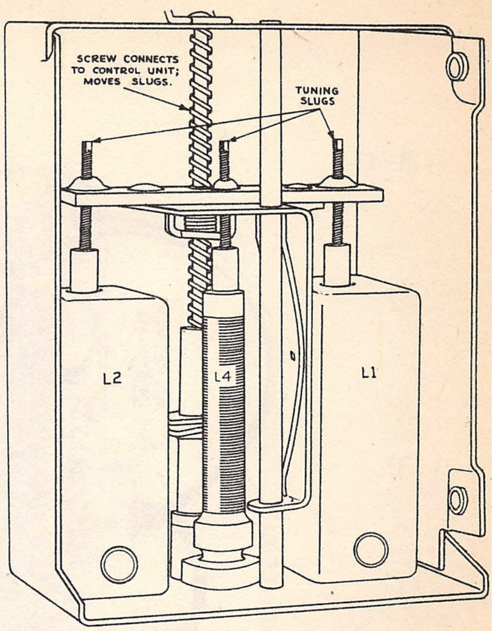

C5
C6
C7
R4
L3
6BE6
C24
R3
C3
R5
6BA6
R2
C2
6BA6
R9
R6
C9
T1
L5
R8
R7
R10
L7
T2
C10
6AV6
R13
R12
C14
C12
C11
C25
T3
C18
7C5
R15
R16
C13
R11
C23
R18
VIBRATOR R18
C21
L10
T4
C20
L13
C22
C19
6X4
C17
R17

BOTTOM VIEW OF CHASSIS

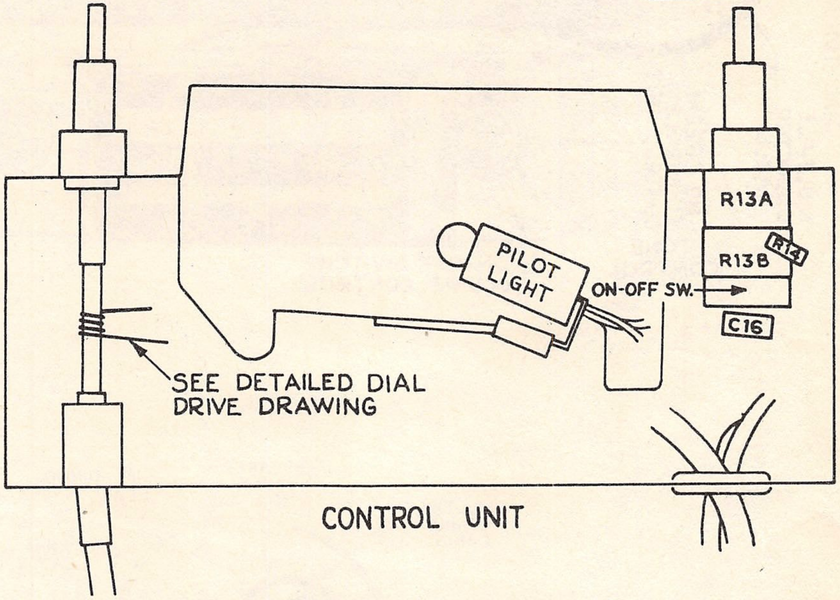
# PHILCO CORP.


TUNING KNOB
DIAL POINTER
TO CHASSIS

DIAL DRIVE


SCREW CONNECTS TO CONTROL UNIT; MOVES SLUGS.
TUNING SLUGS
L2
L4
L1

PERMEABILITY TUNER


R13A
R13B
R14
PILOT LIGHT
ON-OFF SW.
C16
SEE DETAILED DIAL DRIVE DRAWING

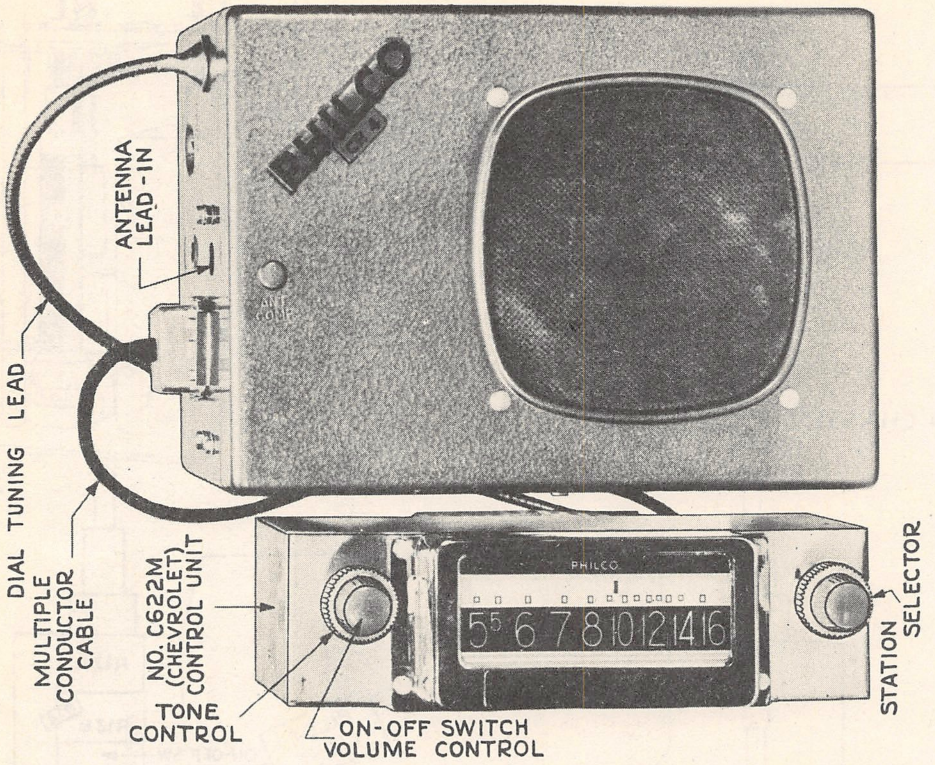
CONTROL UNIT

| TUBE | PIN NO. | VTVM | 20,000 Ω/V | 1,000 Ω/V | RESISTANCE |
|---|---|---|---|---|---|
| 6 B A 6<br>RF | 1 | -0.65V | -2 V | 0 V. | 1.2 MEG. |
| | 2 | 0V | 0 V | 0 V. | 0 |
| | 3 | 0V | 0 V | 0 V. | 0 |
| | 4 | 5.5V | 5.3V. | 5.4V. | 0.5 Ω |
| | 5 | 166V | 160V. | 160V. | OVER 5 MEG. |
| | 6 | 60V | 58V | 52V. | OVER 5 MEG. |
| | 7 | 1.44 V | 1.3 V. | 1.3 V. | 500 Ω |
| 6 B E 6<br>CONV | 1 | -3.5V | -2.5V | -1.2V. | 24 K |
| | 2 | 0V. | 0V. | 0V. | 1.4 Ω |
| | 3 | 0V | 0V. | QV. | 0 |
| | 4 | 5.5V | 5.3V | 5.4V | 0.5 Ω |
| | 5 | 220V | 220V. | 200V. | OVER 5 MEG. |
| | 6 | 60V | 59V. | 51V. | OVER 5 MEG. |
| | 7 | -0.6V | -0.1V. | 0V. | 2.2 MEG. |
| 6 B A 6<br>IF | 1 | 0V | 0V | 0V | 17.5 Ω |
| | 2 | 0V | 0V | 0V | 0 |
| | 3 | 0V | 0V | 0V | 0 |
| | 4 | 5.5V | 5.4V | 5.4V | 0.4 Ω |
| | 5 | 220V | 210V | 210V | OVER 5 MEG. |
| | 6 | 60V | 58V | 52V | OVER 5 MEG. |
| | 7 | 3.3V | 3.0V | 2.8V | 2K |
| 6 A V 6<br>DET & 1ST AUDIO | 1 | -0.7V | -0.4V. | -0.1V | 10 MEG |
| | 2 | 0V | 0V. | 0V. | 0 |
| | 3 | 0V | 0V | 0V. | 0 |
| | 4 | 5.5V | 5.3V. | 5.4V. | 0.4 Ω |
| | 5 | -0.75V | -0.5V. | -0.2V. | 280 K |
| | 6 | -0.75V | -0.5V. | -0.2V. | 300 K |
| | 7 | 105V | 100V | 54V | OVER 5 MEG. |
| 7 C 5<br>AUDIO OUTPUT | 1 | 0 | 0 | 0 | 0 |
| | 2 | 220V | 210V. | 200V. | OVER 5 MEG. |
| | 3 | 220V | 210V. | 200V. | OVER 5 MEG. |
| | 4 | 235V | 230V | 220V | OVER 5 MEG. |
| | 5 | — | — | — | — |
| | 6 | 0.05V | 0V. | 0V | 400 K |
| | 7 | 7.7V | 8V. | 8V | 210 Ω |
| | 8 | 5.5V | 5.3 | 5.5V | 0.4 Ω |
| 6 X 4<br>RECTIFIER | 1 | A.C. | A.C. | A.C. | 460 Ω |
| | 2 | 0V | 0V. | 0V. | 0 |
| | 3 | 0V | 0V. | 0V. | 0 |
| | 4 | 5.4V | 5.2V. | 5.3V. | 0.5 Ω |
| | 5 | — | — | — | — |
| | 6 | A.C. | A.C. | A.C. | 420 Ω |
| | 7 | 237V | 220V. | 220V. | OVER 5 MEG. |
| VIBRATOR | 1 | 0V | 0V. | 0V. | 0 |
| 2 3 | 2 | 5.3V | 5.0V | 5.2V | .8 Ω |
| | 3 | 5.3V | 5.0V | 5.2V | .8 Ω |
| 1 4 | 4 | 5.4V | 5.2V | 5.3V | .6 Ω |

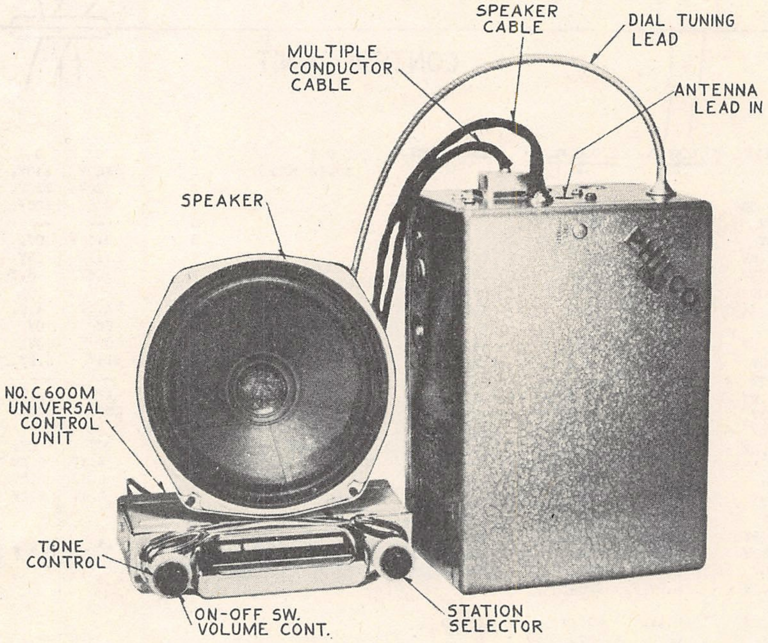
VOLTAGE MEASURED WHEN "A" VOLTAGE = 6.0 V, TUNING SLUG AT LOWEST FREQUENCY, VOLUME CONTROL AT MINIMUM, TONE CONTROL FULLY CLOCKWISE.

# PHILCO CORP.

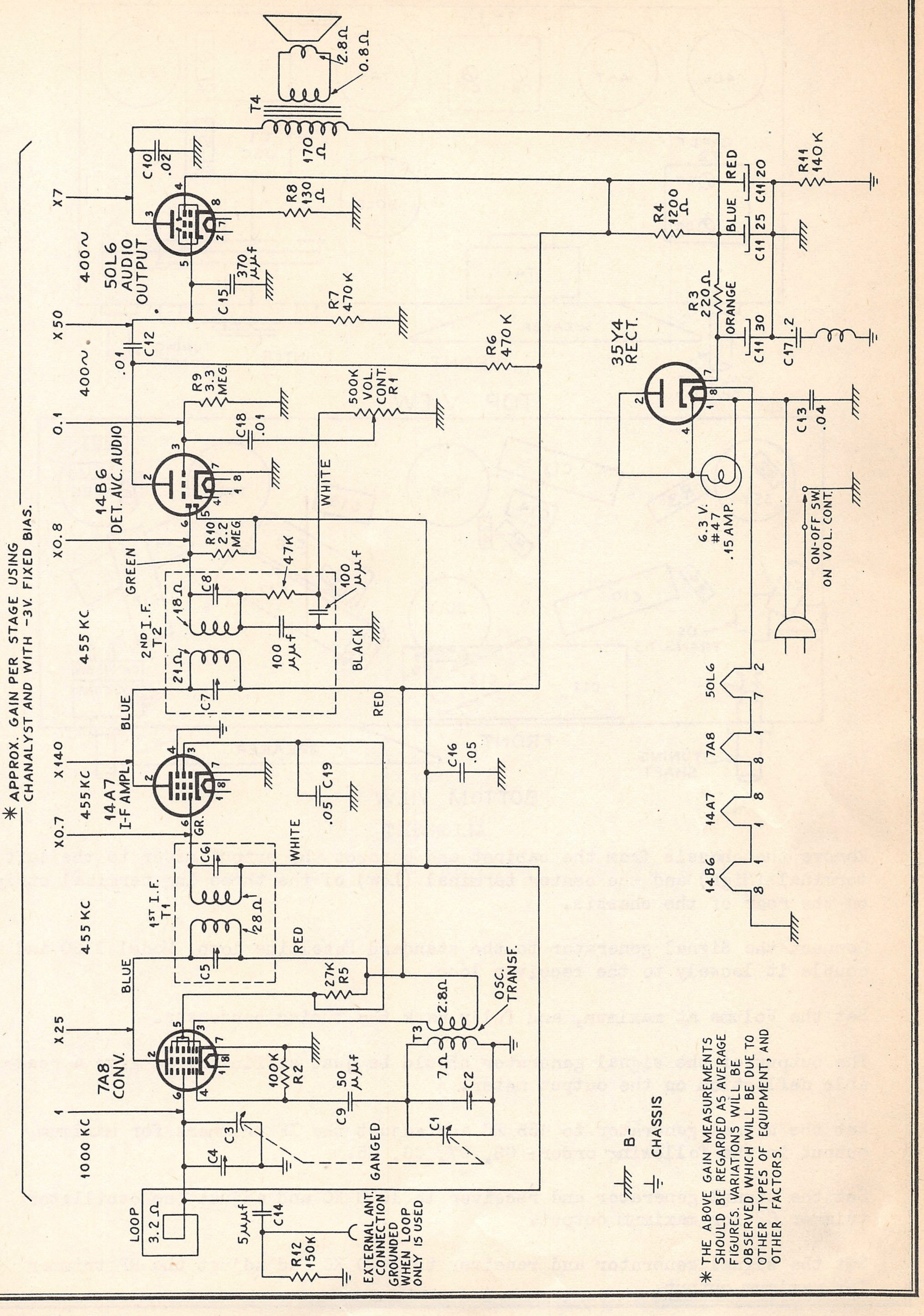
CR-4


PHILCO
ANT COMP
ANTENNA LEAD-IN
DIAL TUNING LEAD
MULTIPLE CONDUCTOR CABLE
NO. C622M (CHEVROLET) CONTROL UNIT
PHILCO
55 6 7 8 10 12 14 16
TONE CONTROL
ON-OFF SWITCH VOLUME CONTROL
STATION SELECTOR

CR-6

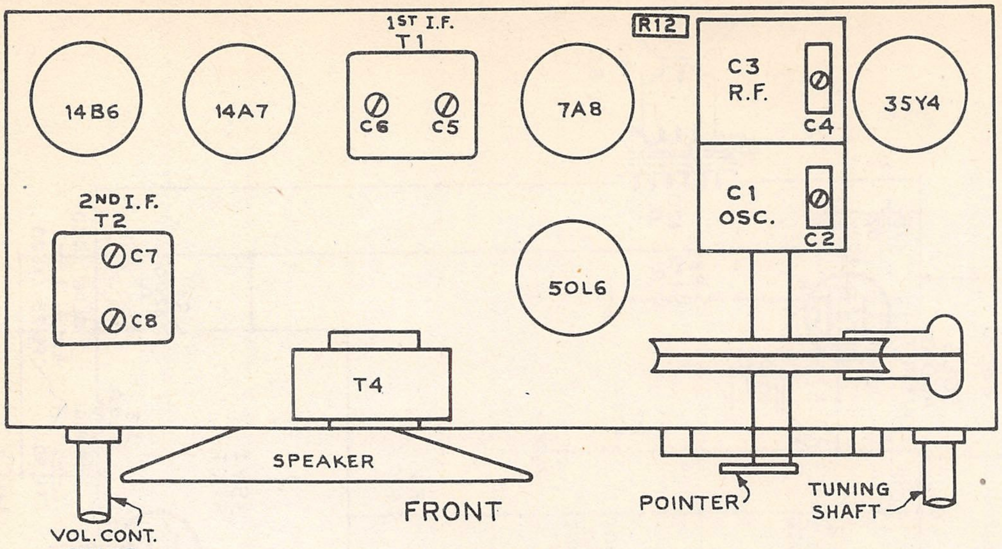

SPEAKER CABLE
DIAL TUNING LEAD
MULTIPLE CONDUCTOR CABLE
ANTENNA LEAD IN
SPEAKER
PHILCO
NO. C600M UNIVERSAL CONTROL UNIT
TONE CONTROL
ON-OFF SW. VOLUME CONT.
STATION SELECTOR

# PHILCO CORP.

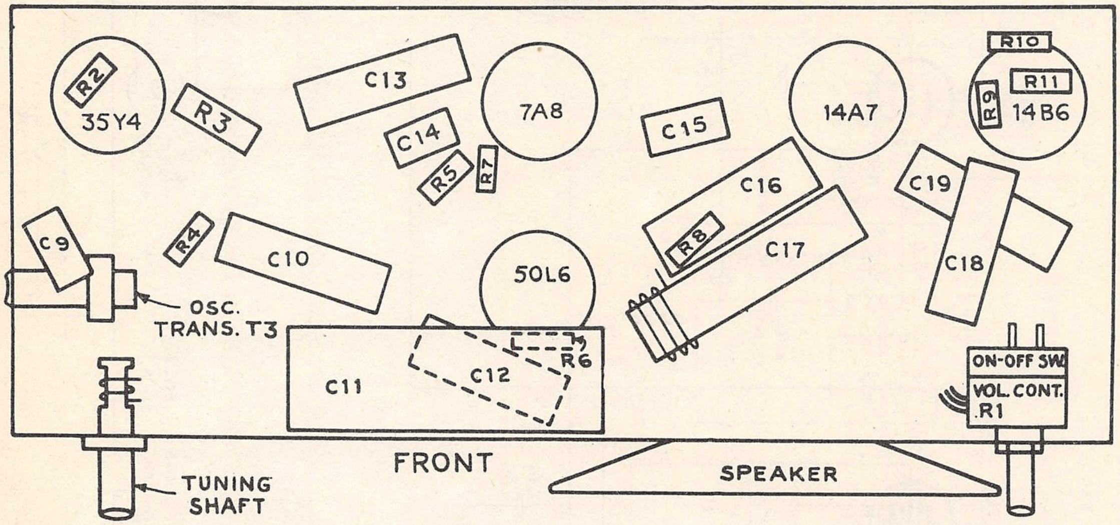

1000 KC
1
X25
455 KC
X0.7
455 KC
X140
455 KC
X0.8
0.1
400~
X50
400~
X7
7A8
CONV.
14A7
I-F AMPL.
14B6
DET. AVC. AUDIO
50L6
AUDIO
OUTPUT
35Y4
RECT.
LOOP
3.2Ω
5μμf
C14
R12
150K
EXTERNAL ANT. CONNECTION GROUNDED WHEN LOOP ONLY IS USED
C4
C3
GANGED
C1
C2
C9
50 μμf
100K
R2
T3
7Ω
2.8Ω
OSC. TRANSF.
BLUE
C5
1ST I.F.
T1
28Ω
RED
27K
R5
C6
GR.
WHITE
C19
.05
C16
.05
BLUE
C7
21Ω
2ND I.F.
T2
18Ω
C8
100 μμf
47K
100 μμf
BLACK
RED
GREEN
R10
2.2
MEG
WHITE
500K
VOL.
CONT.
R1
C18
.01
R9
3.3
MEG.
.01
C12
R6
470K
R7
470 K
C15
370 μμf
R8
130 Ω
C10
.02
T4
170 Ω
2.8Ω
0.8Ω
R4
1200 Ω
RED
BLUE
C11 20
C11 25
R11
140K
R3
220Ω
ORANGE
C11 30
C47 .2
C13
.04
6.3 V.
#47
.15 AMP.
ON-OFF SW.
ON VOL. CONT.
50L6
7A8
14A7
14B6
B-
CHASSIS

* APPROX. GAIN PER STAGE USING CHANALYST AND WITH -3V. FIXED BIAS.

* THE ABOVE GAIN MEASUREMENTS SHOULD BE REGARDED AS AVERAGE FIGURES. VARIATIONS WILL BE OBSERVED WHICH WILL BE DUE TO OTHER TYPES OF EQUIPMENT, AND OTHER FACTORS.


1ST I.F.
T1
C6
C5
R12
C3
R.F.
C4
C1
OSC.
C2
14B6
14A7
7A8
35Y4
2ND I.F.
T2
C7
C8
50L6
T4
SPEAKER
FRONT
VOL. CONT. SHAFT
POINTER
TUNING SHAFT

TOP VIEW


R2
35Y4
R3
C13
C14
R5
R7
7A8
C15
14A7
R10
R11
R9
14B6
C16
R8
C17
C19
C18
C9
R4
C10
50L6
OSC. TRANS. T3
C11
C12
R6
ON-OFF SW.
VOL. CONT. R1
TUNING SHAFT
FRONT
SPEAKER

BOTTOM VIEW

## ALIGNMENT

Remove the chassis from the cabinet and connect the output meter to the left terminal (High) and the center terminal (Low) of the three lug terminal strip on the rear of the chassis.

Connect the Signal generator to the standard Hazeltine loop, Model 1150 and couple it loosely to the receiver loop.

Set the Volume at maximum, and fully mark the tuning condenser.

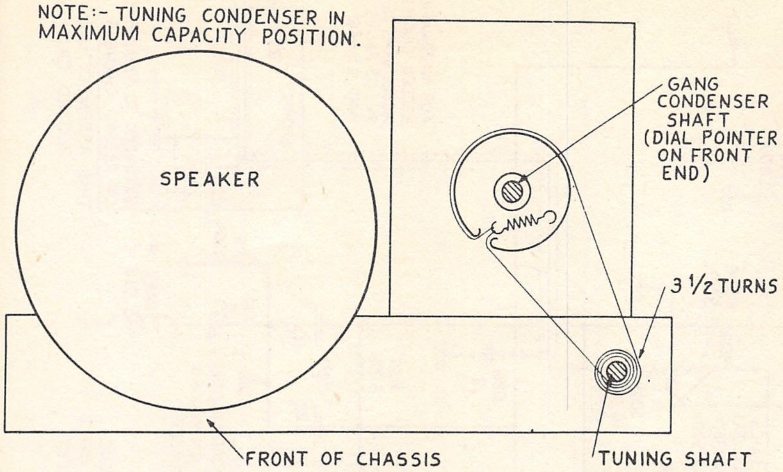
The output of the signal generator should be just sufficient to give a readable deflection on the output meter.

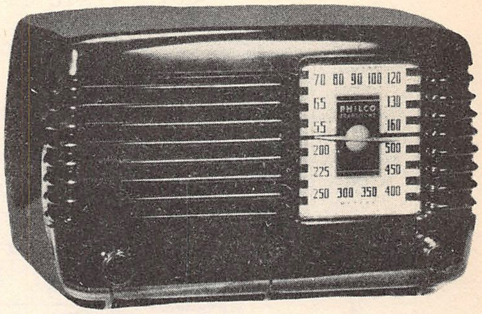
Set the signal generator to 455 KC and adjust the IF trimmers for maximum output in the following order: C8, C7, C6, C5.

Set the signal generator and receiver to 1600 KC and adjust the oscillator trimmer C2 for maximum output.

Set the signal generator and receiver to 1400 KC and adjust the RF trimmer C4 for maximum output.

## PHILCO CORP.


NOTE:- TUNING CONDENSER IN MAXIMUM CAPACITY POSITION.
SPEAKER
GANG CONDENSER SHAFT (DIAL POINTER ON FRONT END)
3 1/2 TURNS
FRONT OF CHASSIS
TUNING SHAFT


70 80 90 100 120
65 130
55 160
PHILCO
200 500
225 450
250 300 350 400

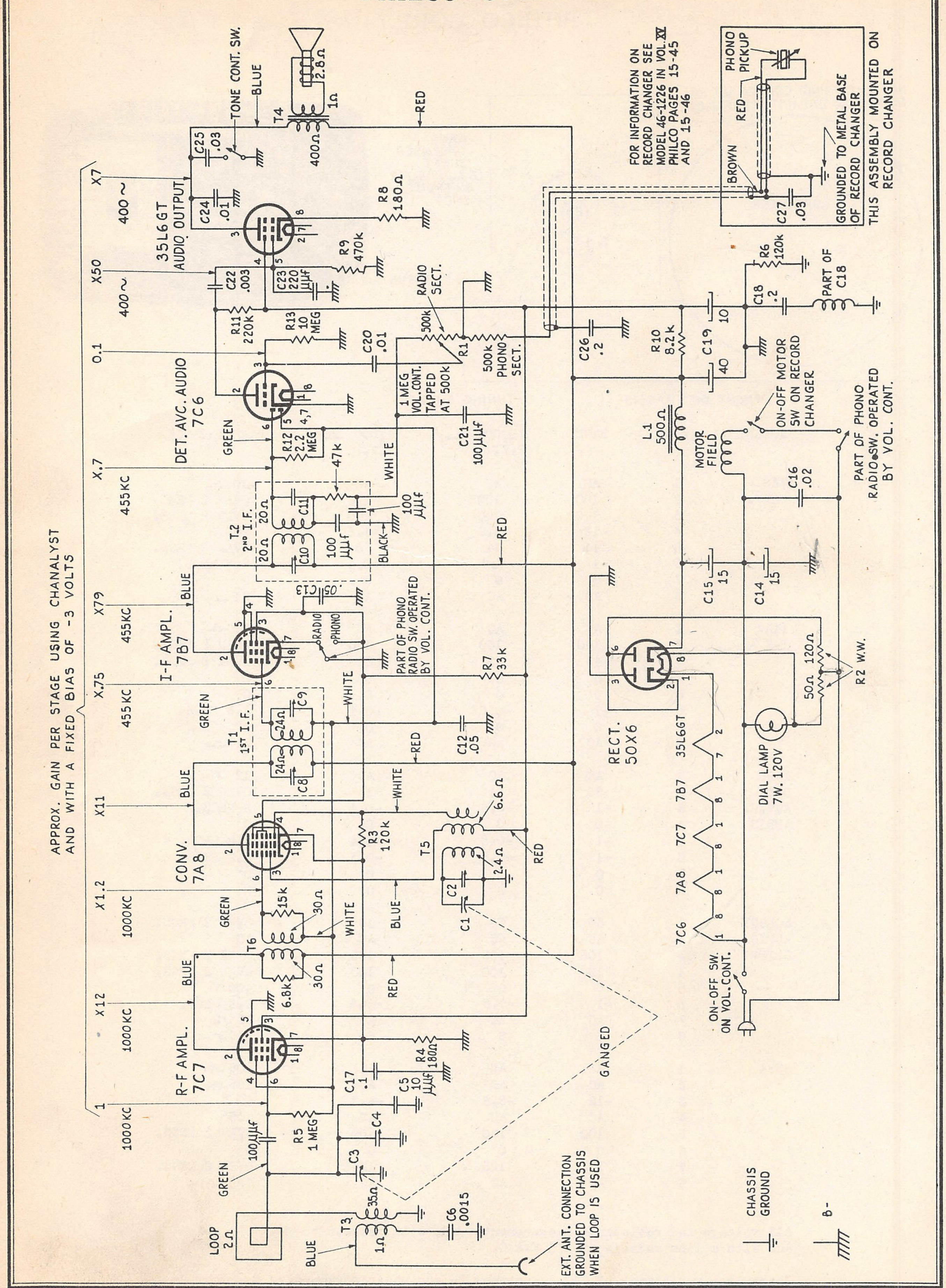
| SOCKET | PIN | VTVM | 20,000 Ω/ P.V. | 1,000 Ω/ P.V. | RESISTANCE |
|---|---|---|---|---|---|
| 7A8 CONV. | 1 | AC | AC | AC | 30 Ω |
| | 2 | 100 | 100 | 100 | OVER 2 MEGS. |
| | 3 | 100 | 100 | 100 | OVER 2 MEGS. |
| | 4 | -12 | -8.6 | -4.2 | 900 K |
| | 5 | 44 | 44 | 38 | OVER 2 MEGS. |
| | 6 | -1 | -0.8 | -0.4 | 2.8 MEGS. |
| | 7 | 0 | 0 | 0 | 0 |
| | 8 | AC | AC | AC | 24 Ω |
| 14A7 I-F AMPL. | 1 | AC | AC | AC | 12 Ω |
| | 2 | 100 | 100 | 100 | OVER 2 MEGS. |
| | 3 | 43 | 43 | 38 | OVER 2 MEGS. |
| | 4 | 0 | 0 | 0 | 0 |
| | 5 | 0 | 0 | 0 | 0 |
| | 6 | -1 | -0.8 | -0.4 | 2.8 MEGS. |
| | 7 | 0 | 0 | 0 | 0 |
| | 8 | AC | AC | AC | 24 Ω |
| 14B6 DET. A.V.C. AUDIO | 1 | AC | AC | AC | 12 Ω |
| | 2 | 56 | 54 | 16 | OVER 2 MEGS. |
| | 3 | -1 | -0.6 | -0.4 | 3 MEGS. |
| | 4 | 0 | 0 | 0 | 0 |
| | 5 | -1 | -0.8 | -0.4 | 2.8 MEGS. |
| | 6 | -1 | -0.6 | -0.3 | 5.2 MEGS. |
| | 7 | 0 | 0 | 0 | 0 |
| | 8 | 0 | 0 | 0 | 0 |
| 50L6GT AUDIO OUTPUT | 1 | 56 | 54 | 16 | OVER 2 MEGS. |
| | 2 | AC | AC | AC | 75 |
| | 3 | 105 | 105 | 105 | OVER 2 MEGS. |
| | 4 | 100 | 100 | 100 | OVER 2 MEGS. |
| | 5 | 0 | 0 | 0 | 400 K |
| | 6 | -1 | -0.8 | -0.4 | 2.8 MEGS. |
| | 7 | AC | AC | AC | 32 Ω |
| | 8 | 6 | 6 | 6 | 130 Ω |
| 35Y4 | 1 | AC | AC | AC | 105 Ω |
| | 2 | AC | AC | AC | 105 Ω |
| | 3 | -12 | -8.6 | -4.2 | 90 K |
| | 4 | AC | AC | AC | 105 |
| | 5 | 100 | 100 | 100 | OVER 2 MEGS. |
| | 6 | 0 | 0 | 0 | 0 |
| | 7 | 125 | 125 | 125 | OVER 2 MEGS. |
| | 8 | AC | AC | AC | 75 Ω |

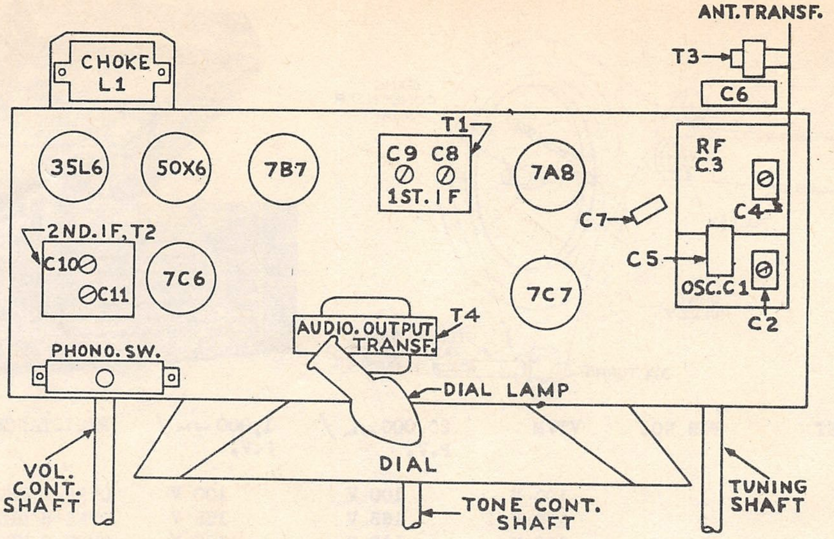
All voltage and resistance measurements made with respect to B-.
And with a line voltage of 116 V.A.C.

There is a resistance of 140 K. between B- and chassis ground.

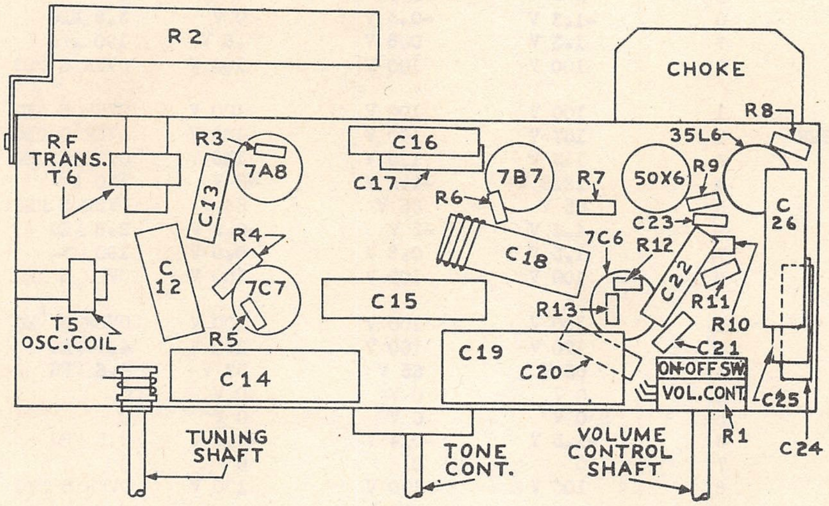
MODEL 46-1203

# PHILCO CORP.


APPROX. GAIN PER STAGE USING CHANALYST AND WITH A FIXED BIAS OF -3 VOLTS
1 1000 KC
X12 1000 KC
X1.2 1000 KC
X11
X.75 455 KC
X79 455 KC
X.7 455 KC
0.1
X50 400 ~
X7 400 ~
R-F AMPL. 7C7
CONV. 7A8
I-F AMPL. 7B7
DET. AVC. AUDIO 7C6
35L6GT AUDIO OUTPUT
TONE CONT. SW.
BLUE
T4
2.8Ω
1Ω
400Ω
RED
C25 .03
C24 .01
R8 180Ω
R9 470k
C22 .003
C23 220 μμf
R11 220k
R13 10 MEG
C20 .01
RADIO SECT.
500k
R1
500k PHONO SECT.
1 MEG VOL. CONT. TAPPED AT 500k
C21 100μμf
R12 2.2 MEG
47k
GREEN
WHITE
T2 2ND I.F.
20Ω
C11
C10
100 μμf
BLACK
C13 .05
RADIO
PHONO
PART OF PHONO RADIO SW. OPERATED BY VOL. CONT.
R7 33k
T1 1ST I.F.
24Ω
C9
C8
C12 .05
6.6Ω
R3 120k
T5
2.4Ω
C2
C1
15k
30Ω
T6
6.8k
R4 180Ω
C17 .1
C5 10 μμf
C4
R5 1 MEG
100μμf
C3
GANGED
35Ω
T3
1Ω
C6 .0015
LOOP 2Ω
EXT. ANT. CONNECTION GROUNDED TO CHASSIS WHEN LOOP IS USED
CHASSIS GROUND
B-
FOR INFORMATION ON RECORD CHANGER SEE MODEL 46-1226 IN VOL. XV PHILCO PAGES 15-45 AND 15-46
PHONO PICKUP
RED
BROWN
C27 .03
GROUNDED TO METAL BASE OF RECORD CHANGER
THIS ASSEMBLY MOUNTED ON RECORD CHANGER
R6 120k
C18 .2
PART OF C18
C26 .2
R10 8.2k
C19 10 40
L1 500Ω
MOTOR FIELD
ON-OFF MOTOR SW ON RECORD CHANGER
C16 .02
PART OF PHONO RADIO SW. OPERATED BY VOL. CONT.
C15 15
C14 15
RECT. 50X6
120Ω
50Ω
R2 W.W.
DIAL LAMP 7W. 120V
35L6GT
7B7
7C7
7A8
7C6
ON-OFF SW. ON VOL. CONT.


ANT.TRANSF.
T3
C6
CHOKE L1
35L6
50X6
7B7
T1
C9 C8
1ST. I F
7A8
RF C3
C4
C7
C5
OSC.C1
C2
2ND. IF, T2
C10
C11
7C6
7C7
AUDIO. OUTPUT TRANSF.
T4
PHONO. SW.
DIAL LAMP
DIAL
VOL. CONT. SHAFT
TONE CONT. SHAFT
TUNING SHAFT

TOP VIEW


R2
CHOKE
R8
35L6
RF TRANS. T6
R3
7A8
C13
C16
C17
7B7
R6
R7
50X6
R9
C23
C26
C 12
R4
7C7
C18
7C6
R12
C22
R11
R10
R13
C15
T5 OSC.COIL
R5
C19
C20
C21
ON-OFF SW.
VOL. CONT.
C25
C14
R1
C24
TUNING SHAFT
TONE CONT.
VOLUME CONTROL SHAFT

BOTTOM VIEW

## ALIGNMENT

This receiver may be aligned with the chassis in the cabinet.

Connect the output meter to the center terminal (Low) and the right terminal (High) of the three lug terminal strip mounted on the rear of the chassis.

Connect the signal generator to the standard Hazeltine loop Model 1150 and couple it loosely to the receiver loop. Set the volume control at maximum, and fully mesh the tuning condenser.

The output of the signal generator should be just sufficient to give a readable deflection on the output meter.

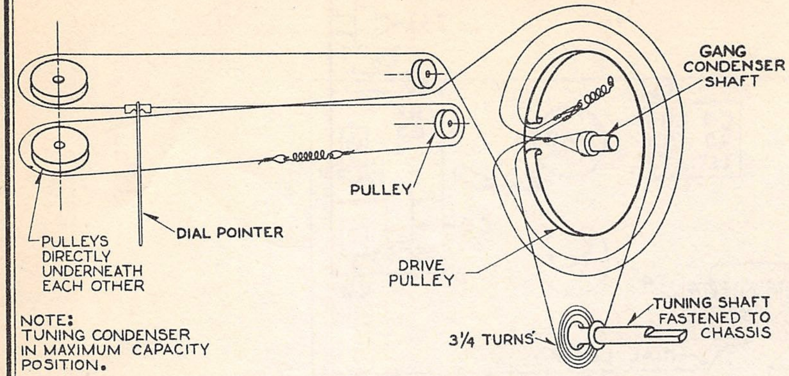
Set the signal generator to 455 KC and adjust the IF trimmers for maximum output in the following order: C11,C10,C9,C8.

Set the signal generator and receiver to 1600 KC and adjust the oscillator trimmer C2 for maximum output.

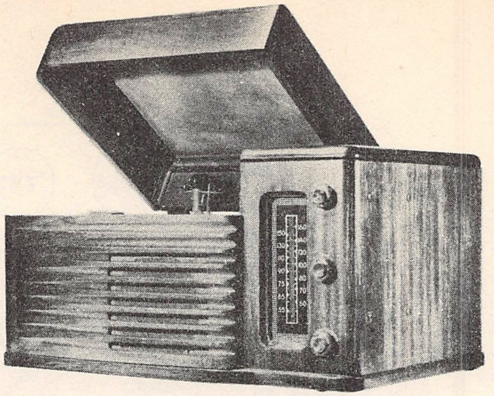
Set the signal generator and receiver to 1400 KC and adjust the RF trimmer C4 for maximum output.

MODEL 46-1203

# PHILCO CORP.


GANG CONDENSER SHAFT
PULLEY
PULLEYS DIRECTLY UNDERNEATH EACH OTHER
DIAL POINTER
DRIVE PULLEY
TUNING SHAFT FASTENED TO CHASSIS
3¼ TURNS

NOTE: TUNING CONDENSER IN MAXIMUM CAPACITY POSITION.

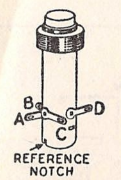


| SOCKET | PIN NO. | VTVM | 20,000 Ω / P.V. | 1,000 Ω / P.V. | RESISTANCE |
|---|---|---|---|---|---|
| 7C7<br>RF | 1 | 100 V | 100 V | 100 V | OVER 5 MEG |
| | 2 | 170 V | 165 V | 165 V | OVER 5 MEG |
| | 3 | 115 V | 108 V | 108 V | OVER 5 MEG |
| | 4 | -4.5 V | -2.2 V | -2 V | 2.8 MEG |
| | 5 | 0 V | 0 V | 0 V | 0 |
| | 6 | -1.3 V | -0.3 V | 0 V | 3.8 MEG |
| | 7 | 1.3 V | 0.8 V | .8 V | 190 Ω |
| | 8 | 100 V | 100 V | 100 V | OVER 5 MEG |
| 7A8<br>CONVERTER | 1 | 100 V | 100 V | 100 V | OVER 5 MEG |
| | 2 | 167 V | 160 V | 160 V | OVER 5 MEG |
| | 3 | 113 V | 110 V | 110 V | OVER 5 MEG |
| | 4 | -12.5 V | -4.4 V | -2 V | 130 K |
| | 5 | 65 V | 65 V | 56 V | OVER 5 MEG |
| | 6 | -4.5 V | -2 V | -0.2 V | 2.8 MEG |
| | 7 | 1.3 V | 0.8 V | 0.9 V | 190 Ω |
| | 8 | 100 V | 100 V | 100 V | OVER 5 MEG |
| 7B7<br>IF | 1 | 100 V | 100 V | 100 V | OVER 5 MEG |
| | 2 | 170 V | 160 V | 160 V | 4.4 MEG |
| | 3 | 65 V | 65 V | 57 V | 4.6 MEG |
| | 4 | 0 V | 0 V | 0 V | 0 |
| | 5 | 0 V | 0 V | 0 V | 0 |
| | 6 | -1.5 V | -0.4 V | -0.2 V | 2.8 MEG |
| | 7 | 0 | 0 | 0 | 0 |
| | 8 | 100 V | 100 V | 100 V | OVER 5 MEG |
| 7C6<br>AVC<br>DETECTOR | 1 | 100 V | 100 V | 100 V | OVER 5 MEG |
| | 2 | 78 | 74 | 35 | OVER 5 MEG |
| | 3 | -0.8 V | -0.5 V | -0.2 V | 10 MEGS. |
| | 4 | 0 V | 0 V | 0 V | 0 |
| | 5 | -4.4 V | -1.2 V | -0.2 V | 2.8 MEG |
| | 6 | -4.3 V | -1.5 V | -0.8 V | 600 K |
| | 7 | 0 V | 0 V | 0 V | 0 |
| | 8 | 100 V | 100 V | 100 V | OVER 5 MEG |
| 35L6GT/G | 1 | 0 V | 0 V | 0 V | 0 |
| | 2 | 100 V | 100 V | 100 V | OVER 5 MEG |
| | 3 | 155 V | 150 V | 150 V | OVER 5 MEG |
| | 4 | 118 V | 115 V | 115 V | OVER 5 MEG |
| | 5 | 0 V | 0 V | 0 V | 500 K |
| | 6 | 173 V | 165 V | 165 V | OVER 5 MEG |
| | 7 | 100 V | 100 V | 100 V | OVER 5 MEG |
| | 8 | 7.9 V | 7.6 V | 7.8 V | 190 Ω |
| 50X6<br>RECTIFIER | 1 | 100 V | 100 V | 100 V | OVER 5 MEG |
| | 2 | 100 V | 100 V | 100 V | OVER 5 MEG |
| | 3 | 0 V | 0 V | 0 V | 0 |
| | 4 | 173 V | 170 V | 170 V | OVER 5 MEG |
| | 5 | 120 V | 115 V | 110 V | OVER 5 MEG |
| | 6 | 100 V | 100 V | 100 V | OVER 5 MEG |
| | 7 | 200 V | 200 V | 200 V | OVER 5 MEG |
| | 8 | 100 V | 100 V | 100 V | OVER 5 MEG |

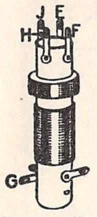
With respect to B-: Line Voltage 116 V

On-Off switch in off position Volume control at minimum
Radio-Phono switch on radio Tone control in left (counterclockwise position)

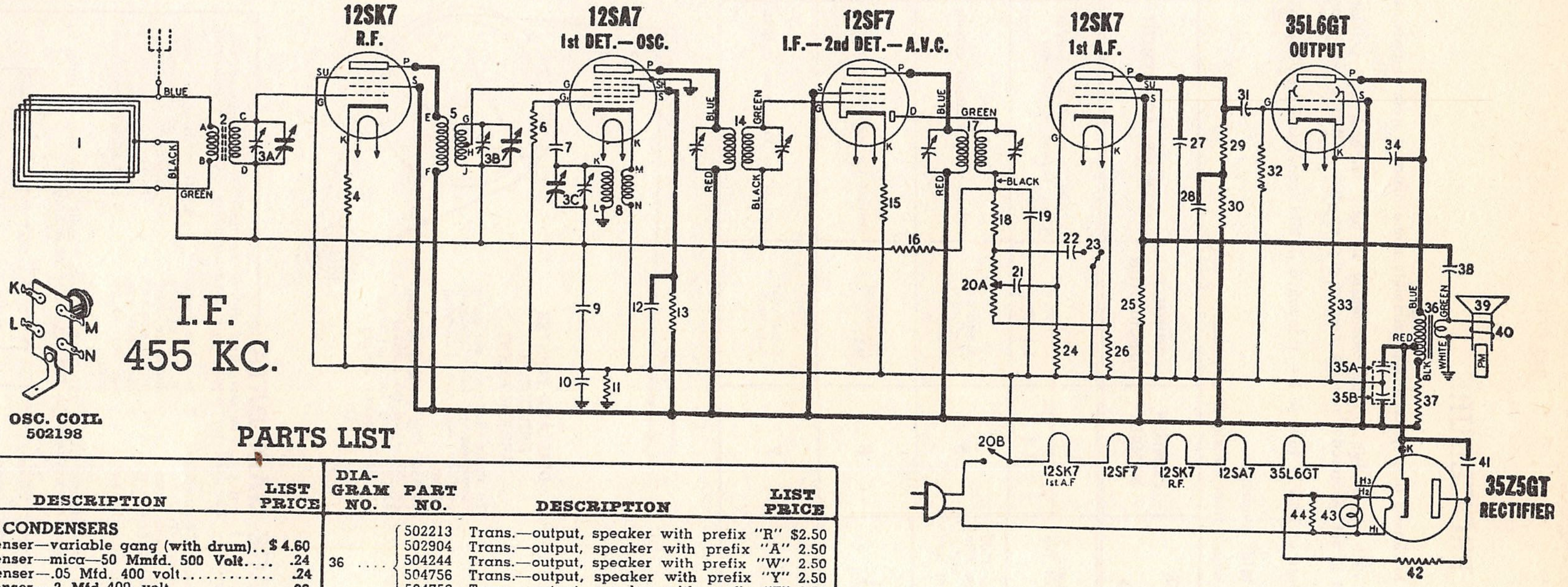
# PHILLIPS PETROLEUM CO.


A
B
C
D
REFERENCE NOTCH

**ANT. COUPLING COIL 502121**



**R. F. COIL 502142**


12SK7
R.F.
12SA7
1st DET.—OSC.
12SF7
I.F.—2nd DET.—A.V.C.
12SK7
1st A.F.
35L6GT
OUTPUT
35Z5GT
RECTIFIER
1
2
3A
3B
3C
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20A
20B
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35A
35B
36
37
38
39
40
41
42
43
44
BLUE
BLACK
GREEN
RED
WHITE
BLK
PM
K
L
M
N
12SK7 1st A.F
12SF7
12SK7 R.F.
12SA7
35L6GT

**OSC. COIL**
502198

I.F.
455 KC.

## PARTS LIST

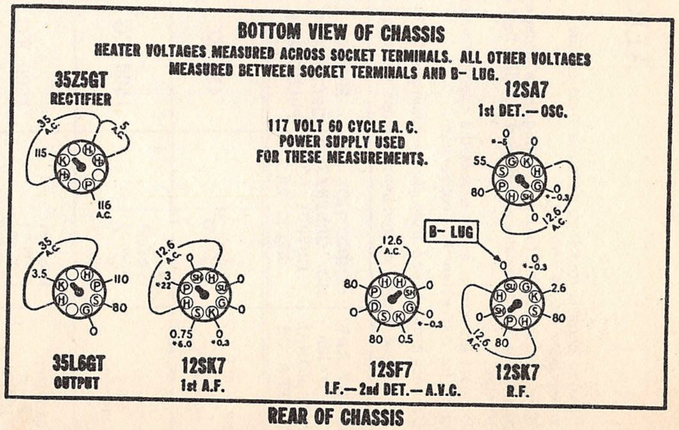
| DIAGRAM NO. | PART NO. | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| | | **CONDENSERS** | |
| 3A-3B-3C | 502123 | Condenser—variable gang (with drum) | $4.60 |
| 7 | 502159 | Condenser—mica—50 Mmfd. 500 Volt | .24 |
| 9 | 502157 | Condenser—.05 Mfd. 400 volt | .24 |
| 10 | 502158 | Condenser—.2 Mfd. 400 volt | .36 |
| 12 | 502262 | Condenser—.25 Mfd. 200 Volt | .36 |
| 19 | 502160 | Condenser—mica—110 Mmfd. 500 Volt | .24 |
| 21 | 502453 | Condenser—.002 Mfd. 400 Volt | .20 |
| 22 | 502470 | Condenser—.0008 Mfd. 400 Volt | .20 |
| 27 | 502160 | Condenser—Mica—110 Mmfd. 500 Volt | .24 |
| 28 | 502153 | Condenser—.05 Mfd. 200 Volt | .24 |
| 31 | 502156 | Condenser—.004 Mfd. 400 Volt | .20 |
| 34 | 502151 | Condenser—.01 Mfd. 400 Volt | .20 |
| 35A-35B | 500256 | Condenser — electrolytic<br>A-40 Mfd. 150 Volt<br>B-20 Mfd. 150 Volt | 1.50 |
| 38 | 502152 | Condenser—.02 Mfd. 400 Volt | .24 |
| 41 | 502157 | Condenser—.05 Mfd. 400 Volt | .24 |
| | | **RESISTORS** | |
| 4 | 502125 | Resistor—carbon 220 Ohms 1/4 watt | .12 |
| 6 | 502130 | Resistor—carbon 22,000 Ohms ¼ Watt | .12 |
| 11 | 502133 | Resistor—carbon 220,000 Ohms ¼ Watt | .12 |
| 13 | 502291 | Resistor—carbon 4700 Ohms, ¼ Watt | .12 |
| 15 | 502264 | Resistor—carbon 47 Ohms ¼ Watt | .12 |
| 16 | 502269 | Resistor—carbon 3.3 Meg. ¼ Watt | .12 |
| 18 | 502131 | Resistor—carbon 47,000 Ohms ¼ Watt | .12 |
| 20A-20B | 502145 | Volume control 500,000 Ohms (with switch) | 1.25 |
| 24 | 502136 | Resistor—carbon 10 Meg. ¼ Watt | .12 |
| 25 | 502135 | Resistor—carbon 2.2 Meg. ¼ Watt | .12 |
| 26 | 502128 | Resistor—carbon 2200 Ohms ¼ Watt | .12 |
| 29-30 | 502133 | Resistor—carbon 220,000 Ohms ¼ Watt | .12 |
| 32 | 502134 | Resistor—carbon 470,000 Ohms ¼ Watt | .12 |
| 33 | 502138 | Resistor—carbon 130 Ohms ¼ Watt | .12 |
| 37 | 502469 | Resistor—carbon 1500 Ohms 1 Watt | .16 |
| 42 | 502574 | Resistor—carbon 33 Ohms ½ Watt | .12 |
| 44 | 502140 | Resistor—carbon 390 Ohms ¼ Watt | .12 |
| | | **COILS & TRANSFORMERS** | |
| 1 | 502504 | Loop Antenna | 2.90 |
| 2 | 502121 | Coil—antenna coupling | 1.64 |
| 5 | 502142 | Coil—R.F. | 2.26 |
| 8 | 502198 | Coil—oscillator | 1.32 |
| 14 | 502102 | Transformer 1st I.F. | 2.30 |
| 17 | 502103 | Transformer 2nd I.F. | 2.30 |
| 36 | 502213 | Trans.—output, speaker with prefix "R" | $2.50 |
| | 502904 | Trans.—output, speaker with prefix "A" | 2.50 |
| | 504244 | Trans.—output, speaker with prefix "W" | 2.50 |
| | 504756 | Trans.—output, speaker with prefix "Y" | 2.50 |
| | 504758 | Trans.—output, speaker with prefix "Z" | 2.50 |
| | 504781 | Trans.—output, speaker with prefix "C" | 2.50 |
| | | **OTHER ELECTRICAL PARTS** | |
| 23 | 500546 | Switch-tone control | 0.84 |
| 39 | 502214 | Cone & voice coil, spkr. with prefix "R" | 2.50 |
| | 502903 | Cone & voice coil, spkr. with prefix "A" | 2.50 |
| | 504245 | Cone & voice coil, spkr. with prefix "W" | 2.50 |
| | 504757 | Cone & voice coil, spkr. with prefix "Y" | 2.50 |
| | 504759 | Cone & voice coil, spkr. with prefix "Z" | 2.50 |
| | 504782 | Cone & voice coil, spkr. with prefix "C" | 2.50 |
| 40 | 502998 | Speaker—P.M. dynamic (5 inch) | 6.60 |
| 43 | 118921 | Lamp—dial (Mazda 47) 6-8V. 150 Ma. | .15 |
| | | **MISCELLANEOUS PARTS** | |
| | 502502 | Back for cabinet | .30 |
| | 116467 | Base for mtg. electrolytic condenser | .04 |
| | 502476 | Cabinet—ivory (Model 3-1AX | 5.00 |
| | 502477 | Cabinet—mahogany (Model 3-2AX | 4.60 |
| | 502506 | Clamp—dial scale mtg. | .04 |
| | 112745 | Clip—coil mtg. | .01 |
| | 114955 | Clip—retainer on end of dial cord | .01 |
| | 500497 | Clip—retainer for cabinet back | .02 |
| | 116563 | Connector—for antenna leads | .01 |
| | 117057 | Cord—dial drive (55 in. required) per ft. | .05 |
| | 500324 | Cover—cardboard, for elect. cond. | .04 |
| | 502598 | Dial scale—glass | 1.40 |
| | 501186 | Grounding plate (under I.F. trans. can) | .10 |
| | 502564 | Knob—ivory (Model 3-1A)X | .08 |
| | 502563 | Knob—mahogany (Model 3-2AX | .08 |
| | 502367 | Pointer | .16 |
| | 81145 | Retaining ring for tuning shaft | .01 |
| | 119087 | Ring for dial cord | .01 |
| | 17063 | Screw—No. 6 x ¼ | .01 |
| | 114628 | Screw—No. 8 x ½ chassis mtg. | .01 |
| | 502173 | Shaft—tuning control | .15 |
| | 116690 | Socket—octal base | .12 |
| | 160392 | Socket—octal (rectifier) | .16 |
| | 500499 | Socket—dial lamp (with leads) | .44 |
| | 161384 | Spring—dial cord tension | .06 |
| | 111456 | Washer—spring washer for tuning shaft | .005 |

## SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

VOLUME ON FULL WITH NO SIGNAL

DIAL TUNED TO 540 KC.


35Z5GT
RECTIFIER
35
A.C.
5
A.C.
115
116
A.C.
12SA7
1st DET.—OSC.
55
80
*-6
0
*-0.3
12.6
A.C.
B- LUG
35L6GT
OUTPUT
35
A.C.
3.5
110
80
12SK7
1st A.F.
12.6
A.C.
3
*22
0.75
*6.0
*0.3
12SF7
I.F.—2nd DET.—A.V.C.
12.6
A.C.
80
0.5
*-0.3
12SK7
R.F.
2.6
80
12.6
A.C.

### BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.

117 VOLT 60 CYCLE A.C.
POWER SUPPLY USED
FOR THESE MEASUREMENTS.

REAR OF CHASSIS

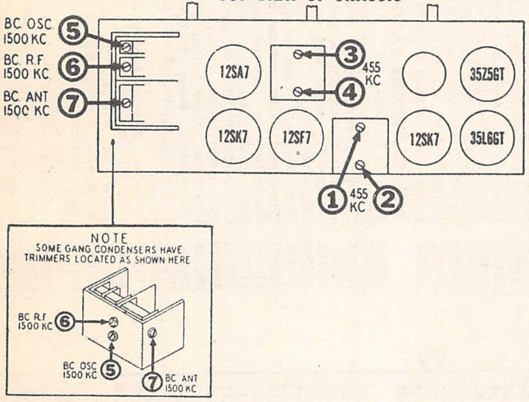
*—Measured with vacuum tube voltmeter

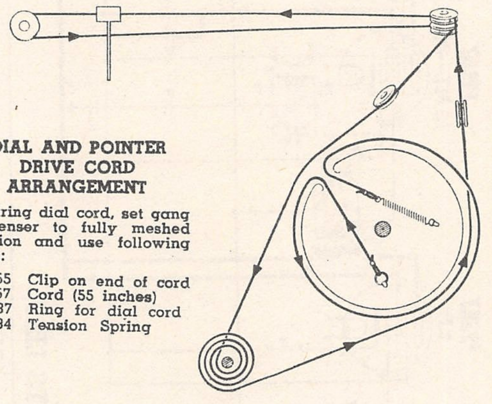
# ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet. Reconnect loop to chassis and space it approximately same distance from chassis as when installed in cabinet.
2. Note that there are four calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead from signal generator to B— through a .25 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

| DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|
| 200 MMFD. Mica Condenser | Control Grid of 12SA7 | 455 KC | Any point where it does not affect the signal | 1-2 | 2nd I.F. | Adjust for maximum output. Then repeat adjustment. |
| | | | | 3-4 | 1st I.F. | |
| 200 MMFD. Mica Condenser | External Antenna Clip on Loop Frame | 1500 KC | Set pointer to 1500 KC reference line stamped into metal dial plate (first line at the right) | 5 | Broadcast Oscillator (Shunt) | Adjust for maximum output. |
| 200 MMFD. Mica Condenser | External Antenna Clip on Loop Frame | 1500 KC | Tune to 1500 KC generator signal | 6 | Broadcast R.F. | Adjust for maximum output. |
| 200 MMFD. Mica Condenser | External Antenna Clip on Loop Frame | 1500 KC | Tune to 1500 KC generator signal | 7 | Broadcast Antenna | Adjust for maximum output. |

**TOP VIEW OF CHASSIS**


BC OSC 1500 KC ⑤
BC R.F. 1500 KC ⑥
BC ANT 1500 KC ⑦
12SA7
③
④
455 KC
35Z5GT
12SK7
12SF7
12SK7
35L6GT
① 455 KC ②
NOTE
SOME GANG CONDENSERS HAVE TRIMMERS LOCATED AS SHOWN HERE
BC RF 1500 KC ⑥
BC OSC 1500 KC ⑤
⑦ BC ANT 1500 KC



**DIAL AND POINTER DRIVE CORD ARRANGEMENT**

To string dial cord, set gang condenser to fully meshed position and use following parts:

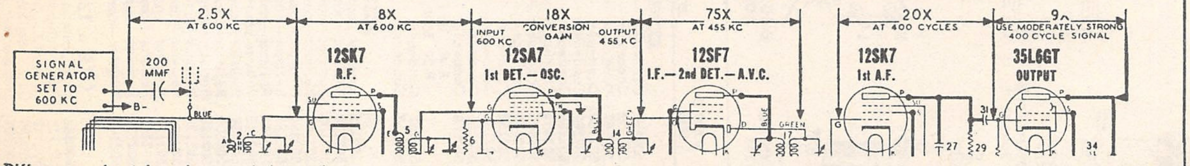
| | |
|---|---|
| 114955 | Clip on end of cord |
| 117057 | Cord (55 inches) |
| 119087 | Ring for dial cord |
| 161384 | Tension Spring |

## APPROXIMATE STAGE GAIN DATA

Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. IMPORTANT: Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

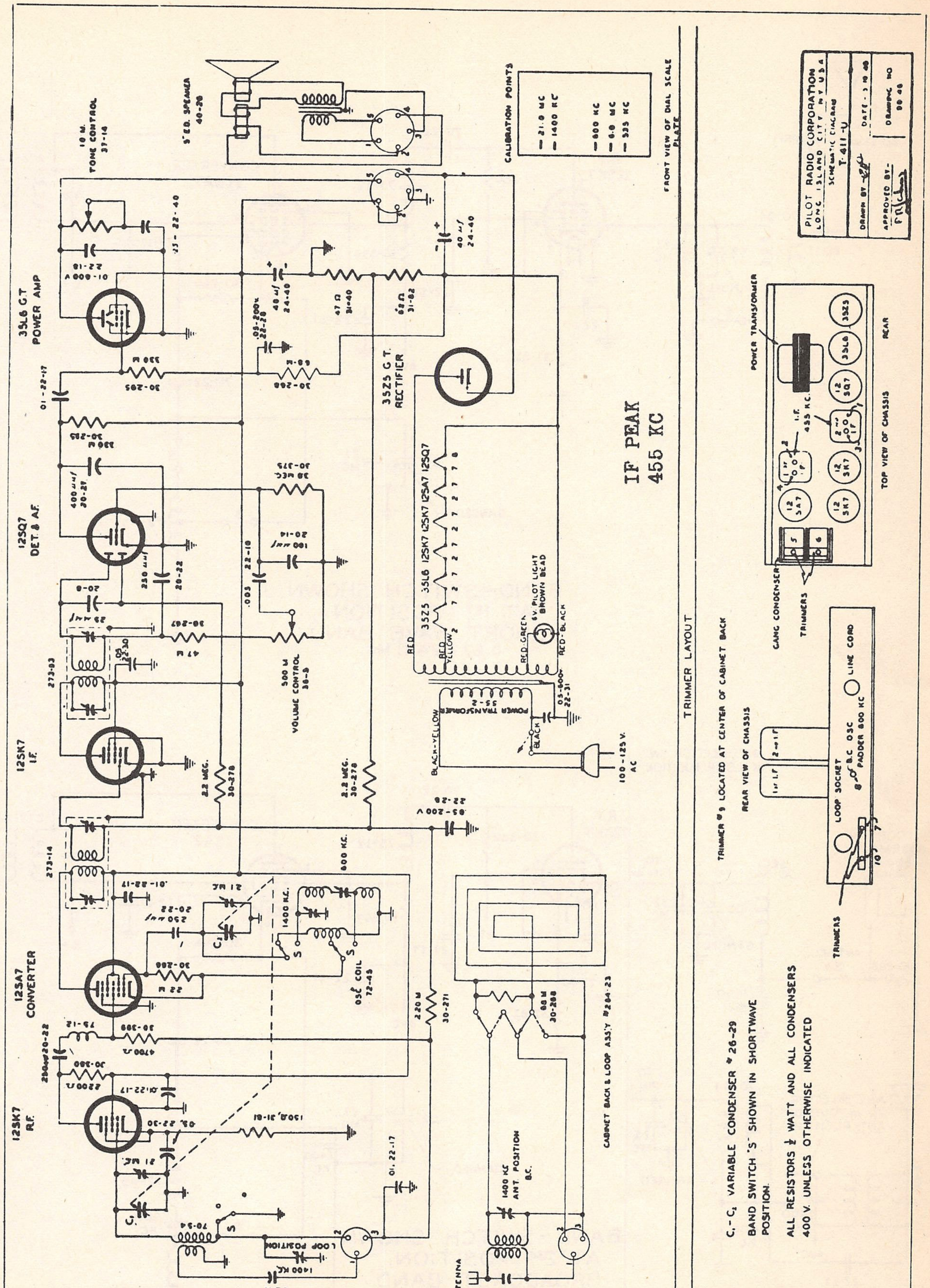
The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.


2.5X AT 600 KC
8X AT 600 KC
18X CONVERSION GAIN
INPUT 600 KC
OUTPUT 455 KC
75X AT 455 KC
20X AT 400 CYCLES
9 USE MODERATELY STRONG 400 CYCLE SIGNAL
SIGNAL GENERATOR SET TO 600 KC
200 MMF
B-
BLUE
12SK7 R.F.
12SA7 1st DET.—OSC.
12SF7 I.F.—2nd DET.—A.V.C.
12SK7 1st A.F.
35L6GT OUTPUT
GREEN
BLUE
GREEN
2
5
6
14
17
27
29
31
34

Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.

MODEL T-411-U

# PILOT RADIO CORP.


12SK7 R.F.
12SA7 CONVERTER
12SK7 I.F.
12SQ7 DET. & A.F.
35L6 G.T. POWER AMP
35Z5 G.T. RECTIFIER
10 M. TONE CONTROL 37-14
5" E.D. SPEAKER 40-20
500 M VOLUME CONTROL 38-3
OSC. COIL 72-43
POWER TRANSFORMER 55-2
6V. PILOT LIGHT BROWN BEAD
100-125 V. AC
ANTENNA
LOOP POSITION
1400 KC ANT POSITION B.C.
CABINET BACK & LOOP ASS'Y #284-23
273-14
273-13
CALIBRATION POINTS
— 21.0 MC
— 1400 KC
— 600 KC
— 6.0 MC
— 535 KC
FRONT VIEW OF DIAL SCALE PLATE
IF PEAK 455 KC
TRIMMER LAYOUT
TRIMMER #9 LOCATED AT CENTER OF CABINET BACK
REAR VIEW OF CHASSIS
TOP VIEW OF CHASSIS
REAR
GANG CONDENSER
TRIMMERS
LOOP SOCKET
B.C. OSC PADDER 600 KC
LINE CORD
POWER TRANSFORMER
I.F. 455 K.C.
PILOT RADIO CORPORATION
LONG ISLAND CITY N.Y. U.S.A.
SCHEMATIC DIAGRAM
T-411-U
DRAWN BY
DATE
APPROVED BY
DRAWING NO

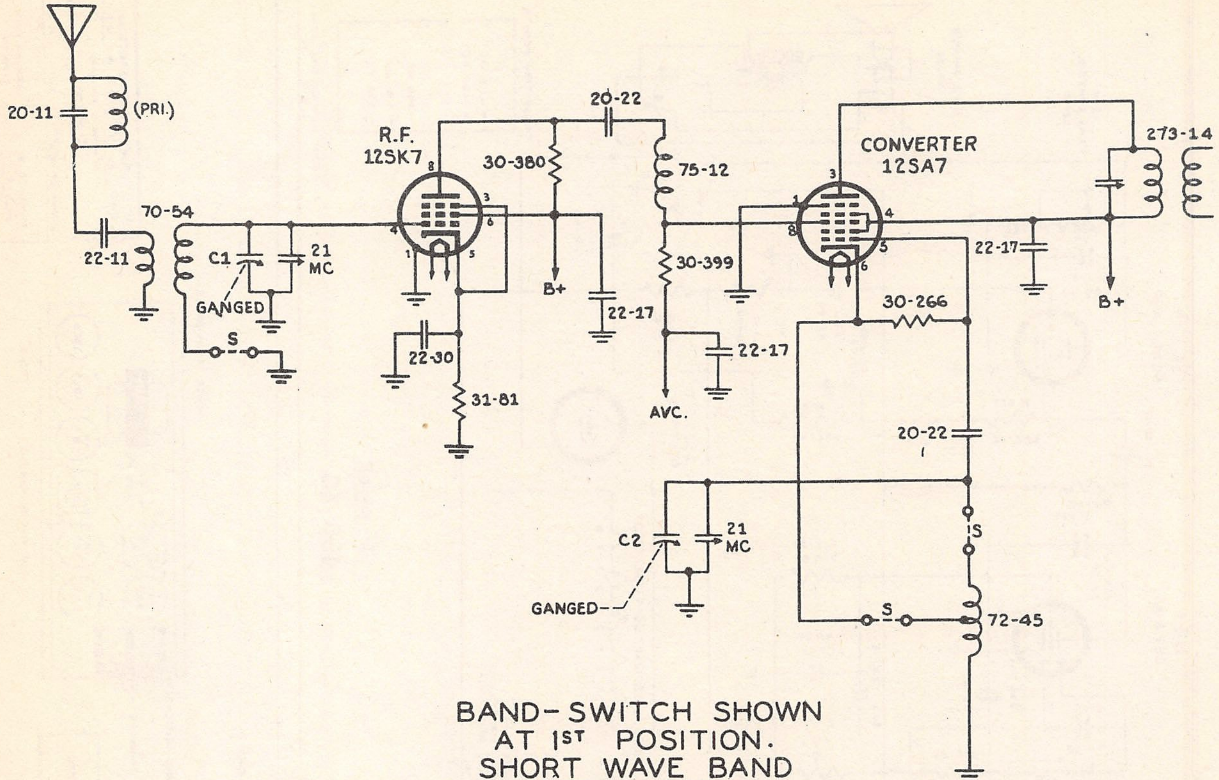
C₁-C₂ VARIABLE CONDENSER # 26-29

BAND SWITCH 'S' SHOWN IN SHORTWAVE POSITION.

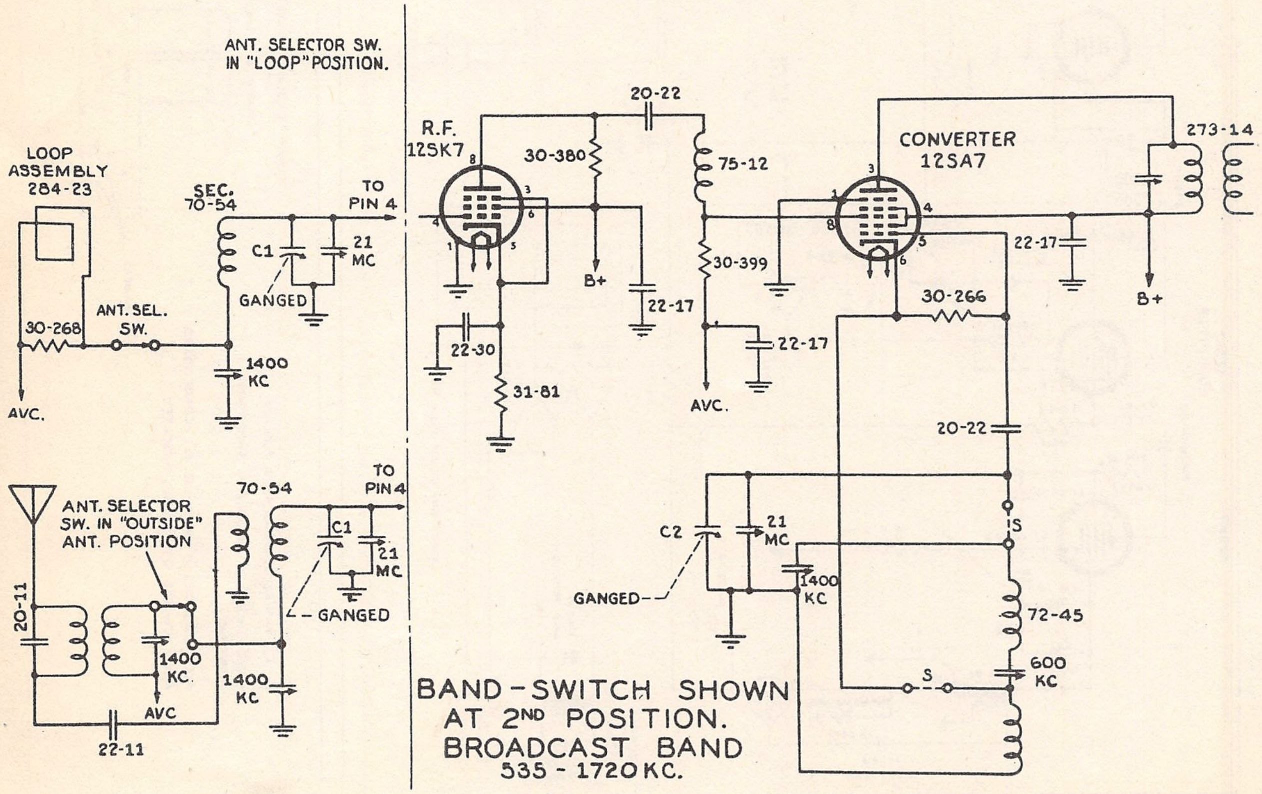
ALL RESISTORS ½ WATT AND ALL CONDENSERS 400 V. UNLESS OTHERWISE INDICATED

MODEL T-411-U

## PILOT RADIO CORP.


20-11
(PRI.)
22-11
70-54
C1
21 MC
GANGED
S
R.F.
12SK7
8
3
4
6
1
5
22-30
31-81
30-380
B+
22-17
20-22
75-12
30-399
22-17
AVC.
CONVERTER
12SA7
3
1
8
4
5
6
30-266
22-17
B+
273-14
20-22
C2
21 MC
GANGED
S
S
72-45

BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
5.67 - 24.0 MC.


ANT. SELECTOR SW.
IN "LOOP" POSITION.
LOOP
ASSEMBLY
284-23
SEC.
70-54
C1
21 MC
GANGED
30-268
ANT. SEL.
SW.
1400 KC
AVC.
TO
PIN 4
ANT. SELECTOR
SW. IN "OUTSIDE"
ANT. POSITION
70-54
TO
PIN 4
C1
21 MC
GANGED
20-11
1400 KC.
AVC
1400 KC
22-11
R.F.
12SK7
8
3
4
6
1
5
22-30
31-81
30-380
B+
22-17
20-22
75-12
30-399
22-17
AVC.
CONVERTER
12SA7
3
1
8
4
5
6
30-266
22-17
B+
273-14
20-22
C2
21 MC
GANGED
1400 KC
S
72-45
600 KC
S

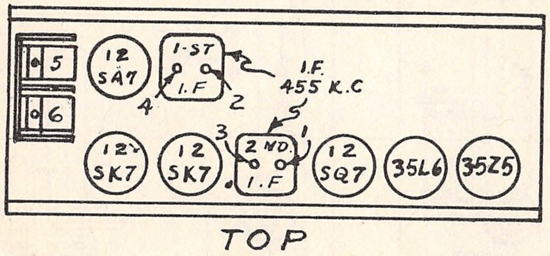
BAND-SWITCH SHOWN
AT 2ND POSITION.
BROADCAST BAND
535 - 1720 KC.

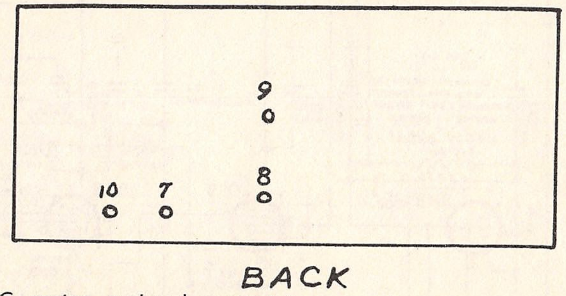
PILOT RADIO CORP.

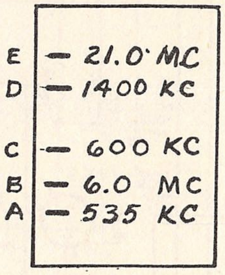
**MODEL T-411-U**

## ALIGNMENT CHART

| STEP | CIRCUIT ALIGNED | RECEIVER | | SIGNAL GENERATOR | | DUMMY ANTENNA | ADJUSTMENTS (All maximum output) |
|---|---|---|---|---|---|---|---|
| | | BAND SWITCH | DIAL POINTER | FREQUENCY | CONNECTION | | |
| 1 | IF | BC | Low end of dial | 455 KC | Grid of 12SK7 RF | 0.1 mfd. | #1, 2, 3, 4 |
| 2 | SW | SW | E | 21 MC | Antenna Post | 400 ohm carbon resistor | First #5<br>Then #6 |
| 3 | BC | BC | D | 1400 KC | Antenna Post | 200 mmfd. mica capacitor | #7 |
| 4 | BC | BC | C | 600 KC | Antenna Post | 200 mmfd. mica capacitor | #8 |
| 5 | Repeat steps 3 and 4 | | | | | | |
| 6 | BC | BC | Set for broadcast station near 1400 KC | | | — | #9 and #10 |







Alignment should be attempted only if a low range A.C. meter, a signal generator, and insulated alignment tools are at your disposal. The A.C. meter is used as an outputmeter. The signal generator must cover a frequency range from 450 kc to 24 mc.

The output of the signal generator must always be kept at its lowest possible value. This is to prevent the automatic volume control of the receiver from interfering with accurate alignment.

During alignment, the line voltage feeding the receiver power supply should be kept at approximately 117 volts.

For all alignments, connect the outputmeter across the voice coil. With the volume control turned fully clockwise, tune for a maximum reading.

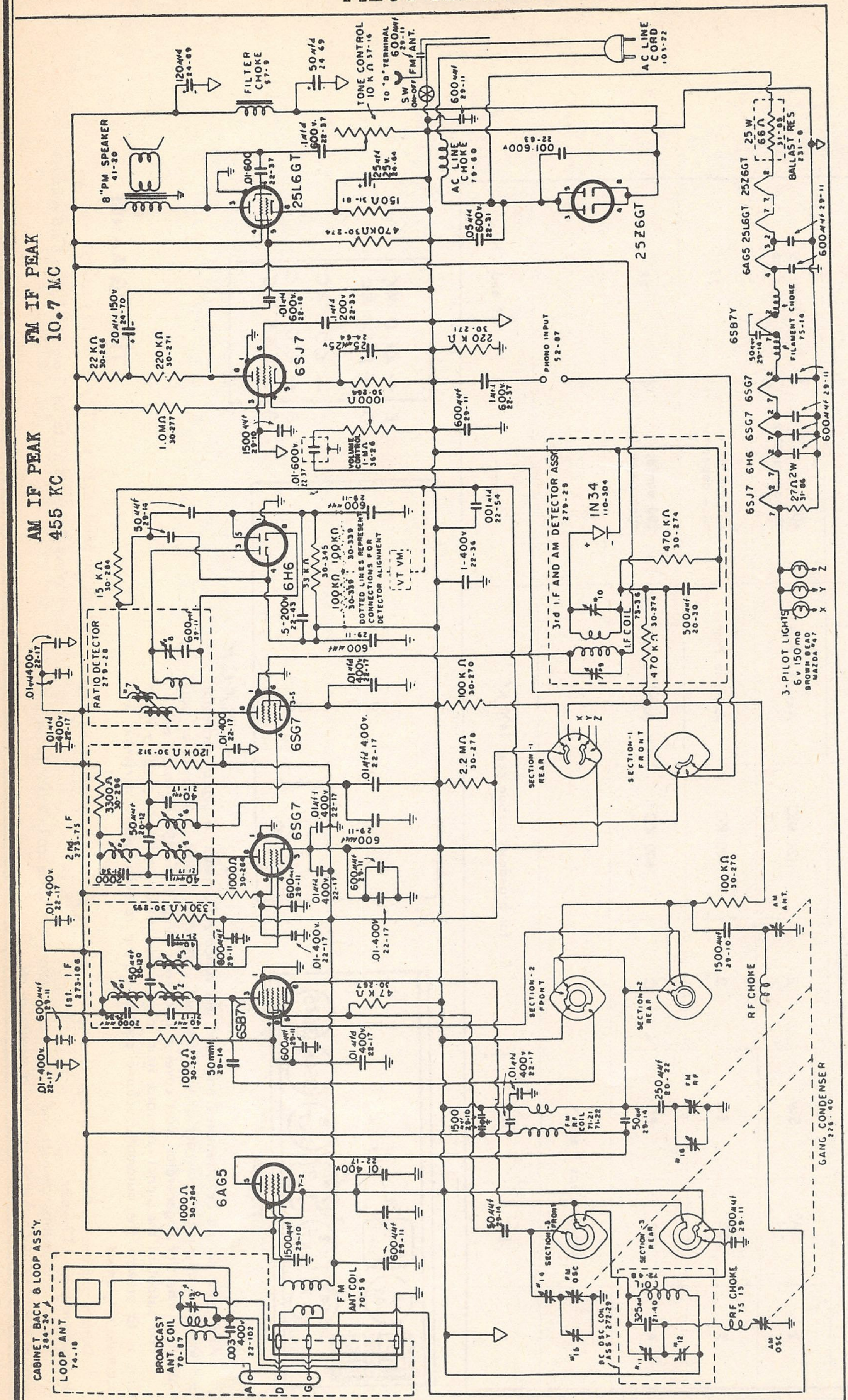
### TUNING RANGE

Broadcast Band—535 to 1720 kc or 174 to 561 meters.

Short Wave Band—5.67 to 24.0 mc or 12.5 to 53.6 meters.

MODEL T-521

## PILOT RADIO CORP.


AM IF PEAK
455 KC
FM IF PEAK
10.7 MC
6AG5
6SB7Y
6SG7
6SG7
6H6
6SJ7
25L6GT
25Z6GT
1N34
8" PM SPEAKER
41-20
FILTER CHOKE
57-9
TONE CONTROL
10 K Ω 37-16
TO "D" TERMINAL
SW ON-OFF
FM ANT.
AC LINE CORD
101-22
AC LINE CHOKE
79-60
25 W
66 Ω
BALLAST RES
231-8
6AG5 25L6GT 25Z6GT
6SB7Y
FILAMENT CHOKE
75-14
6SJ7 6H6 6SG7 6SG7
27 Ω 2W
3-PILOT LIGHTS
6 v 150 ma
PHONO INPUT
52-87
VOLUME CONTROL
1 MEG
DOTTED LINES REPRESENT CONNECTIONS FOR DETECTOR ALIGNMENT
VT VM
RATIO DETECTOR
279-28
3rd I.F AND AM DETECTOR ASS'Y
279-29
I.F. COIL
2nd I.F
273-73
1st. I.F
273-108
SECTION-1 REAR
SECTION-1 FRONT
SECTION-2 FRONT
SECTION-2 REAR
SECTION-3 FRONT
SECTION-3 REAR
AM ANT.
RF CHOKE
FM RF COIL
71-22
FM RF
GANG CONDENSER
226-40
FM OSC
BC OSC COIL ASS'Y 279-29
RF CHOKE
75-13
AM OSC
CABINET BACK & LOOP ASS'Y
LOOP ANT
74-18
BROADCAST ANT. COIL
70-87
FM ANT COIL
70-58
A
D
G

NOTES

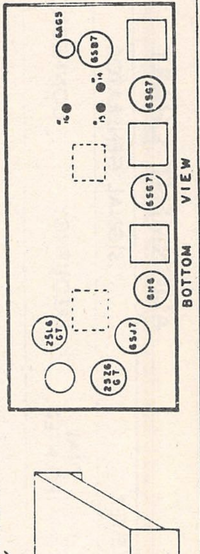
Band Switch Shown in F M Position

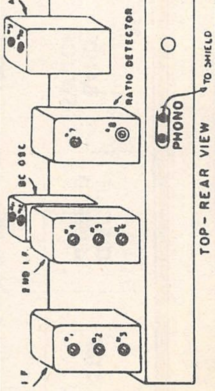
All Resistors 1/2 Watt & All Condensers 400 Volts Unless Otherwise Specified.

▽ = B-   ⏚ = Ground

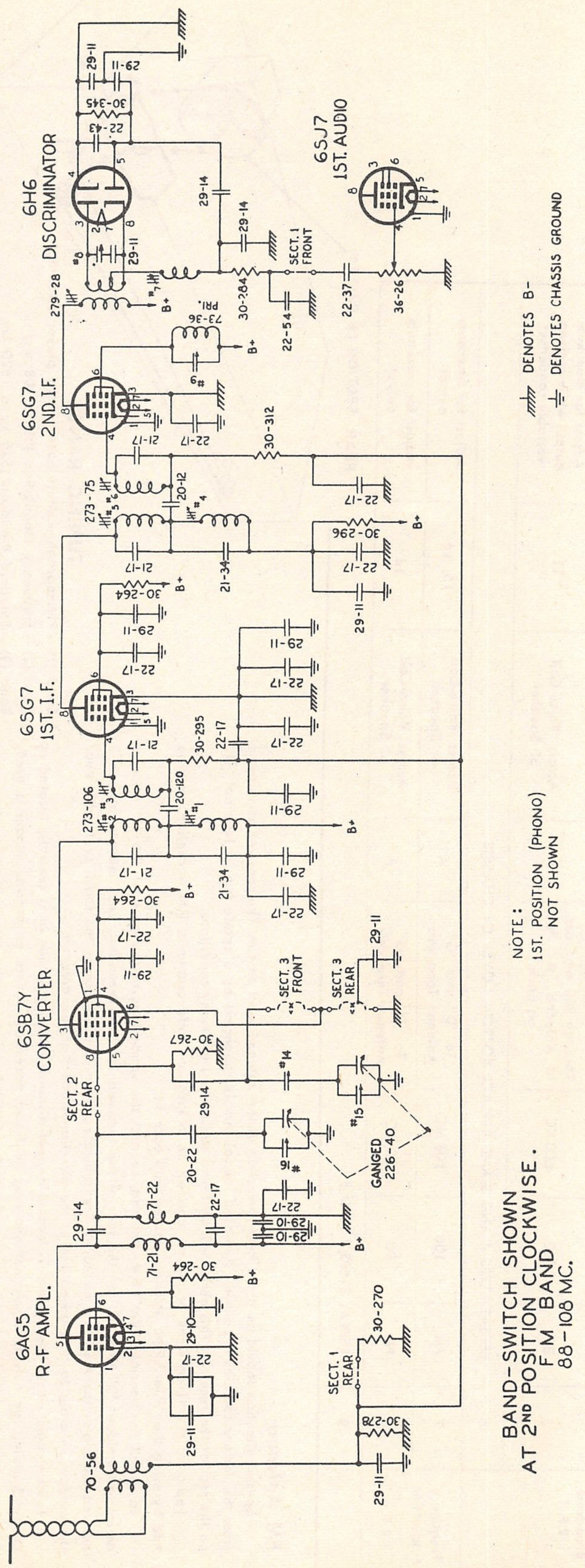
ALIGNMENT ADJUSTMENTS

1- 1st IF 455 Kc
2- 1st IF 10.7 mc, Primary
3- 1st IF 10.7 mc, Secondary
4- 2nd IF 455 Kc
5- 2nd IF 10.7 mc, Primary
6- 2nd IF 10.7 mc, Secondary
7- Ratio Detector 10.7 mc, Primary
8- Ratio Detector 10.7 mc, Secondary
9- AM 3rd IF 455 Kc, Primary
10- AM 3rd IF 455 Kc, Secondary
11- BC Osc Padder
12- BC Osc Trimmer
13- Ant BC Trimmer (on rear cover)
14- FM Osc Padder
15- FM Osc Trimmer
16- FM R.F. Trimmer


BOTTOM VIEW
25L6 GT
25Z6 GT
6SJ7
6H6
6SG7
6SG7
6SB7
6AG5

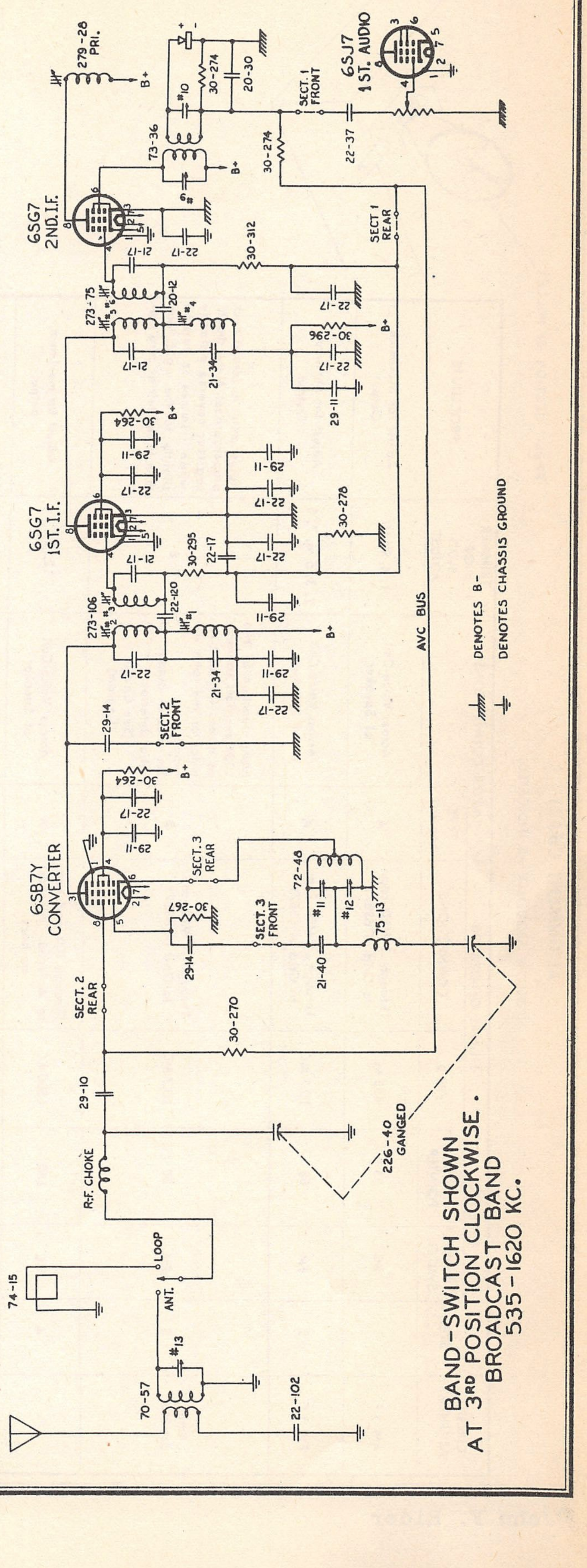

TOP- REAR VIEW
AM 3RD IF
RATIO DETECTOR
PHONO
TO SHIELD
BC OSC
2ND I.F
1-ST. I.F

## PILOT RADIO CORP.


6AG5
R-F AMPL.
6SB7Y
CONVERTER
6SG7
1ST. I.F.
6SG7
2ND. I.F.
6H6
DISCRIMINATOR
6SJ7
1ST. AUDIO
70-56
71-21
71-22
29-14
20-22
22-17
29-10
30-264
30-270
30-278
29-11
30-267
SECT. 2
REAR
SECT. 1
REAR
SECT. 3
FRONT
SECT. 3
REAR
SECT. 1
FRONT
GANGED
226-40
273-106
273-75
279-28
PRI.
73-36
20-120
20-12
21-17
21-34
30-295
30-296
30-312
30-345
22-43
22-54
22-37
30-264
36-26
B+
#1
#4
#6
#7
#8
#14
#15
#16
DENOTES B-
DENOTES CHASSIS GROUND

NOTE :
1ST. POSITION (PHONO)
NOT SHOWN

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
F M BAND
88-108 MC.


6SB7Y
CONVERTER
6SG7
1ST. I.F.
6SG7
2ND. I.F.
6SJ7
1ST. AUDIO
70-57
74-15
LOOP
ANT.
R-F. CHOKE
29-10
22-102
30-270
29-14
30-267
SECT. 2
REAR
SECT. 2
FRONT
SECT. 3
FRONT
SECT. 3
REAR
SECT. 1
REAR
SECT. 1
FRONT
21-40
72-48
75-13
226-40
GANGED
273-106
273-75
279-28
PRI.
73-36
20-120
20-12
21-17
22-17
21-34
29-11
30-264
30-295
30-278
30-296
30-312
30-274
20-30
22-37
AVC BUS
B+
#1
#4
#6
#10
#11
#12
#13
DENOTES B-
DENOTES CHASSIS GROUND

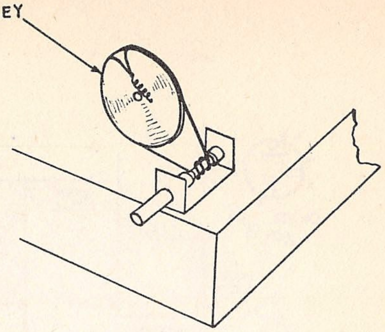
BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
BROADCAST BAND
535-1620 KC.

## ALIGNMENT CHART

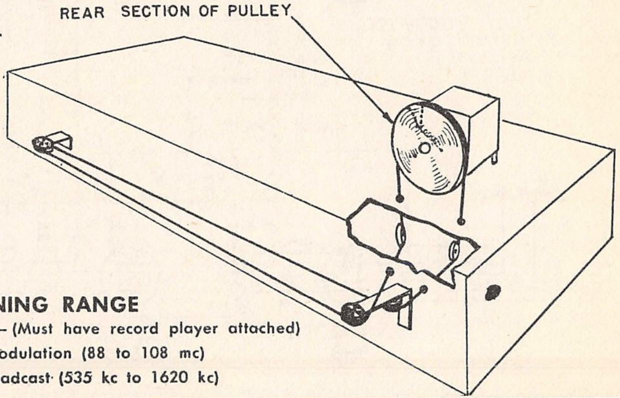
(FOLLOW SEQUENCE AS INDICATED)

| CIRCUIT ALIGNED | STEP | RECEIVER | | SIGNAL GENERATOR | | METER CONNECTIONS | | TRIMMER OR SLUG ADJUST | PROCEDURE |
|---|---|---|---|---|---|---|---|---|---|
| | | BAND SWITCH | DIAL POINTER | FREQ. | CONNECTIONS | TYPE See List | | | |
| AM I.F. | 1 | BC | 55 | 455 KC | Through .1 MFD cap. to Grid of 6SB7Y | A | Across Voice-Coil of Speaker | 1, 4, 9, 10 | Adjust for Maximum Output |
| FM I.F. | 2 | FM | 88 | 10.7 MC | Through .1 MFD cap. to Grid of 6SB7Y | A | Across Voice-Coil of Speaker | 2, 3, 5, 6, 7, 8 | Adjust for Maximum Output |
| Ratio-detector | 3 | FM | 88 | 10.7 MC | Through .1 MFD cap. to Grid of 6SB7Y | B | From: Junction of two 100K resistors connected across 47K load resistor of the ratio detector.<br>To: Audio output of ratio detector. (See Circuit Diagram) | 8 | Adjust meter to zero. (Check proper zero set. Meter should register reverse polarity when trimmer is turned slightly to the right, and then to the left of zero output) |
| Broadcast R.F. | 4 | BC | 150 | 1500 KC | Through 200 mmf. cap. to Antenna "A" Post on back. | A | Across Voice-Coil of Speaker | 12, 13 | Adjust for maximum output |
| | 5 | BC | 60 | 600 KC | Through 200 mmf. cap. to Antenna "A" Post on back. | A | Across Voice-Coil of Speaker | 11 | Adjust for maximum output while rocking variable condenser |
| | 6 | REPEAT STEPS 4 AND 5 AND REPLACE BOTTOM COVER OF CHASSIS | | | | | | | |
| Frequency Modulation R.F. | 7 | FM | 106 | 106 MC | To "D" and "G" Antenna Terminals | A | Across Voice-Coil of Speaker | 15, 16 | Adjust for maximum output |
| | 8 | FM | 90 | 90 MC | To "D" and "G" Antenna Terminals | A | Across Voice-Coil of Speaker | 14 | Adjust for maximum output |
| | 9 | REPEAT STEPS 7 AND 8 | | | | | | | |

FRONT SECTION OF PULLEY



REAR SECTION OF PULLEY



### *FM Antenna*

Special attention should be given to the selection of the antenna used on F.M. The receiver as shipped from the factory contains a built-in "line-cord" aerial that is connected by a spade lug to terminal "D" on the rear of the receiver. This aerial will be found satisfactory for many conditions.

Improved results on weak or distant stations, or in locations unfavorable to F.M. reception, can be had by using the "Pilot" F.M. antenna, packed with each set.

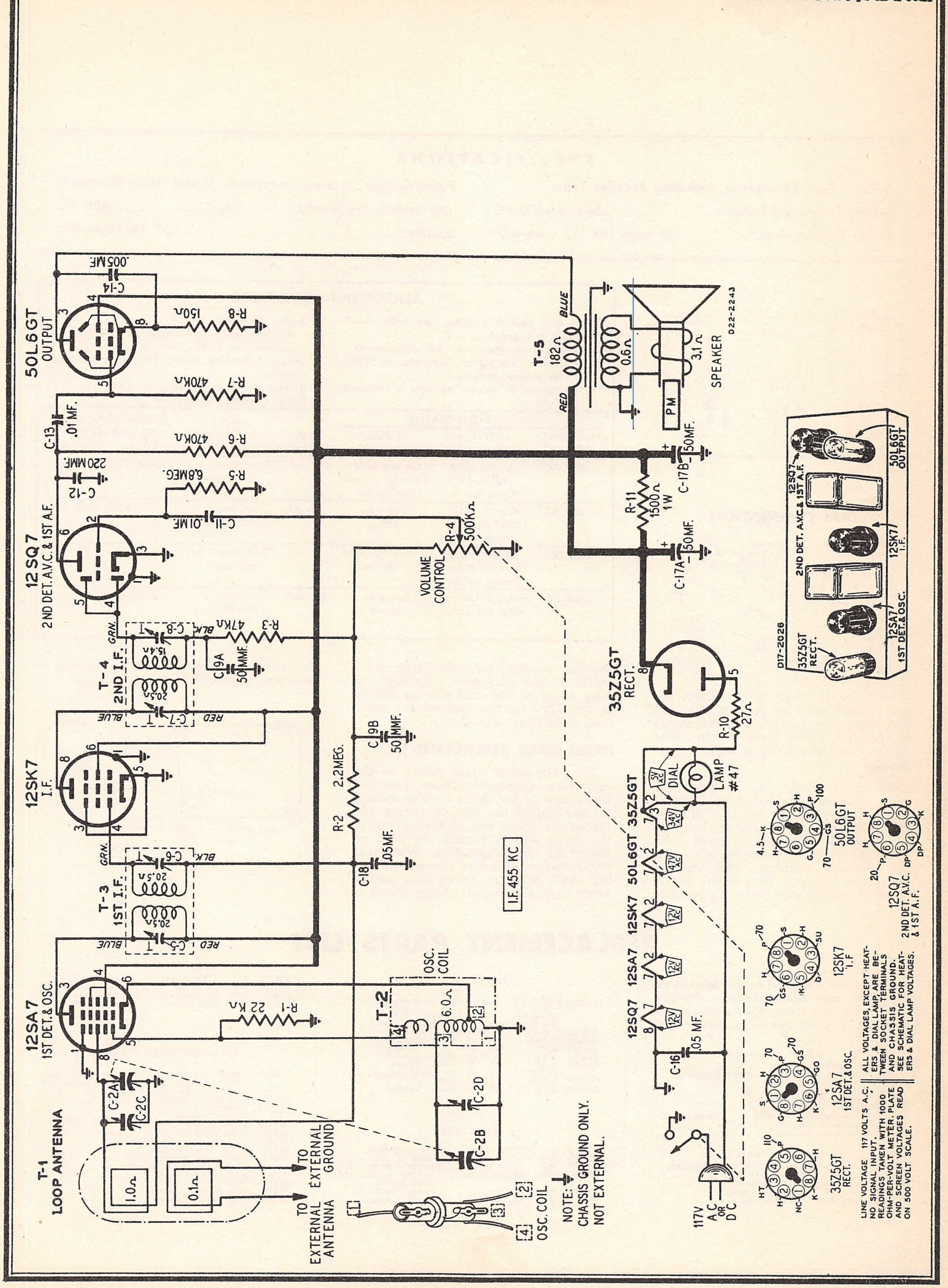
To install the special "Pilot" F.M. antenna, connect the spade lugs at the base of the "T" shaped aerial to terminals "D" and "G" on the rear of the receiver. The two remaining ends may be stretched out under a rug or fastened to a moulding. Try to locate a favorable position in the room, preferably near the window, in order to take advantage of the directional effect of this antenna.

In rare cases, where the receiver is located a great distance from the station or is centrally located in a steel building, an outside dipole antenna may be found necessary. Where an outside dipole is used, the ends of the lead-in, should be connected to "D" and "G" terminals on the rear of the receiver.

### TUNING RANGE

Band (1) — Phonograph — (Must have record player attached)
Band (2) — Frequency Modulation (88 to 108 mc)
Band (3) — Standard Broadcast (535 kc to 1620 kc)

# THE PURE OIL CO., U.S.A.


T-1 LOOP ANTENNA
1.0Ω
0.1Ω
TO EXTERNAL ANTENNA
TO EXTERNAL GROUND
12SA7 1ST DET. & OSC.
C-2A
C-2C
C-2B
C-2D
T-2
OSC. COIL
6.0Ω
R-1 22 KΩ
T-3 1ST I.F.
20.5Ω
C-5
C-6
BLUE
RED
GRN.
BLK.
12SK7 I.F.
C-18 .05MF.
R-2 2.2MEG.
C-9B 50 MMF.
I.F. 455 KC
T-4 2ND I.F.
15.4Ω
C-7
C-8
C-9A 50 MMF
R-3 47KΩ
12SQ7 2ND DET. A.V.C. & 1ST A.F.
VOLUME CONTROL
R-4 500KΩ
C-11 .01MF
R-5 6.8MEG.
C-12 220 MMF.
R-6 470KΩ
C-13 .01 MF.
R-7 470KΩ
50L6GT OUTPUT
R-8 150Ω
C-14 .005MF
T-5
182Ω
0.6Ω
SPEAKER
3.1Ω
PM
D22-2243
C-17B 50MF.
R-11 1500Ω 1W
C-17A 50MF.
35Z5GT RECT.
R-10 27Ω
DIAL LAMP #47
3V AC
34V AC
47V AC
12V AC
12SQ7
12SA7
12SK7
50L6GT
35Z5GT
C-16 .05 MF.
117V AC OR DC
OSC. COIL
NOTE: CHASSIS GROUND ONLY. NOT EXTERNAL.
D17-2028
35Z5GT RECT.
12SA7 1ST DET. & OSC.
12SK7 I.F.
2ND DET. A.V.C. & 1ST A.F.
12SQ7
50L6GT OUTPUT
110
4.5
100
70
20

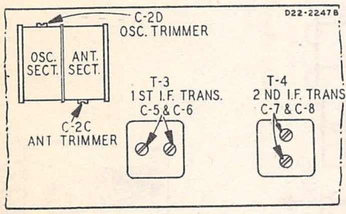
LINE VOLTAGE 117 VOLTS A.C. NO SIGNAL INPUT. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE AND SCREEN VOLTAGES READ ON 500 VOLT SCALE.

ALL VOLTAGES, EXCEPT HEATERS & DIAL LAMP ARE BETWEEN SOCKET TERMINALS AND CHASSIS GROUND. SEE SCHEMATIC FOR HEATERS & DIAL LAMP VOLTAGES.

# THE PURE OIL CO., U.S.A.

## SPECIFICATIONS

5 Tube Superheterodyne, including Rectifier Tube.
Tuning Frequency Range....................540 to 1600 KC
Power Consumption....................30 watts (At 117 volts AC)
Power Output....1.5 watt maximum, .9 watt (10% distortion)
Intermediate Frequency....................455 KC
Speaker....................5" PM Dynamic



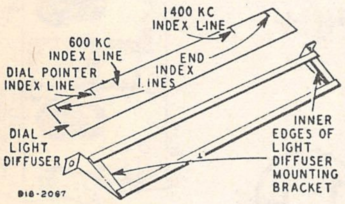
## ALIGNMENT PROCEDURE

Check dial pointer position, see DIAL CALIBRATION paragraph.
Volume Control—Maximum All Adjustments.
Allow Chassis and Signal Generator to "Heat Up" for several Minutes.
The equipment in column at right is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter: Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 50 mmf.
Blocking Condenser—.1 mf.

| SIGNAL GENERATOR | | | DUMMY ANTENNA | GANG CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration) |
|---|---|---|---|---|---|
| FREQUENCY SETTING | ANTENNA CONNECTION | GROUND CONNECTION | | | |
| 455 KC | Control Grid 12SK7—I.F. Prong No. 4 | Chassis Base Through .1 mf. Condenser | .1 mf. | Turn Rotor to full open | 2nd I.F. (C-7) & (C-8) |
| 455 KC | Control Grid 12SA7—1st Det. Prong No. 8 | Same As Above | .1 mf. | Turn Rotor to full open | 1st I.F. (C-5) & (C-6) |
| 1620 KC | Control Grid 12SA7—1st Det. Prong No. 8 | External Ground Clip On Loop | .1 mf. | Turn Rotor to full open | Oscillator (C-2D) |
| 1400 KC | External Antenna Clip On Loop | Same As Above | 50 mmf. | Turn dial to 1400 KC. See Note A | Antenna (C-2C) |

## DIAL CALIBRATION

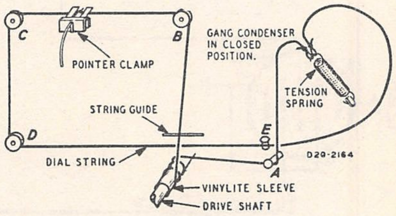


In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial light diffuser for this purpose.

Before aligning the receiver (or when replacing the dial light diffuser) check the position of the diffuser strip, making certain that the two extreme index lines are aligned with the inner edges of the diffuser mounting bracket opening. The bracket should be crimped to prevent movement of the diffuser strip. To position the dial pointer, turn the large drive pulley to the maximum counterclockwise position. The dial pointer should be directly over the dial pointer index line. (See illustration).

## DRIVE CORD REPLACEMENT

Turn the large drive pulley to the maximum counterclockwise position. Use a new 10X48 drive cord assembly, tie one end to the tension spring and fasten the other end of the spring to the drive pulley. Install the cord as shown in the illustration. Wind 2¾ turns counterclockwise around the tuning shaft with the turns progressing away from the chassis. After string is installed, stretch the tension spring and tie free end of cord to spring.



# REPLACEMENT PARTS LIST

NOTICE: There is a model number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

### MISCELLANEOUS

| | |
|---|---|
| 12A432 | 5" Speaker |
| 3A303 | Tube Socket, Octal (8 prong) Molded |
| 10A297 | Knob (Brown) |
| 10A300 | Knob (Ivory) |
| 55X255 | Cabinet (Ivory) |
| 55X313 | Cabinet (Brown) |
| 28X292 | Snap Buttons (mounting loop to cabinet) |
| 14X334 | Speaker Baffle |
| 13X328 | Line Cord Assembly |

### TRANSFORMERS AND COILS

| | | |
|---|---|---|
| 9A1916 | T-1 | "B" Range Loop Antenna Assembly |
| 9A1914 | T-2 | Oscillator Coil Assembly |
| 9A1808 | T-3 | 1st I-F Coil Assembly |
| 9A1809 | T-4 | 2nd I-F Coil Assembly |
| 51X132 | T-5 | Output Transformer |

### CAPACITORS

| | | | | |
|---|---|---|---|---|
| 14A194 | C-2A,C-2B,<br>C-2C,C-2D | | | Gang Condenser Assembly |
| | C-5,C-6 | | | Part of T-3 (1st I-F Coil) |
| | C-7,C-8 | | | Part of T-4 (2nd I-F Coil) |
| 47X112 | C-9A,C-9B | 50-50 mmf. | | Dual Mica |
| B66103 | C-11,C-13 | .01 mf | 200V. | Tubular |
| 47X468 | C-12 | 220 mmf | | Molded |
| D66502 | C-14 | .005 mf | 400V. | Tubular |
| D66503 | C-16 | .05 mf | 400V. | Tubular |
| 45X341 | C-17A<br>C-17B | 50 mf<br>50 mf | 150V.<br>150V. | Dry Electrolytic |
| B66503 | C-18 | .05 mf | 200V. | Tubular |

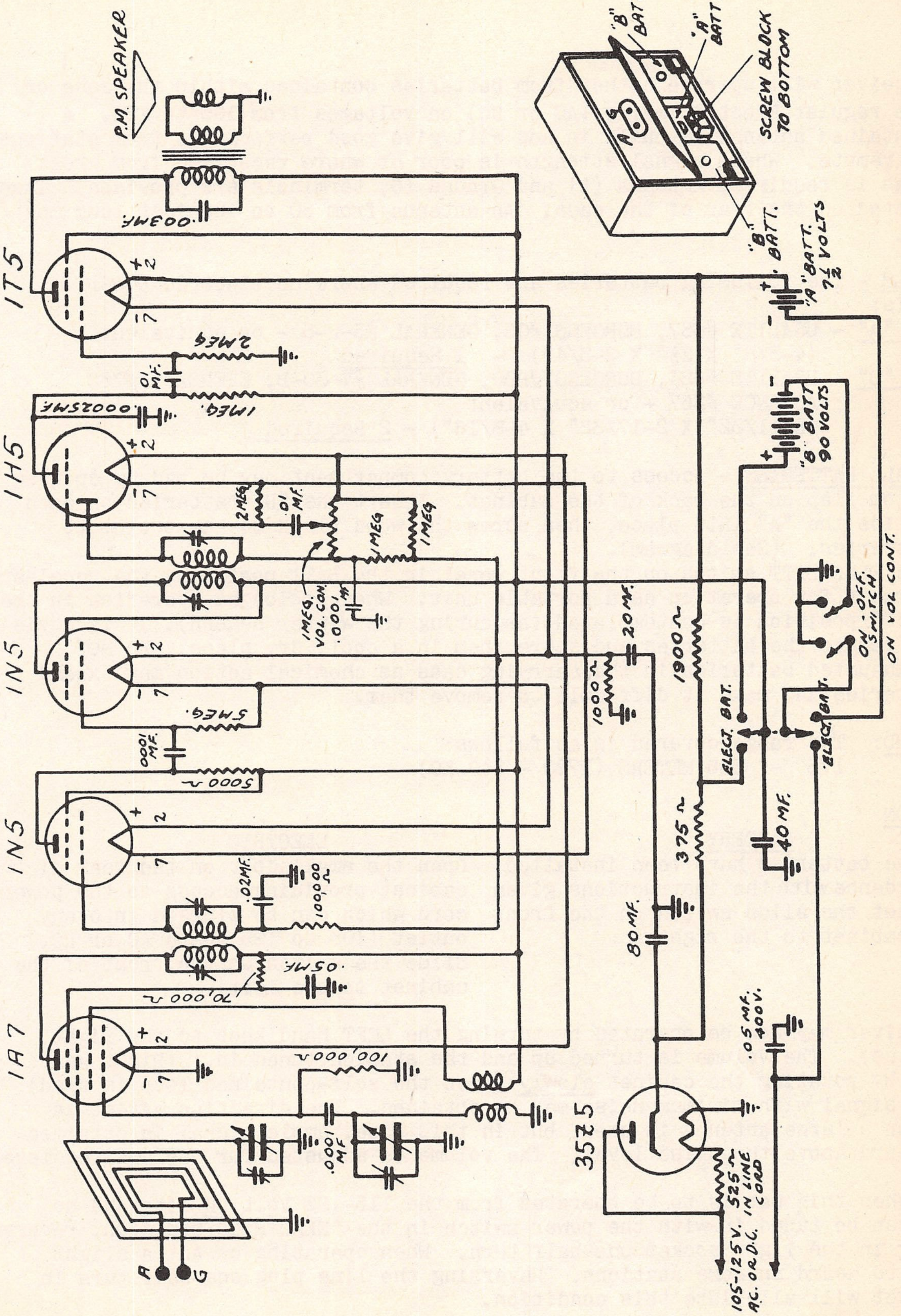
### RESISTORS

| | | | |
|---|---|---|---|
| B84223 | R-1 | 22.000 ohms | 0.5 watt Carbon |
| B85225 | R-2 | 2.2 meg. | 0.5 watt Carbon |
| B85473 | R-3 | 47,000 ohms | 0.5 watt Carbon |
| 36X352 | R-4 | 500,000 ohms | Volume control and line switch |
| B85685 | R-5 | 6.8 meg. | 0.5 watt Carbon |
| B84474 | R-6 | 470,000 ohms | 0.5 watt Carbon |
| B85474 | R-7 | 470,000 ohms | 0.5 watt Carbon |
| B84151 | R-8 | 150 ohms | 0.5 watt Carbon |
| B84270 | R-10 | 27 ohms | 0.5 watt Carbon |
| C85152 | R-11 | 1500 ohms | 1.0 watt Carbon |

### DIAL AND DRIVE ASSEMBLY

| | |
|---|---|
| 26A466 | Pointer Bracket Assembly complete with light diffuser holder, string guide and idler pulleys |
| 41X74 | Dial light diffuser |
| 15X223 | Pointer |
| 6X21 | Rubber Grommet } Mtg. gang condenser |
| 20X329 | Cond. Cushion Stud } Mtg. gang condenser |
| 26X482 | Drive shaft |
| 19X192 | "C" Washer (for drive shaft) |
| 10X48 | Drive cord assembly |
| 28X95 | Drive cord tension spring |
| 7A194 | Pilot light socket assembly |
| | No. 47 Pilot light |
| 58X688 | Dial |
| 30X508 | Dial clamp (upper) |
| 30X509 | Dial clamp (lower) |

## RADIO WIRE TELEVISION


P.M. SPEAKER
.003MF.
1T5
+ 2
- 7
2 MEG.
.01 MF.
1 MEG.
.00025MF.
1H5
2 MEG
.01 MF.
1 MEG
1 MEG
1 MEG. VOL. CON.
.0001 MF
1N5
5 MEG.
.0001 MF.
20 MF.
1000 Ω
1900 Ω
5000 Ω
1N5
375 Ω
40 MF.
.02MF.
100000 Ω
80 MF.
.05 MF.
70,000 Ω
1A7
100,000 Ω
.0001 MF
35Z5
525 Ω IN LINE CORD
105-125 V. A.C. OR D.C.
.05 MF. 400 V.
A
G
"B" BATT.
"A" BATT.
SCREW BLOCK TO BOTTOM
"B" BATT.
"A" BATT. 1½ VOLTS
"B" BATT 90 VOLTS
ELECT. BAT.
ELECT. BAT.
ON-OFF SWITCH
ON VOL CONT.

SCHEMATIC CIRCUIT DIAGRAM

MODEL BP-12

I.F. = 455 K.C.

MODEL BP-12

## RADIO WIRE TELEVISION

This receiver will operate either from batteries contained within the case or from the regular Electric mains (AC or DC) on voltages from 105 to 125. A self-contained antenna is built in and will give good performance from stations not too remote. Where signal strength is poor or where reception from great distances is required, Antenna (A) and Ground (G) terminals are provided. These are located on the rear of the case. An antenna from 50 to 100 feet long may be used.

BATTERIES - The following batteries are required where no electric power is abailable:

7½ Volt "A" - USALITE #687, BURGESS #G5, GENERAL #5-H-5 - or equivalent
(4-3/8" X 3½" X 2-3/4") - 1 Required

45 Volt "B" - USALITE #624, BURGESS #B30, GENERAL #V-30-B, EVEREADY #762
ADVANCE #267 - or equivalent
(5-11/32" X 2-17/32" X 4-3/16") - 2 Required

TO INSTALL BATTERIES - Access to the battery compartment may be had by opening the bottom flap on the back of the cabinet. Insert the "B" batteries on each side, slide the "A" into place, then screw the wood block to the bottom to hold batteries. (See diagram).

With the ELEC-BATT switch on the front panel in the BATT position, the receiver is now ready for operation as a portable unit. When prolonged operation in the "ELECTRIC" position is contemplated (as during the winter season), it is advisable to remove the batteries and store them in a cool, dry place. DO NOT leave exhausted batteries in the carrying case as chemical action may expand the batteries and make it difficult to remove them.

WAVE BAND: The range covered is as follows:
175 - 555 METERS (1720 - 540 KC)

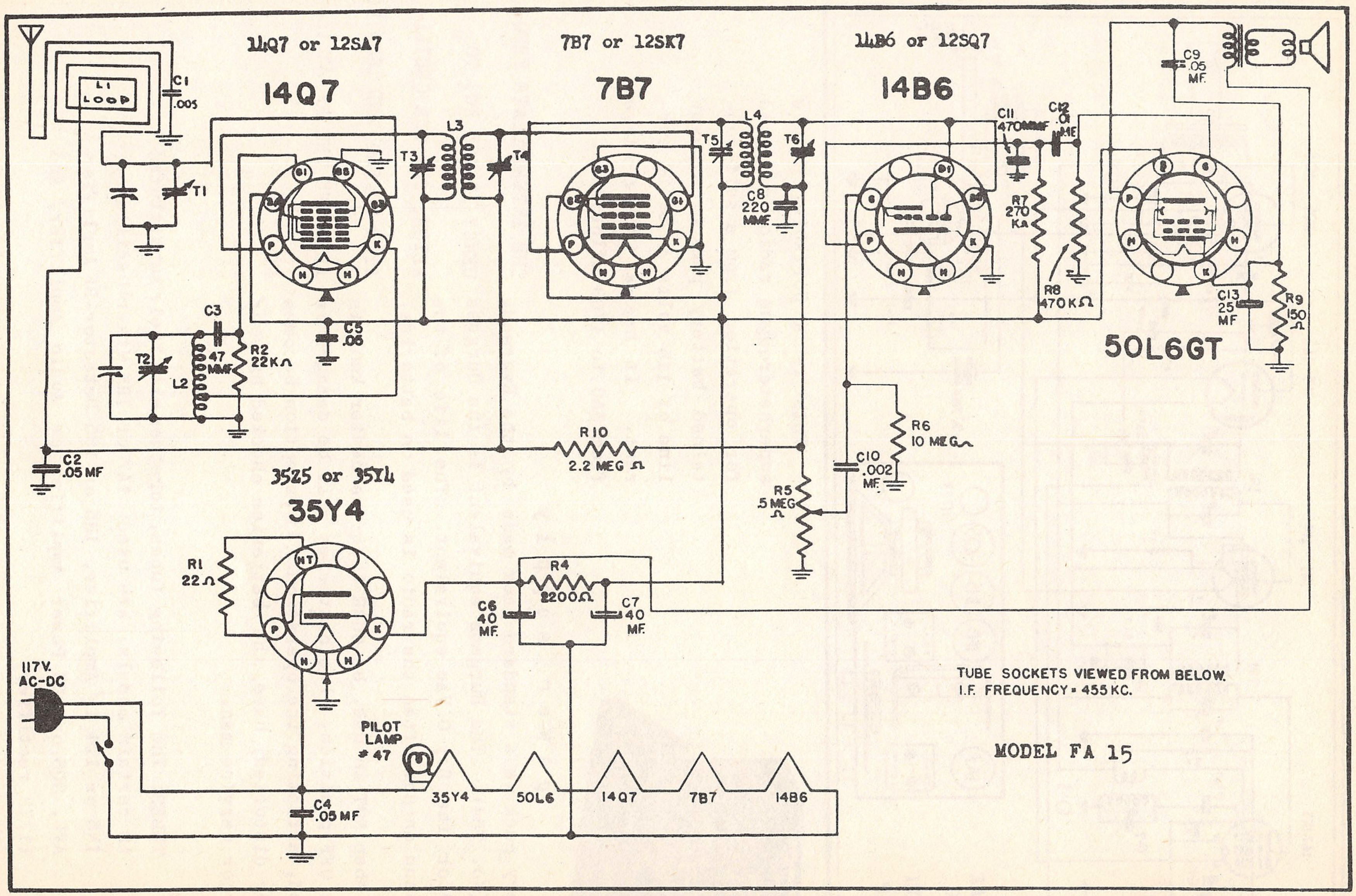
OPERATION

| BATTERY | ELECTRIC |
|---|---|
| After the batteries have been installed in accordance with the instructions given above, set the slide switch on the front of the cabinet to the right. | Open the small door on the rear of the cabinet providing access to the power cord which can be plugged into any outlet (105 to 125 Volts AC or DC.) Slide the switch on the front of the cabinet to the left. |

The receiver may now be operated by turning the LEFT hand knob to the right, (Clockwise). The Volume is turned up and the station tuned in. (Right hand knob). By rotating the cabinet slowly (when the self-contained loop is used) maximum signal with minimum noise may be obtained. The direction effect is lost when a large antenna is used, but in this case, ample signal is obtained to be heard above the noise level. The volume is adjusted for the desired level.

NOTE:- When this set is to be operated from the 115-125 Volt DC line and no signal can be tuned in with the power switch in the "ELECTRIC" position, reverse the plug in the light socket one-half turn. When operating on AC, a slight hum may be heard on some stations. Reversing the line plug one-half turn in the socket will alleviate this condition.

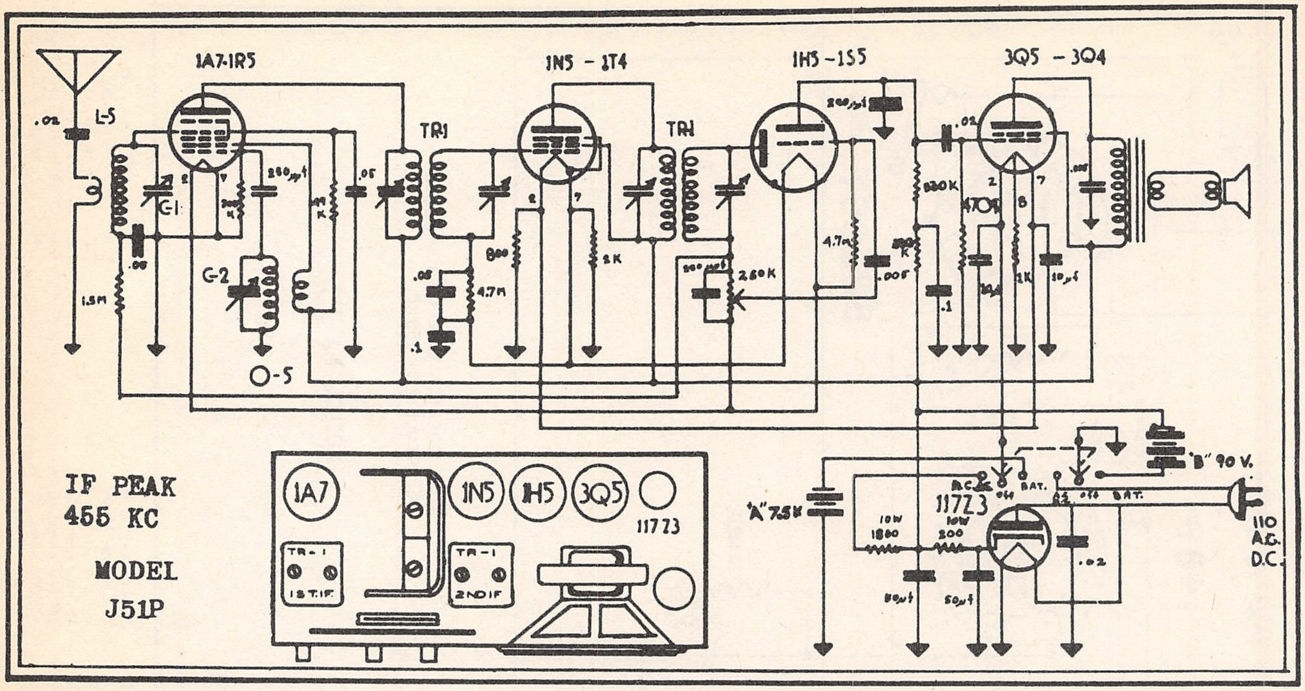
# RADIO WIRE TELEVISION

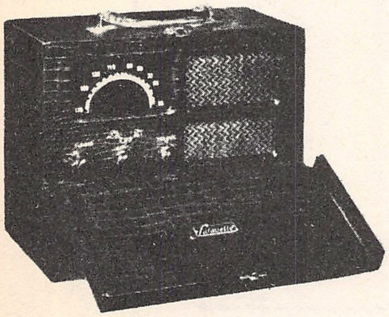

14Q7 or 12SA7
14Q7
7B7 or 12SK7
7B7
14B6 or 12SQ7
14B6
50L6GT
3525 or 35Y4
35Y4
L1 LOOP
C1 .005
T1
T2
L2
C3
47 MMF
R2 22KΛ
C5 .05
L3
T3
T4
L4
T5
T6
C8 220 MMF
C11 470MMF
C12 .01 MF
R7 270 KΛ
R8 470 KΩ
C9 .05 MF
C13 25 MF
R9 150 Ω
R10 2.2 MEG Ω
R6 10 MEG
C10 .002 MF
R5 .5 MEG Ω
C2 .05 MF
R1 22Ω
R4 2200Ω
C6 40 MF
C7 40 MF
117V. AC-DC
PILOT LAMP #47
C4 .05 MF
35Y4
50L6
14Q7
7B7
14B6
TUBE SOCKETS VIEWED FROM BELOW.
I.F. FREQUENCY = 455 KC.
MODEL FA 15

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C-1 | Paper, .005 mfd., 400 volts | C-8 | Mica, 220 mmfd., 500 volts | R-2 | 22,000 ohms, 2 W. | R-9 | 150 ohms, 1 W. |
| C-2 | Paper, .05 mfd., 400 volts | C-9 | Paper, .05 mfd., 400 volts | R-4 | 2200 ohms, ½ W. | R-10 | 2.2 Megohms, ¼ W. |
| C-3 | Mica, 47 mmfd., 500 volts | C-10 | Paper, .002 mfd., 400 volts | R-5 | Volume Control & Switch | L-1 | Loop Aerial |
| C-4 | Paper, .05 mfd., 400 volts | C-11 | Mica, 470 mmfd., 500 volts | R-6 | 10 Megohms, ¼ W. | L-2 | Oscillator Coil |
| C-5 | Paper, .05 mfd., 400 volts | C-12 | Paper, .01 mfd., 400 volts | R-7 | 270,000 ohms, ½ W. | L-3 | First I-F Transformer |
| C-6, C-7, C-13 | Electrolytic, 40x40, 150 V, 25 mfd., 25V. | R-1 | 22 ohms, ½ W. | R-8 | 470,000 ohms, ¼ W. | L-4 | Second I-F Transformer |

MODEL J51P

# RADIO WIRE TELEVISION


1A7-1R5
1N5 - 1T4
1H5 - 1S5
3Q5 - 3Q4
L-5
TR1
TR1
G-1
G-2
O-5
1.5M
4.7M
250K
220K
470K
1K
10W 1880
10W 200
117Z3
"A" 7.5V
"B" 90 V.
BAT.
110 AC. D.C.
IF PEAK
455 KC
MODEL
J51P
1A7
1N5
1H5
3Q5
117Z3
TR-1 1ST.I.F.
TR-1 2ND IF



This is a portable, 5-tube superheterodyne radio, designed for operation from a self-contained battery pack or a power line of 115 volts AC or DC current. It has a tuning range from 550 to 1700 kilocycles.

## power supply

The battery pack is a standard pack made by the Eveready Company (No. 754). The Burgess equivalent is the Burgess No. G6M60 or the Ray O Vac equivalent. The life of the packs depend on how often the radio is used on batteries.

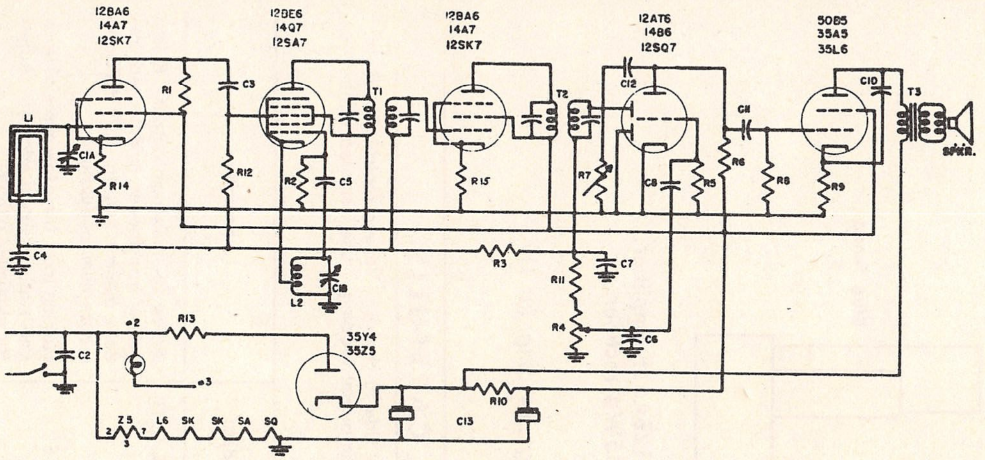
*CAUTION:* When NOT in use, be SURE that the center knob is in the OFF position, else batteries will be damaged or drained, affecting the operation. If reception becomes weak or distorted, have the batteries checked by your dealer or service man.

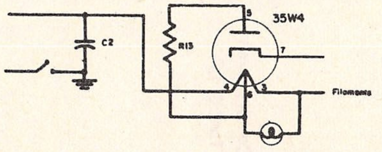
**THE INTERMEDIATE FREQUENCY IS 455 KC. TO ALIGN, SET THE OSCILLATOR TO 550 AND 1650 KC, ALIGNING THE RF AT 1500 KC.**

**TUBES:** The following tubes, together with their substitutes in certain models, are used: 1A7 or 1R5 Mixer-Oscillator, 1N5 or 1T4 IF Amplifier, 1H5 or 1S5 Detector-RF Amplifier-AVC, 3Q5 or 3Q4 Power Amplifier or Audio Amplifier, and 117Z3 rectifier.

# RADIO WIRE TELEVISION

MODEL MC-11


12BA6
14A7
12SK7
12BE6
14Q7
12SA7
12BA6
14A7
12SK7
12AT6
14B6
12SQ7
50B5
35A5
35L6
L1
C1A
R14
R1
C3
R12
R2
C5
T1
C1B
L2
R15
T2
R3
R7
C12
C8
R5
C7
R11
R4
C6
C11
R6
R8
R9
C10
T3
SPKR.
C4
C2
R13
35Y4
35Z5
Z5
L6
SK
SK
SA
SQ
R10
C13

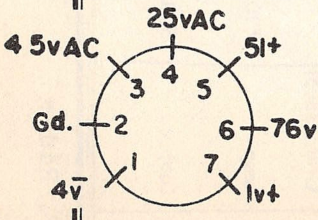

C2
R13
35W4
Filaments

IF PEAK
455 KC

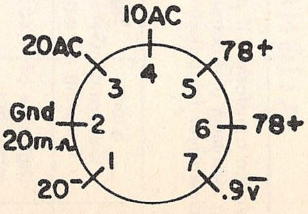
| CIRCUIT SYMBOL | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | CV-10009 | Condenser, Variable with Pulley. |
| C2 | CP-14503 | Condenser, Paper .05 Mfd. 400 volts. |
| C3 | CH-15250 | Condenser, Mica 25 mmf. 500 volts. |
| C4 | CP-12503 | Condenser, Pdper .05 Mfd. 200 volts. |
| C5 | CH-15500 | Condenser, Mica 50 mmf. 500 volts. |
| C6-C7 | CH-15251 | Condenser, Mica 250 mmf. 500 volts. |
| C8, C11 | CP-14103 | Condenser, Paper .01 mfd. 400 volts. |
| C10 | CP-14203 | Condenser, Paper .02 mfd. 400 volts. |
| C12 | CP-14302 | Condenser, Paper .003 mfd. 400 volts. |
| C13 | CL-10007 | Condenser, Electrol. 50/30 mfd. 150 volts. |
| L1 | AL-10010 | Loop Antenna. |
| L2 | TRC-10000D | Coil, Oscillator |
| R1 | RC-34701 | Resistor, Carbon 4700 ohm ½ watt. |
| R2 | RC-32202 | Resistor, Carbon 22000 ohm ½ watt. |
| R3 | RC-32204 | Resistor, Carbon 2.2 megohm ½ watt. |

| CIRCUIT SYMBOL | PART NO. | DESCRIPTION |
|---|---|---|
| R4 | VC-11105 | Control, Volume 1 megohm with switch. |
| R5 | RC-31005 | Resistor, Carbon 10 megohm ½ watt. |
| R6 | RC-32203 | Resistor, Carbon 220,000 ohm ½ watt. |
| R7 | VC-13105 | Control, Tone 1 megohm. |
| R8, R12 | RC-34703 | Resistor, Carbon 470,000 ohm ½ watt. |
| R9, R14 | RC-31500 | Resistor, Carbon 150 ohm ½ watt. |
| R10 | RC-41001 | Resistor, Carbon 1000 ohm 1 watt. |
| R11 | RC-31003 | Resistor, Carbon 100,000 ohm ½ watt. |
| R13 | RC-30220 | Resistor, Carbon 22 ohm ½ watt. |
| R15 | RC-33300 | Resistor, Carbon 330 ohm ½ watt. |
| SPKR | SO-10002 | Speaker, Oval 4 x 6. |
| T1 | TS-10000 | Transformer, I. F. Input. |
| T2 | TS-10001 | Transformer, I. F. Output. |
| T3 | TO-10000 | Transformer, Output. |

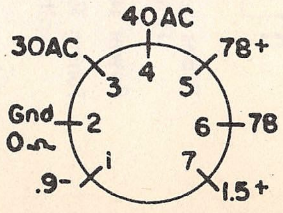
All grid voltages measured with 200,000 ohms per volt meter and other voltages with 1000 ohms per volt meter.


25vAC
4 5vAC
51+
Gd.
76v+
4v̄
1v+
1
2
3
4
5
6
7

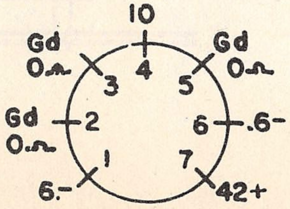
12BA6


10AC
20AC
78+
Gnd
20m.n.
78+
20-
.9v̄
1
2
3
4
5
6
7

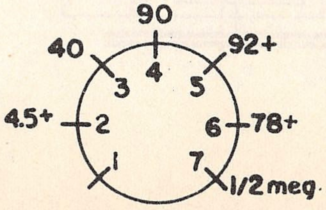
12BE6


40AC
30AC
78+
Gnd
0.n.
78
.9-
1.5+
1
2
3
4
5
6
7

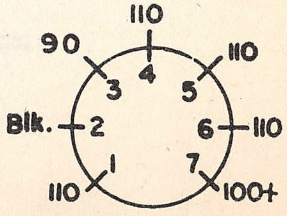
12BA6


10
Gd
0.n.
Gd
0.n.
Gd
0.n.
.6-
6.-
42+
1
2
3
4
5
6
7

12AT6

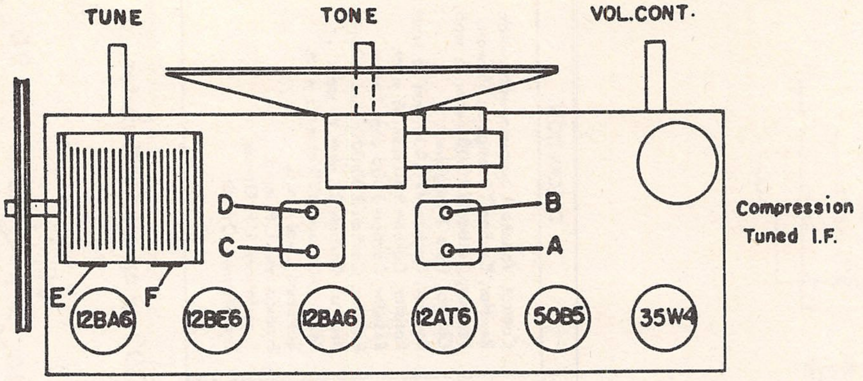

90
40
92+
4.5+
78+
1/2meg
1
2
3
4
5
6
7

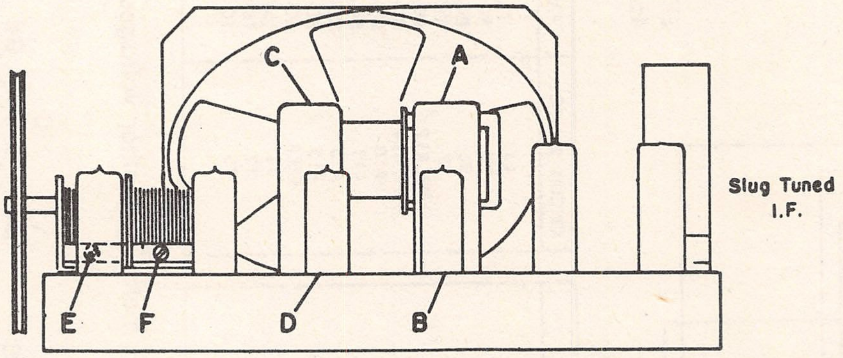
50B5


110
90
110
Blk.
110
110
100+
1
2
3
4
5
6
7

35W4

©John F. Rider





Tubes used (6) 12BA6 RF amplifier; 12BE6 converter; 12BA6 IF amplifier; 12AT6 Det., AVC, AF; 50B5 power output; and 35W4 rectifier.

Power supply 110-125 volts AC/DC.

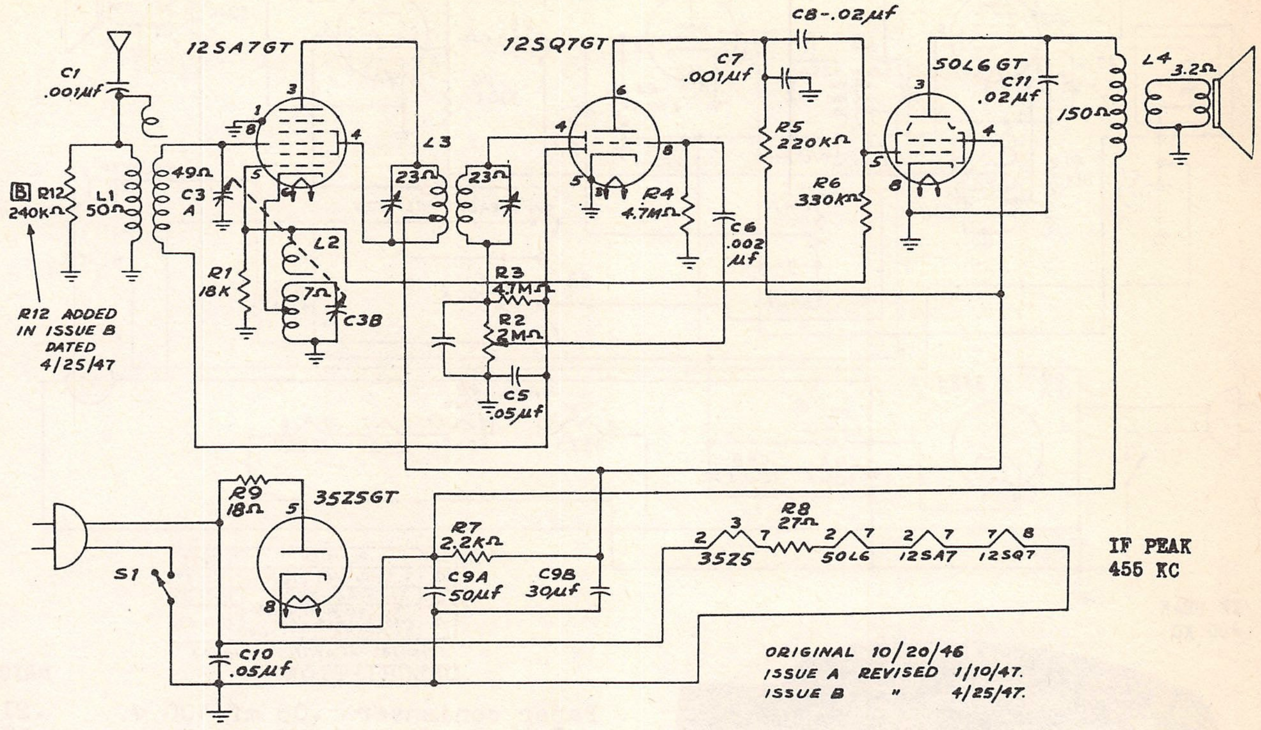
Tuning Range—Broadcast 550 Kc to 1720 Kc Rating .24 amp @ 117 volts AC/DC.

## ALIGNMENT INSTRUCTIONS — READ CAREFULLY

Use isolation transformer if available. If not, connect a capacitor in series with low side to chassis. Volume control should be at a maximum and output of signal generator no higher than necessary to obtain output reading. Use insulated alignment screwdriver for adjusting.

| Dummy Antenna | Signal Generator Coupling | Signal Generator Frequency | Gang Condenser Position | Output Meter | Adjust | Remarks |
|---|---|---|---|---|---|---|
| .05 Mfd. | High side of Mixer tube Grid (12BE6) | 455 Kc | Stator Turned out to minimum Capacity position | Across Voice Coil | A, B, C, D | Adjust for maximum output. If isolation transformer is not used, reduce dummy ant. to .001 MFD. to reduce hum modulation. |
|  | Loop | 1720 Kc | Stator Turned out to minimum Capacity position | Across Voice coil | E | Fashion loop from few turns of wire and radiate signal into set. Adjust for maximum output. |
|  | Loop | 1500 Kc | Tune gang to resonance | Across Voice coil | F | Fashion loop from few turns of wire and radiate signal into set. Adjust for maximum output. |

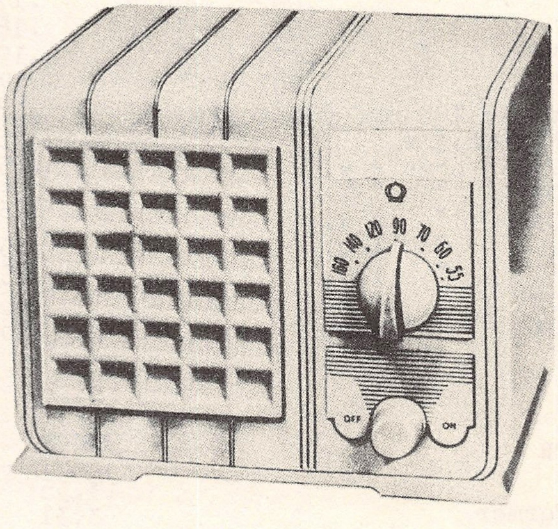
# RADIONIC EQUIPMENT CO.


12SA7GT
12SQ7GT
50L6GT
35Z5GT
C1 .001µf
B R12 240KΩ
L1 50Ω
49Ω
C3 A
C3B
L2
7Ω
L3
23Ω
23Ω
R1 18K
R2 2MΩ
R3 4.7MΩ
C5 .05µf
R4 4.7MΩ
C6 .002 µf
C7 .001µf
C8-.02µf
R5 220KΩ
R6 330KΩ
C11 .02µf
150Ω
L4
3.2Ω
R9 18Ω
S1
R7 2.2KΩ
C9A 50µf
C9B 30µf
C10 .05µf
R8 27Ω
35Z5
50L6
12SA7
12SQ7
1
2
3
4
5
6
7
8

R12 ADDED IN ISSUE B DATED 4/25/47

IF PEAK 455 KC

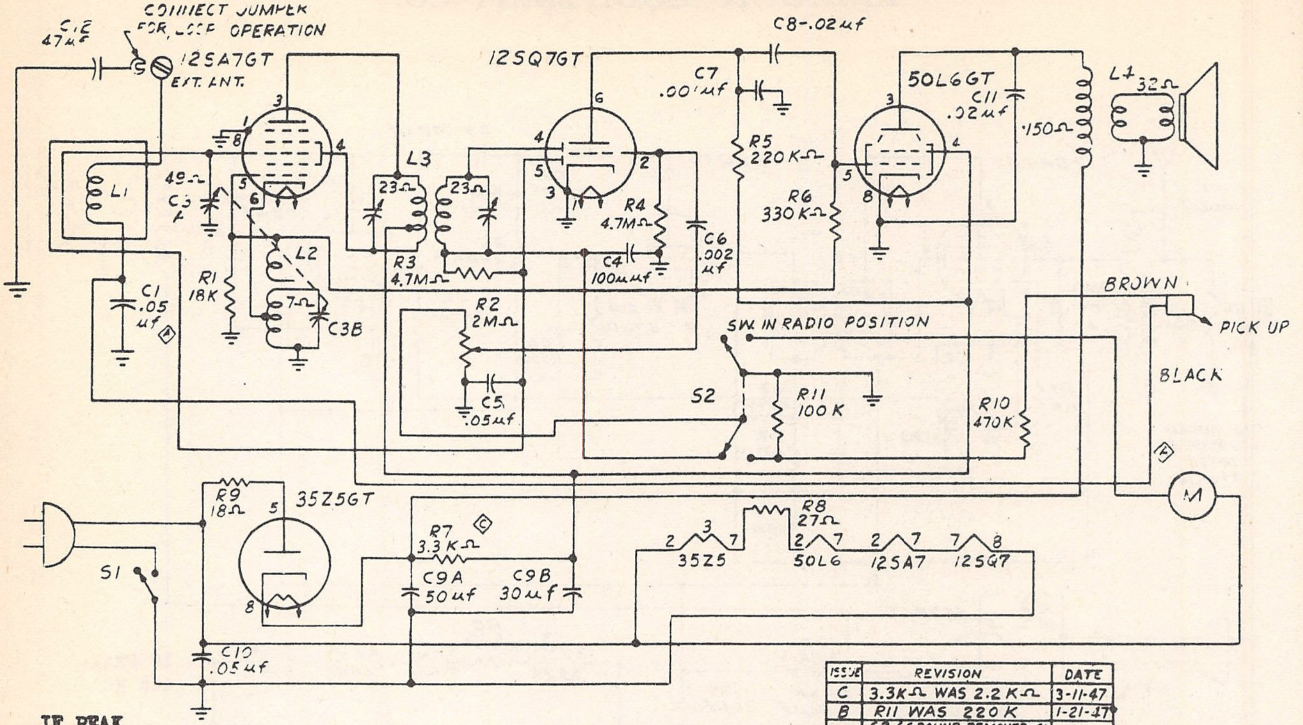
ORIGINAL 10/20/46
ISSUE A REVISED 1/10/47.
ISSUE B " 4/25/47.


160
140
120
90
70
60
55
OFF
ON

| DESCRIPTION | PRICE |
|---|---|
| Paper condenser .05/400 v. | .21 |
| " " .01/ " | .18 |
| " " .002/" | .17 |
| " " .02/ " | .18 |
| " " .05/200 v. | .19 |
| " " .005/" | .17 |
| " " .001/500 v. | .18 |
| Mica " 100 mmf | .19 |
| " " 47 " | .17 |
| Resistor 10K ohm $\frac{1}{4}$w. | .05 |
| " 4.7 meg ohm $\frac{1}{4}$w. | .05 |
| " 220 ohm $\frac{1}{4}$ w. | .05 |
| " 2200 ohm 2 w. | .18 |
| " 18 ohm $\frac{1}{4}$ w. | .05 |
| " 47 " 1 w. | .10 |
| " 330K ohm $\frac{1}{4}$ w. | .05 |

| | DESCRIPTION | PRICE |
|---|---|---|
| | Plastic cabinet walnut | 2.40 |
| 5877 | Speaker and output transformers | 3.19 |
| 39156 | Plastic knob tuning | .30 |
| 39157 | " " volume | .13 |
| 62192 | Cabinet back | .25 |
| | Instruction book | .05 |
| 1673 | Variable condenser | 3.65 |
| 2073 | Electrolytic condenser unit 50-30 mf 150 v. | 1.60 |
| 2479 | Volume control with switch 2 meg ohm | 1.20 |
| 28182 | Antenna coil | 1.05 |
| 28184 | Oscillator coil | .75 |
| 3376 | I.F. transformer | 2.05 |
| 5580 | Antenna hank | .37 |
| | Line cord | .75 |

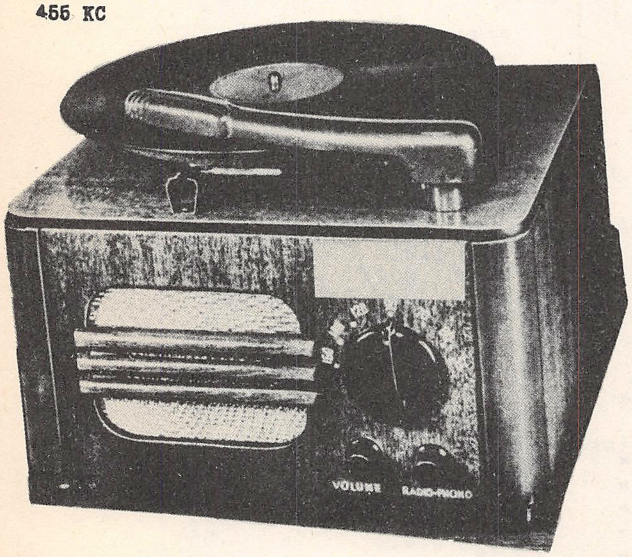
# RADIONIC EQUIPMENT CO.


C2 47μμf
CONNECT JUMPER FOR LOOP OPERATION
12SA7GT
EXT. ANT.
L1
49Ω
C3A
C1 .05 μf
R1 18K
L2
7Ω
C3B
L3
23Ω
23Ω
R3 4.7MΩ
12SQ7GT
C7 .001μf
R4 4.7MΩ
C4 100μμf
C6 .002 μf
R2 2MΩ
C5 .05μf
C8-.02μf
R5 220KΩ
R6 330KΩ
50L6GT
C11 .02μf
150Ω
L4 32Ω
BROWN
PICK UP
BLACK
SW. IN RADIO POSITION
S2
R11 100 K
R10 470K
M
R9 18Ω
35Z5GT
S1
R7 3.3KΩ
C9A 50μf
C9B 30μf
R8 27Ω
35Z5
50L6
12SA7
12SQ7
C10 .05μf

| ISSUE | REVISION | DATE |
|---|---|---|
| C | 3.3KΩ WAS 2.2 KΩ | 3-11-47 |
| B | R11 WAS 220 K | 1-21-47 |
| A | C2 & GROUND REMOVED-C1 WAS .001-BLK. LEAD BETWEEN XTAL & C1 ADDED | 1-14-47 |

ORIGINAL DRAWING 1-10-47

**IF PEAK 455 KC**


VOLUME
RADIO-PHONO

| DESCRIPTION | | | PRICE |
|---|---|---|---|
| Paper condenser | .05 mf | 400 v. | .21 |
| " " | .002 | 200 v. | .17 |
| " " | .02 | " | .18 |
| " " | .05 | " | .19 |
| " " | .001 | " | .17 |
| Ceramic 100 mmf 500 volts | | | .18 |
| 16K ohms ¼ w. | | | .15 |
| 4.7 meg ohms ¼ w. | | | .15 |
| 220K " " | | | .15 |
| 2200 " 2 w. | | | .18 |
| 18 " ½ w. | | | .15 |
| 47 " 1 w. | | | .15 |
| 330K " ¼ w. | | | .15 |
| 470K " ¼ w. | | | .15 |

| | DESCRIPTION | PRICE |
|---|---|---|
| A403 | Cabinet, wood less lid | 13.35 |
| 5877 | Speaker and output transformer | 3.31 |
| 39160 | Knob, tuning wood | .30 |
| 39161 | Knob, (volume, phono-radio) | .15 |
| 59307 | Instruction book | .05 |
| 1675 | Variable condenser | 4.00 |
| 2073 | Electrolytic condenser unit 50-30 mf/150 v. | 1.70 |
| 2480 | Volume control 2 meg with switch | 1.20 |
| 28184 | Oscillator coil | .75 |
| 28185 | Antenna coil (chassis 470-1) | .80 |
| 3376 | I.F. transformer | 2.20 |
| 28186 | | |
| 28189 | Loop and loading coil (chassis 470-2) | 1.75 |
| 5559 | Line cord | .75 |
| 3828 | Switch radio/phono | .85 |
| 6343 | Pick-up arm and rest | 7.65 |
| 6418 | Motor and turntable 8" | 8.70 |
| | Lifetime needle | 1.30 |

# RCA MFG. CO.

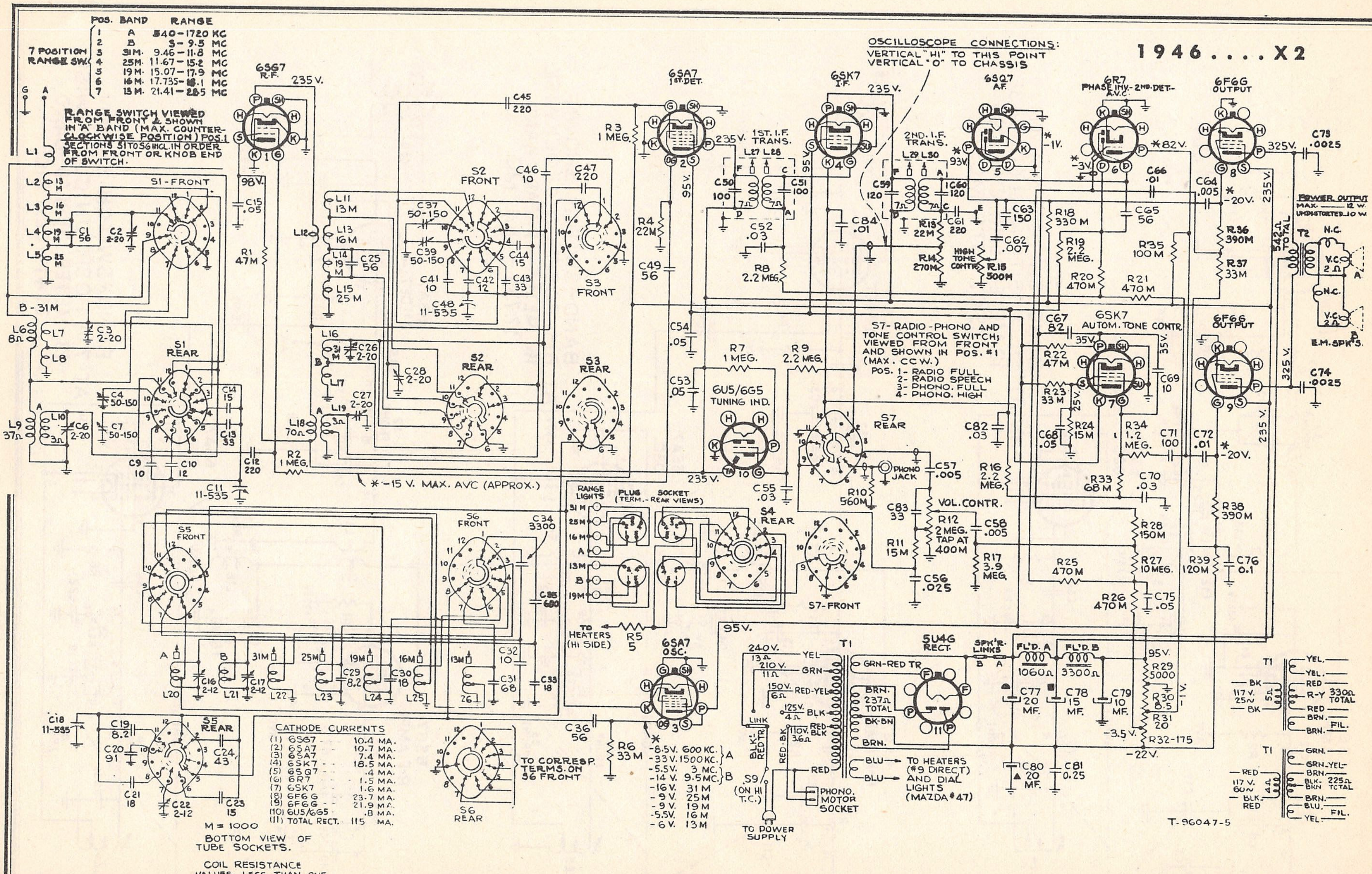
1946....X2

| POS. | BAND | RANGE |
|---|---|---|
| 1 | A | 540-1720 KC |
| 2 | B | 3- 9.5 MC |
| 3 | 31M. | 9.46-11.8 MC |
| 4 | 25M. | 11.67-15.2 MC |
| 5 | 19 M. | 15.07-17.9 MC |
| 6 | 16 M. | 17.735-18.1 MC |
| 7 | 13 M. | 21.41-28.5 MC |

7 POSITION RANGE SW.

RANGE SWITCH VIEWED FROM FRONT & SHOWN IN "A" BAND (MAX. COUNTER-CLOCKWISE POSITION) POS.1

SECTIONS S1 TO S6 INCL. IN ORDER FROM FRONT OR KNOB END OF SWITCH.



OSCILLOSCOPE CONNECTIONS:
VERTICAL "HI" TO THIS POINT
VERTICAL "O" TO CHASSIS
6SG7 R.F.
6SA7 1ST. DET.
6SK7 I.F.
6SQ7 A.F.
6R7 PHASE INV.-2ND. DET.-A.V.C.
6F6G OUTPUT
6SK7 AUTOM. TONE CONTR.
6F6G OUTPUT
6U5/6G5 TUNING IND.
6SA7 OSC.
5U4G RECT.
1ST. I.F. TRANS.
2ND. I.F. TRANS.
HIGH TONE CONTR.
VOL. CONTR.
PHONO JACK
S1-FRONT
S1 REAR
S2 FRONT
S2 REAR
S3 FRONT
S3 REAR
S4 REAR
S5 FRONT
S5 REAR
S6 FRONT
S6 REAR
S7 REAR
S7-FRONT
S7- RADIO-PHONO AND TONE CONTROL SWITCH; VIEWED FROM FRONT AND SHOWN IN POS. #1 (MAX. CCW.)
POS. 1- RADIO FULL
2- RADIO SPEECH
3- PHONO. FULL
4- PHONO. HIGH
*-15 V. MAX. AVC (APPROX.)
RANGE LIGHTS
PLUG SOCKET (TERM.-REAR VIEWS)
TO HEATERS (HI SIDE)
TO CORRESP. TERMS. ON S6 FRONT
POWER OUTPUT MAX. 12 W. UNDISTORTED 10 W.
E.M. SPK'S.
SPK'R. LINKS
FL'D. A 1060Ω
FL'D. B 3300Ω
TO HEATERS (#9 DIRECT) AND DIAL LIGHTS (MAZDA #47)
PHONO. MOTOR SOCKET
S9 (ON HI T.C.)
TO POWER SUPPLY
-8.5V. 600 KC.
-33V. 1500 KC.
-5.5V. 3 MC.
-14 V. 9.5 MC.
-16V. 31 M
-9 V. 25 M
-9 V. 19 M
-5.5V. 16 M
-6 V. 13 M
T1
T2
T-96047-5

| CATHODE CURRENTS | | |
|---|---|---|
| (1) | 6SG7 | 10.4 MA. |
| (2) | 6SA7 | 10.7 MA. |
| (3) | 6SA7 | 7.4 MA. |
| (4) | 6SK7 | 18.5 MA. |
| (5) | 6SQ7 | .4 MA. |
| (6) | 6R7 | 1.5 MA. |
| (7) | 6SK7 | 1.6 MA. |
| (8) | 6F6G | 23.7 MA. |
| (9) | 6F6G | 21.9 MA. |
| (10) | 6U5/6G5 | .8 MA. |
| (11) | TOTAL RECT. | 115 MA. |

M = 1000

BOTTOM VIEW OF TUBE SOCKETS.

COIL RESISTANCE VALUES LESS THAN ONE OHM ARE NOT SHOWN.

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED SUPPLY.

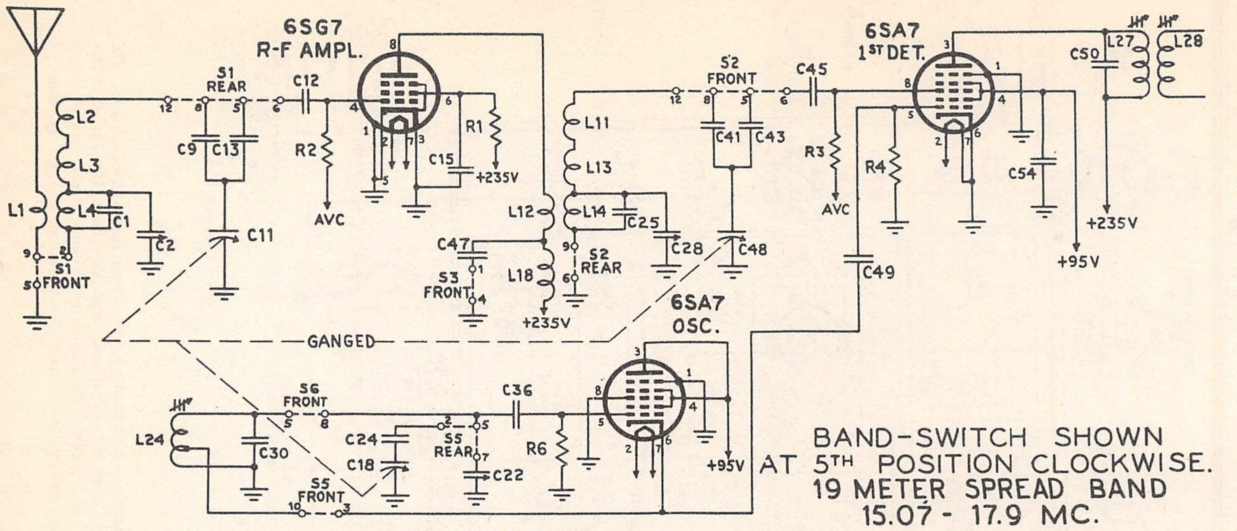
* MEASURED WITH CHANALYST OR VOLT-OHMYST.

VOLTAGES MEASURED WITH DIAL AT LOW FREQ. END OF "A" BAND WITHOUT SIGNAL APPLIED

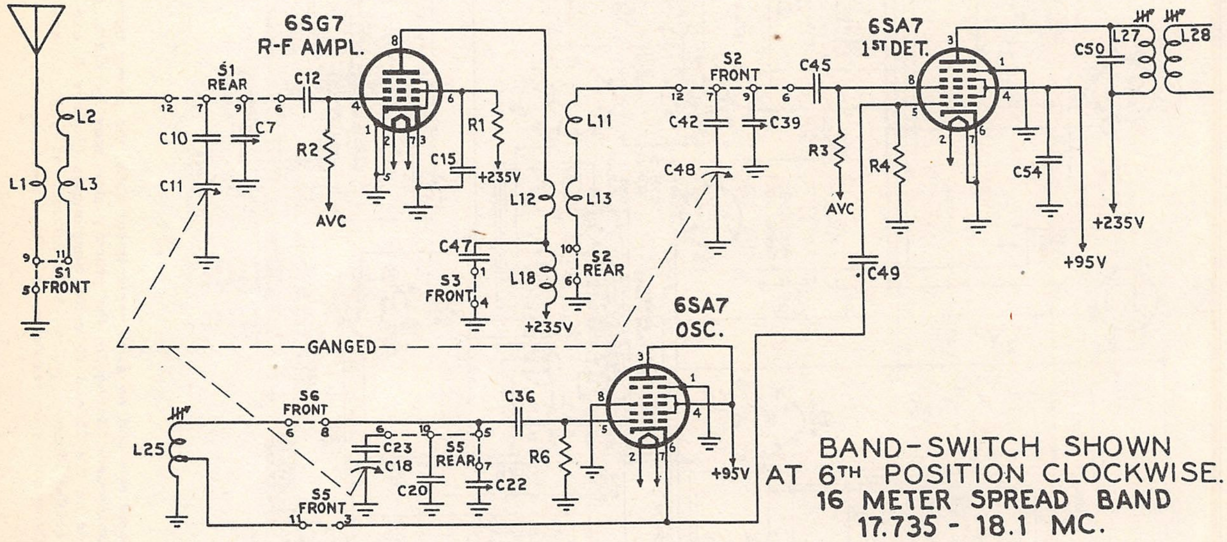
**NOTE:** On some sets C52, C55, C70 or C82 may be .025 mfd.

**NOTE:** In some sets and on some replacement units, the power transformer lead color code may vary from that shown above. On universal transformers (Rating D), the primary start may be black, the 110 v. tap black/yellow, and the link, black/red. The primary leads on the 25 and 60 cycle transformers (Ratings A and B) may be black. Secondaries of the three transformers would be—rectifier filament, yellow—high voltage, red—high voltage center tap, red/yellow—amplifier filament, green. In case of doubt, identify windings by resistance or voltage measurements.

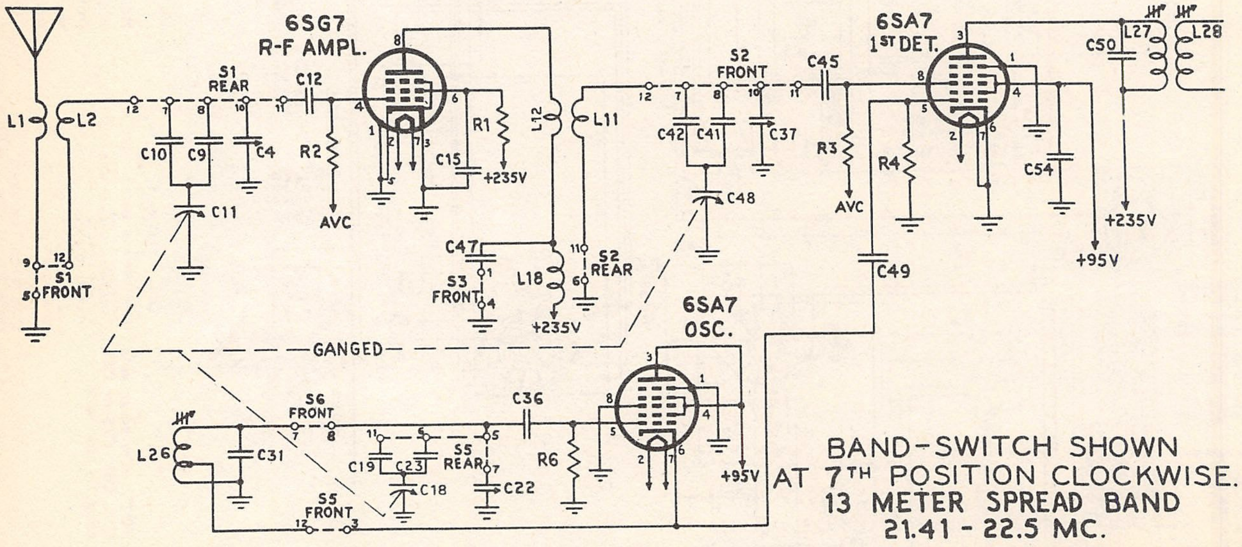
## RCA MFG. CO.


6SG7
R-F AMPL.
S1
REAR
C12
L2
L3
L1
L4
C1
C2
C9
C13
C11
S1
FRONT
R2
AVC
R1
C15
+235V
L11
L13
L12
L14
C25
C47
S3
FRONT
L18
+235V
S2
REAR
C28
S2
FRONT
C41
C43
C48
C45
6SA7
1ST DET.
R3
AVC
R4
C49
C54
+235V
+95V
C50
L27
L28
GANGED
6SA7
OSC.
S6
FRONT
C36
L24
C30
C24
C18
S5
REAR
C22
R6
S5
FRONT
+95V

BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE.
19 METER SPREAD BAND
15.07 - 17.9 MC.

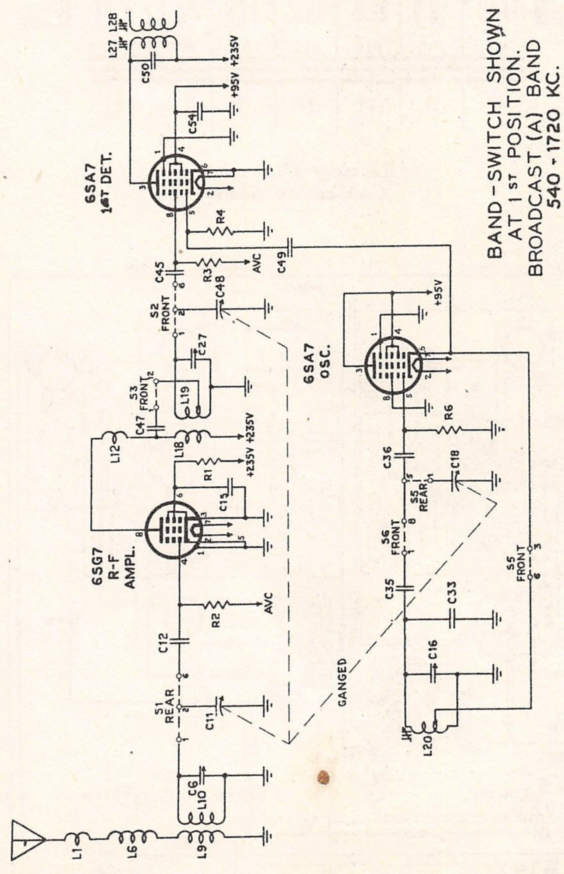

6SG7
R-F AMPL.
S1
REAR
C12
L2
L1
L3
C10
C7
C11
S1
FRONT
R2
AVC
R1
C15
+235V
L11
L12
L13
C47
S3
FRONT
L18
+235V
S2
REAR
S2
FRONT
C42
C39
C48
C45
6SA7
1ST DET.
R3
AVC
R4
C54
+235V
+95V
C49
C50
L27
L28
GANGED
6SA7
OSC.
S6
FRONT
C36
L25
C23
C18
C20
S5
REAR
C22
R6
S5
FRONT
+95V

BAND-SWITCH SHOWN
AT 6TH POSITION CLOCKWISE.
16 METER SPREAD BAND
17.735 - 18.1 MC.


6SG7
R-F AMPL.
L1
L2
S1
REAR
C12
C10
C9
C4
C11
S1
FRONT
R2
AVC
R1
C15
+235V
L12
L11
C47
S3
FRONT
L18
+235V
S2
REAR
S2
FRONT
C42
C41
C37
C48
C45
6SA7
1ST DET.
R3
AVC
R4
C54
+235V
+95V
C49
C50
L27
L28
GANGED
6SA7
OSC.
S6
FRONT
C36
L26
C31
C19
C23
C18
S5
REAR
C22
R6
S5
FRONT
+95V

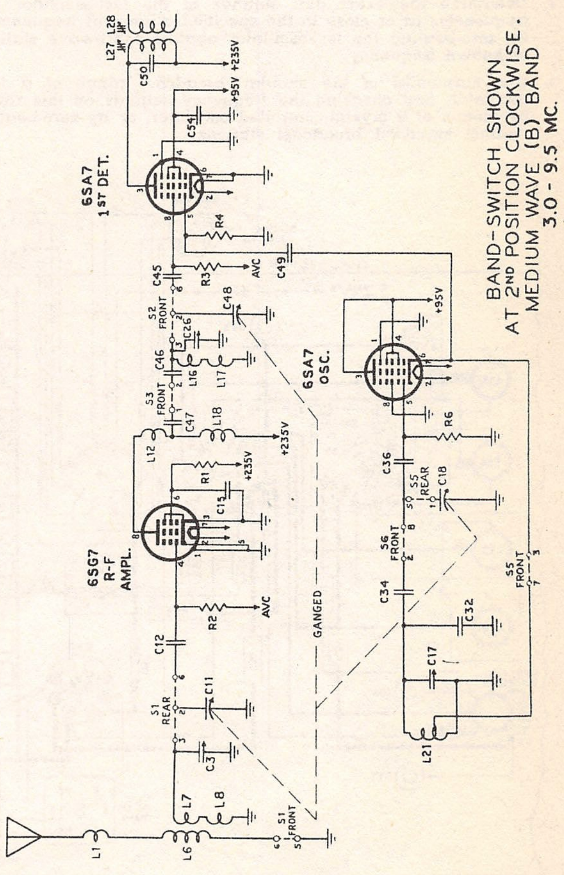
BAND-SWITCH SHOWN
AT 7TH POSITION CLOCKWISE.
13 METER SPREAD BAND
21.41 - 22.5 MC.

## RCA MFG. CO.



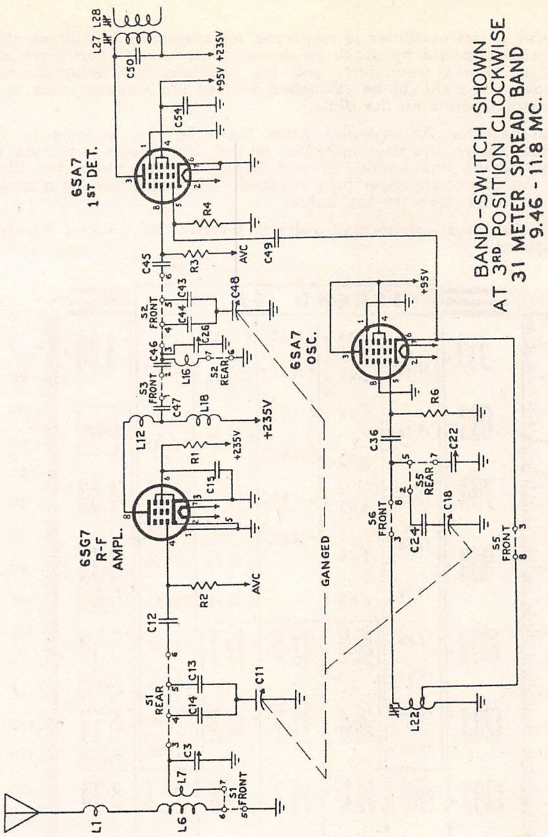
BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST (A) BAND 540 - 1720 KC.

6SG7
R-F
AMPL.
6SA7
1ST DET.
6SA7
OSC.
GANGED
L1
L6
L9
L10
C6
S1 REAR
C11
C12
R2
AVC
C15
R1
+235V
L12
C47
L18
S3 FRONT
L19
C27
S2 FRONT
C45
R3
C48
R4
C49
C54
C50
+95V +235V
L27 L28
C36
R6
+95V
C35
C33
C16
L20
S5 REAR
C18
S6 FRONT
S5 FRONT



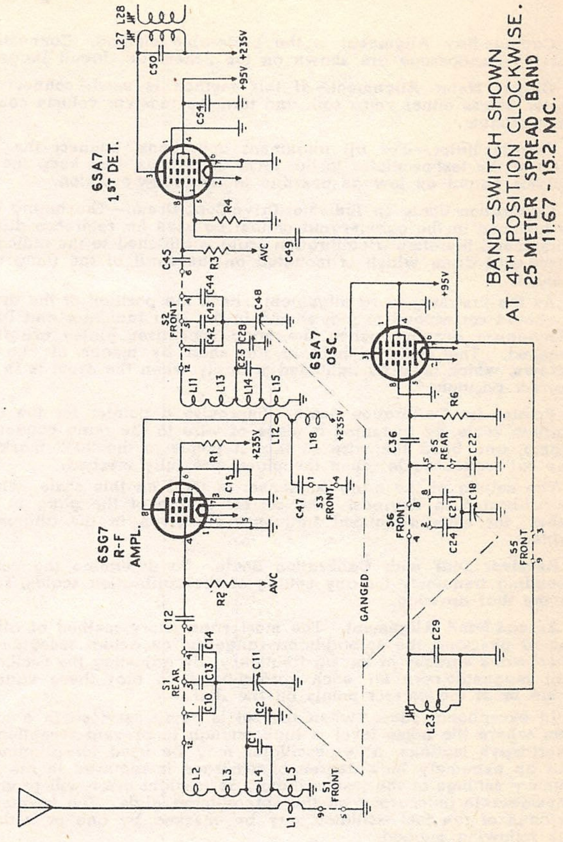
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. MEDIUM WAVE (B) BAND 3.0 - 9.5 MC.

6SG7
R-F
AMPL.
6SA7
1ST DET.
6SA7
OSC.
GANGED
L1
L6
L7
L8
S1 FRONT
C3
S1 REAR
C11
C12
R2
AVC
C15
R1
+235V
L12
C47
L18
S3 FRONT
C46
L16
L17
C26
S2 FRONT
C45
R3
C48
R4
C49
C54
C50
+95V +235V
L27 L28
C36
R6
+95V
C34
C32
C17
L21
S5 REAR
C18
S6 FRONT
S5 FRONT



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE 31 METER SPREAD BAND 9.46 - 11.8 MC.

6SG7
R-F
AMPL.
6SA7
1ST DET.
6SA7
OSC.
GANGED
L1
L6
L7
S1 FRONT
C3
C14
C13
S1 REAR
C11
C12
R2
AVC
C15
R1
+235V
L12
C47
L18
S3 FRONT
C46
L16
C26
S2 REAR
C44
C43
S2 FRONT
C48
C45
R3
R4
C49
C54
C50
+95V +235V
L27 L28
C36
R6
+95V
C22
S5 REAR
C18
C24
S6 FRONT
S5 FRONT
L22



BAND-SWITCH SHOWN AT 4TH POSITION CLOCKWISE. 25 METER SPREAD BAND 11.67 - 15.2 MC.

6SG7
R-F
AMPL.
6SA7
1ST DET.
6SA7
OSC.
GANGED
L1
L2
L3
L4
L5
S1 FRONT
C1
C2
C10
C13
C14
S1 REAR
C11
C12
C29
R2
AVC
C15
R1
+235V
L12
C47
S3 FRONT
L18
L11
L13
L14
L15
C25
C28
C42
C43
C44
S2 FRONT
C48
C45
R3
R4
C49
C54
C50
+95V +235V
L27 L28
C36
R6
+95V
C22
S5 REAR
C18
C21
C24
S6 FRONT
S5 FRONT
L23

MODEL Q36

## RCA MFG. CO.

## Alignment Procedure

**Cathode-Ray Alignment** is the preferable method. Connections for the oscilloscope are shown on the Schematic Circuit Diagram.

**Output Meter Alignment.**—If this method is used, connect the meter across either voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser.

As the first step in r-f alignment, check the position of the drum, it should correspond to that shown in the Dial Indicator and Drive Mechanism drawing when the gang condenser plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the "0°" mark on the calibration scale when the plates are fully meshed.

The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

**Receiver Dial with Calibration Scale.**—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial drawing.

**Spread-Band Alignment.**—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the oscillator coil magnetite-core for each spread-band so that these stations come in at the correct points on the dial.

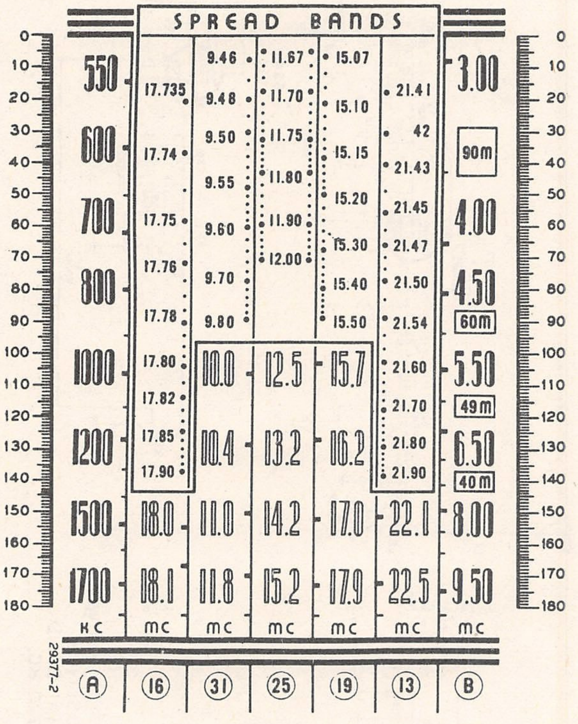
In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

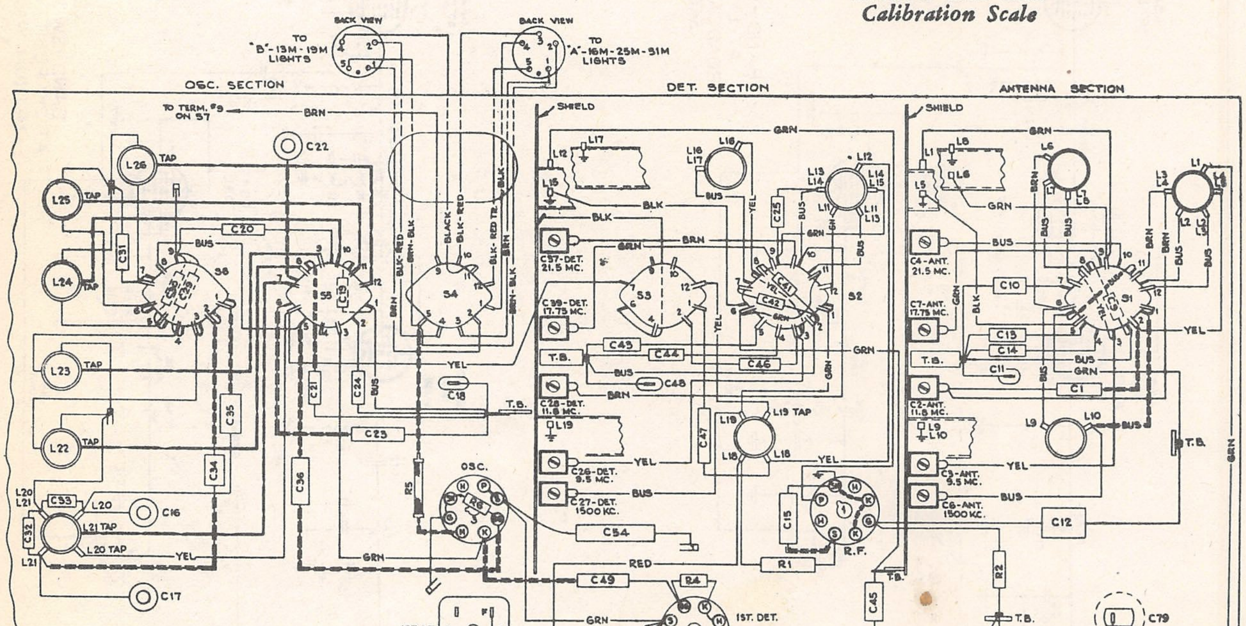
When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the oscillator coil magnetic-core for each band should be retouched so that the stations come in at the correct points on the dial.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with the indicator to the line under "Spread Bands" on the glass dial plate with the gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional information, refer to booklet "RCA Victor Receiver Alignment."


SPREAD BANDS
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180
550 600 700 800 1000 1200 1500 1700
17.735 17.74 17.75 17.76 17.78 17.80 17.82 17.85 17.90 18.0 18.1
9.46 9.48 9.50 9.55 9.60 9.70 9.80 10.0 10.4 11.0 11.8
11.67 11.70 11.75 11.80 11.90 12.00 12.5 13.2 14.2 15.2
15.07 15.10 15.15 15.20 15.30 15.40 15.50 15.7 16.2 17.0 17.9
21.41 42 21.43 21.45 21.47 21.50 21.54 21.60 21.70 21.80 21.90 22.1 22.5
3.00 90m 4.00 4.50 60m 5.50 49m 6.50 40m 8.00 9.50
KC mc mc mc mc mc mc
A 16 31 25 19 13 B
29377-2

*Receiver Dial with Calibration Scale*


OSC. SECTION
DET. SECTION
ANTENNA SECTION
BACK VIEW
TO "B"-13M-19M LIGHTS
TO "A"-16M-25M-31M LIGHTS
TO TERM. #9 ON S7
SHIELD
C57-DET. 21.5 MC.
C39-DET. 17.75 MC.
C28-DET. 11.8 MC.
C26-DET. 9.5 MC.
C27-DET. 1500 KC.
C4-ANT. 21.5 MC.
C7-ANT. 17.75 MC.
C2-ANT. 11.8 MC.
C3-ANT. 9.5 MC.
C6-ANT. 1500 KC.
OSC.
R.F.
1ST. DET.
1ST. I.F. TRANS.
TO S ON TUBE #4
TO R16 R19-C32
T.B.
T-93083

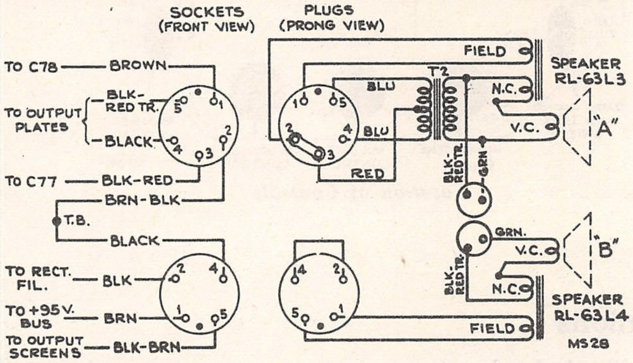
*R. F. Wiring, Bottom View*

RCA MFG. CO.

## Alignment Procedure

**Precautionary Lead Dress.—**

1. All leads in the R.F. assembly should be dressed away from coils, switch assemblies, capacitors, shield plates, and mounting plates.
2. All capacitors in the R.F. assembly should be dressed apart from each other and away from the Range Switch drive shaft.
3. All indicating light cable leads to S4 should be dressed toward the shield plate and away from all other leads and components.
4. Leads and components connected to the oscillator and 1st Detector tube sockets must not impede the flexible mounting.
5. The green lead from pin 4 of the oscillator tube socket to pin 4 of the 1st Detector should be dressed close to C54.
6. All excess power transformer leads should be dressed back between transformer and rear chassis apron and close to chassis base.
7. The capacitors that connect the volume control and tone control should be dressed away from other parts.


SOCKETS (FRONT VIEW)
PLUGS (PRONG VIEW)
TO C78
BROWN
TO OUTPUT PLATES
BLK-RED TR.
BLACK
TO C77
BLK-RED
BRN-BLK
T.B.
BLACK
TO RECT. FIL.
BLK
TO +95V. BUS
BRN
TO OUTPUT SCREENS
BLK-BRN
FIELD
T2
BLU
BLU
RED
N.C.
V.C.
BLK-RED TR.
GRN.
SPEAKER RL-63L3
"A"
"B"
SPEAKER RL-63L4
FIELD
MS28

*Loudspeaker Connections*

**Loudspeaker.**—It is essential that the two speaker cones move in and out together, i.e. in phase. For an outline of test methods refer to RCA Victor Supplementary Information—No. 5 "Speaker Phasing."

**ALIGNMENT TABLE**

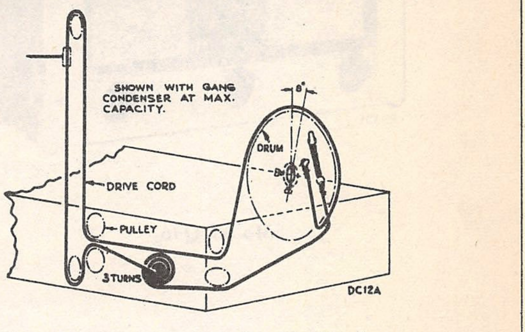
| Steps | Connect the high side of test osc. to— | Tune test osc. to— | Turn Range Switch to— | Turn Radio Dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|---|
| 1 | 6SK7 I-F grid in series with .01 mfd. | 455 kc | "A" Band | Quiet point near 600 kc (35°) | L30-L29 2nd I-F trans. |
| 2 | 6SA7 Det. grid in series with .01 mfd. |  |  |  | L28-L27 1st I-F trans. |
| 3 | Antenna terminal in series with 200 mmfd. | 1500 kc | "A" Band | 1500 kc (154°) | C16 (osc.)<br>C27 (det.)<br>C6 (ant.) |
| 4 |  | 600 kc | "A" Band | 600 kc (35°) | L20*<br>Rock in |
| 5 | Repeat steps 3 and 4 until aligned |  |  |  |  |
| 6 | Antenna terminal in series with 300 ohms | 9.5 mc | "31M" Band | 9.5 mc (30°) | L22 (osc.)*<br>C26 (det.)<br>C3 (ant.) |
| 7 |  | 11.8 mc | "31M" Band | 11.8 mc (170°) | C22 (osc.)<br>** |
| 8 | Repeat steps 6 and 7 |  |  |  |  |
| 9 | Antenna terminal in series with 300 ohms | 9.5 mc | "B" Band | 9.5 mc (175.5°) | C17 (osc.)<br>** |
| 10 |  | 11.8 mc | "25M" Band | 11.8 mc (43°) | L23 (osc.)*<br>C28 (det.)<br>C2 (ant.) |
| 11 |  | 15.2 mc | "19M" Band | 15.2 mc (50°) | L24 (osc.)* |
| 12 |  | 17.75 mc | "16M" Band | 17.75 mc (58°) | L25 (osc.)***<br>C39 (det.)<br>C7 (ant.) |
| 13 |  | 21.5 mc | "13M" Band | 21.5 mc (77°) | L26 (osc.)***<br>C37 (det.)<br>C4 (ant.) |

* If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

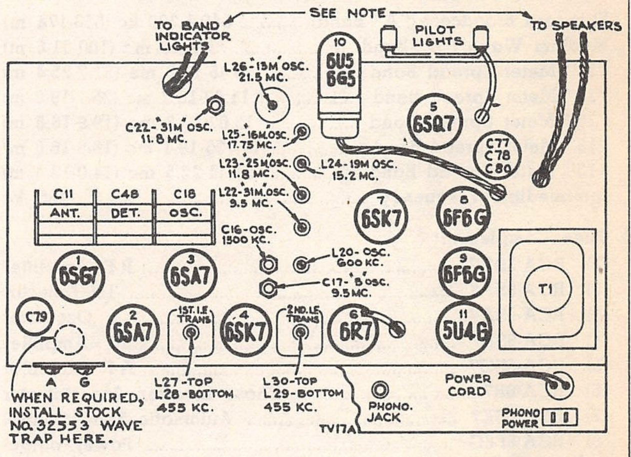
** Use minimum capacity peak if two can be obtained.

*** If two peaks can be obtained use the one obtained when the core screw is farthest in (clockwise).

**NOTE: Oscillator tracks above signal on all except the 16M and 13M bands.**


SHOWN WITH GANG CONDENSER AT MAX. CAPACITY.
8°
DRUM
DRIVE CORD
PULLEY
3 TURNS
DC12A

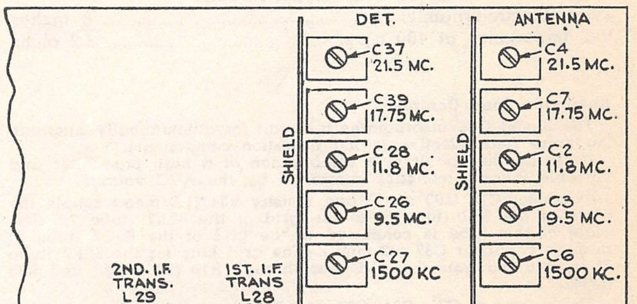
*Dial-Indicator and Drive Mechanism*


SEE NOTE
TO BAND INDICATOR LIGHTS
PILOT LIGHTS
TO SPEAKERS
L26-13M OSC. 21.5 MC.
10 6U5 6G5
C22-31M OSC. 11.8 MC.
L25-16M OSC. 17.75 MC.
5 6SQ7
L23-25M OSC. 11.8 MC.
L24-19M OSC. 15.2 MC.
C77 C78 C80
C11 ANT.
C48 DET.
C18 OSC.
L22-31M OSC. 9.5 MC.
7 6SK7
8 6F6G
C16-OSC. 1500 KC.
L20-OSC. 600 KC.
C17-B OSC. 9.5 MC.
2 6SG7
3 6SA7
9 6F6G
T1
C79
6SA7
1ST I.F. TRANS
4 6SK7
2ND I.F. TRANS
6 6R7
11 5U4G
A G
WHEN REQUIRED, INSTALL STOCK NO. 32553 WAVE TRAP HERE.
L27-TOP L28-BOTTOM 455 KC.
L30-TOP L29-BOTTOM 455 KC.
PHONO. JACK
POWER CORD
PHONO POWER
TV17A

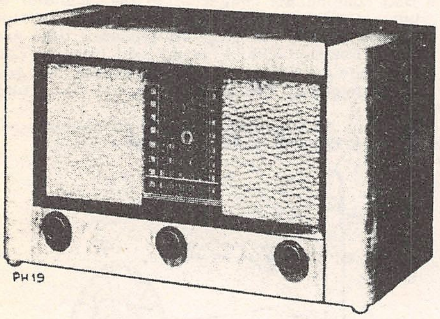
*Tube and Trimmer Locations (Top View)*

**Caution.**—The sockets used on the band indicator light cables are identical to those used on the speaker cables. In connecting, care should be taken to assure that the cables are plugged to the proper units.

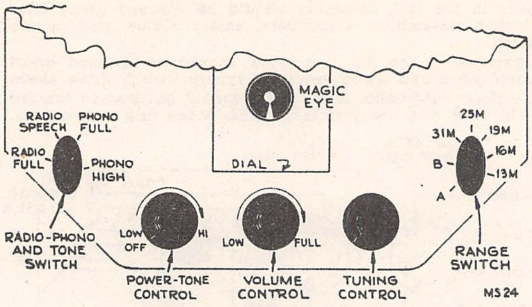
**Use of Wave Trap.**—Should interference from a powerful nearby station require the use of a wave trap, install a Stock No. 32553 trap behind antenna and ground terminal board as indicated above. Connect coil lug to antenna connection, ground connection is made to chassis through coil mounting foot. Adjust capacitor to resonance with interfering station.


DET.
ANTENNA
SHIELD
SHIELD
C37 21.5 MC.
C39 17.75 MC.
C28 11.8 MC.
C26 9.5 MC.
C27 1500 KC
C4 21.5 MC.
C7 17.75 MC.
C2 11.8 MC.
C3 9.5 MC.
C6 1500 KC.
2ND. I.F TRANS. L29 455 KC.
1ST. I.F TRANS L28 455 KC.
BV4

*Trimmer Locations (Bottom View)*



*Model Q36*



*Location of Controls*

## Specifications

**Frequency Ranges**

| | |
|---|---|
| Standard Broadcast ("A" Band) | 540-1,720 kc (556-174 m) |
| Medium Wave ("B" Band) | 3.0-9.5 mc (100-31.6 m) |
| "31" Meter Spread Band | 9.46-11.8 mc (31.7-25.4 m) |
| "25" Meter Spread Band | 11.67-15.2 mc (25.7-19.8 m) |
| "19" Meter Spread Band | 15.07-17.9 mc (19.9-16.8 m) |
| "16" Meter Spread Band | 17.735-18.1 mc (16.9-16.6 m) |
| "13" Meter Spread Band | 21.41-22.5 mc (14.0-13.4 m) |
| **Intermediate Frequency** | 455 kc |

**Tube Complement**

| | | |
|---|---|---|
| (1) | RCA-6SG7 | R-F Amplifier |
| (2) | RCA-6SA7 | 1st Detector |
| (3) | RCA-6SA7 | Oscillator |
| (4) | RCA-6SK7 | I-F Amplifier |
| (5) | RCA-6SQ7 | A-F Amplifier |
| (6) | RCA-6R7 | Phase Inverter, 2nd Detector |
| (7) | RCA-6SK7 | Automatic Tone Control |
| (8) | RCA-6F6G | Power output |
| (9) | RCA-6F6G | Power output |
| (10) | RCA-6U5/6G5 | Tuning indicator |
| (11) | RCA-5U4G | Rectifier |

**Pilot Lamps** ........ 9-type 47; 6.3 volts, 0.15 amps.

**Power Output Rating**

| | |
|---|---|
| Undistorted | 10 watts |
| Maximum | 12 watts |

**Loudspeakers**

One Model RL-63L3 and one model RL-63L4

| | |
|---|---|
| Type (Electrodynamic) | 8 inches |
| V-C Impedance at 400 c.p.s. | 2.2 ohms |

**Victrola Attachment**

A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug.

A 110-volt outlet for Victrola attachment is available on back of the chassis.

**Cabinet Dimensions**

| | |
|---|---|
| Height | 14¾ inches |
| Width | 24¾ inches |
| Depth | 12⅞ inches |
| Net Weight | approx. 49 pounds |
| Shipping Weight | approx. 56 pounds |
| Chassis Base Dimensions (inches) | Height, 3½; Length, 22; Depth 13 |
| Over-all Chassis Height | 12¾ inches |
| Tuning Drive Ratio | 25 to 1 |

**Power Supply Ratings**

| Symbol | Voltages | Frequency (cycles) | Watts |
|---|---|---|---|
| Rating A | 105 to 125, nominal 117 | 25 to 60 | 135 |
| Rating B | 105 to 125, nominal 117 | 50 to 60 | 135 |
| Rating D | (See below) | 40 to 60 | 135 |

| | | |
|---|---|---|
| 110 position | 100 min. | 115 max. |
| 125 position | 115 min. | 135 max. |
| 150 position | 135 min. | 165 max. |
| 210 position | 190 min. | 230 max. |
| 240 position | 220 min. | 260 max. |

**Note:** Shipped in 240-volt position. To change, remove round cover on top of transformer case and move link to required position.

**CAUTION: Remove power cord from line receptacle before changing link position.**

**Automatic Tone Control.—**

The Model Q36 incorporates a circuit for automatically attenuating noise and selective fading distortion components.

Basically the circuit is a combination of a high pass filter and variable inverse feedback controlled by the AVC voltage.

Capacitor C71 (100 mmf.) and resistor R34 (1.2 meg.) couple the plate of the 6R7 (tube 6) to the grid of the 6SK7 (tube 7). The plate of this tube is connected to the grid of the 6SQ7 (tube 5) through capacitor C67 (82 mmf.). The grid bias for the 6SK7 (tube 7) is obtained from the AVC bus through R16 (2.2 meg.) and R33 (68M).

The values of C71, R34, C67 and R33 are such that this inverse feedback loop passes only the high audio frequencies therefore they are the frequencies that are attenuated in the output of the audio system. The amount of attenuation of the "highs" is controlled by the negative voltage on the AVC bus.

When the incoming signal is weak the AVC voltage is close to zero, the gain of the ATC 6SK7 is large and the attenuation of the highs is a maximum; when the incoming signal is strong the AVC voltage becomes more negative thus decreasing the gain and thereby increasing the high frequency response of the audio system. The cathode of the 6SK7 (tube 7) is grounded only when S7 is switched to either "Radio" position; the ATC circuit is inoperative when S7 is in either of the "Phono" positions.

With an R.F. input of 100 microvolts the audio frequency response at 2000 cycles is down approximately 20 db. as compared to the response obtained with an RF input of 10,000 microvolts.

If desired, the amount of high frequency attenuation at a particular value of input signal below approximately 10,000 microvolts may be varied by changing the value of R33. Increasing R33 will increase the attenuation of the "highs"; decreasing R33 will decrease the attenuation.

A quick check of the operation of the circuit may be made by tuning in a weak station and then pulling the 6SK7 (tube 7) out of its socket, a very noticeable increase in the high frequency audio response will indicate that the circuit is functioning properly.

As can be well appreciated by the foregoing explanation of ATC operation, it is desirable to use an antenna with good signal pickup when full fidelity is required. Short length antennas should be avoided whenever possible.

## MODEL QB13 Replacement Parts

### CHASSIS ASSEMBLIES

### QB13 (RC-612)

| STOCK No. | DESCRIPTION |
|---|---|
| 35622 | Bracket—Mounting bracket for tuning knob shaft and flywheel |
| 37976 | Bracket—Tone control mounting bracket |
| 35642 | Calibrator—Drive drum calibrator scale |
| 34654 | Capacitor—Mica trimmer, triple, 2.5-10 mmf. (C1, C2, C3) |
| 12714 | Capacitor—Air trimmer, 2-12 mmf. (C4, C7, C14) |
| 35646 | Capacitor—Ceramic, 6 mmf. (C36) |
| 45465 | Capacitor—Ceramic, 15 mmf. (C33) |
| 36012 | Capacitor—Ceramic, 15 mmf. (C37) |
| 35644 | Capacitor—Ceramic, 47 mmf. (C8, C12) |
| 39622 | Capacitor—Mica, 56 mmf. (C17) |
| 70586 | Capacitor—Mica, 68 mmf. (C9) |
| 35645 | Capacitor—Ceramic, 68 mmf. (C13) |
| 39628 | Capacitor—Mica, 100 mmf. (C29) |
| 39634 | Capacitor—Mica, 180 mmf. (C34) |
| 39636 | Capacitor—Mica, 220 mmf. (C16) |
| 70667 | Capacitor—Mica, 560 mmf. (C5) |
| 70687 | Capacitor—Mica, 3000 mmf. (C6) |
| 70602 | Capacitor—Tubular, .0025 mfd., 400 volts (C23, C24) |
| 70606 | Capacitor—Tubular, .005 mfd., 400 volts (C25, C26) |
| 70610 | Capacitor—Tubular, .01 mfd., 400 volts (C39) |
| 70615 | Capacitor—Tubular, .05 mfd., 400 volts (C19, C35, C48) |
| 71010 | Capacitor—Tubular, .07 mfd., 400 volts (C22) |
| 70618 | Capacitor—Tubular, 0.25 mfd., 400 volts (C28) |
| 70617 | Capacitor—Tubular, 0.1 mfd., 400 volts (C46) |
| 70619 | Capacitor—Tubular, 0.5 mfd., 400 volts (C38) |
| 72121 | Capacitor—Electrolytic, 5 mfd., 50 volts (C47) |
| 37250 | Capacitor—Electrolytic, 20 mfd., 250 volts (C32) |
| 37867 | Capacitor—Electrolytic, 30 mfd., 250 volts (C30) |
| 35631 | Coil—Antenna coil, 25 meter and 19-13 meter bands (L1, L2, L3) |
| 35632 | Coil—Antenna coil, "A" band, "B" band and 31 meter band (L4, L5, L6, L7, L18) |
| 35623 | Coil—Oscillator coil, "A" and "B" band (L8, L9) |
| 35626 | Coil—Oscillator coil, 31 meter band (L10) |
| 35625 | Coil—Oscillator coil, 25 meter band (L11) |
| 35624 | Coil—Oscillator coil, 19-13 meter band (L12) |
| 35619 | Condenser—Variable tuning condenser (C10, C11) |
| 37833 | Control—Volume control and power switch (R6, S6) |
| 32634 | Cord—Drive cord (approx. 30' overall length)<br>NOTE: Before assembling, stretch to full length. |
| 34662 | Cord—Indicator cord (approx. 54' overall length)<br>NOTE: Before assembling, stretch to full length. |
| 35788 | Core—Adjustable core and stud for "A" and "B" band oscillator coil |
| 31259 | Core—Adjustable core and stud for 19-13 meter band, 25 meter band or 31 meter band oscillator coils |
| 12006 | Core—Adjustable core and stud for I-F transformers |
| 35627 | Drum—Drive drum less calibrator |
| 35638 | Flywheel—Tuning knob shaft flywheel |
| 70930 | Grommet—Rubber mounting grommet for tuning condenser (4 required) |
| 5119 | Plug—3 contact female plug for speaker cable |
| 14404 | Plug—7 prong plug for power input cable |
| 35641 | Pulley—Drive cord pulley |
| 35630 | Pulley—Idler pulley, between tuning knob shaft and range switch shaft |
| 8063 | Resistor—330 ohms, ½ watt (R19) |
| 30498 | Resistor—390 ohms, ½ watt (R17) |
| 30734 | Resistor—5600 ohms, ¼ watt (R7) |
| 30151 | Resistor—18,000 ohms, 1 watt (R4) |
| 30492 | Resistor—22,000 ohms, ¼ watt (R5) |
| 30685 | Resistor—33,000 ohms, ¼ watt (R2) |
| 30180 | Resistor—120,000 ohms, ½ watt (R9, R18) |
| 30648 | Resistor—470,000 ohms, ¼ watt (R11) |
| 30652 | Resistor—1 megohm, ¼ watt (R1) |
| 30162 | Resistor—1.2 megohm, ¼ watt (R10) |
| 30649 | Resistor—2.2 megohms, ¼ watt (R3) |
| 30992 | Resistor—10 megohms, ½ watt (R8) |
| 14350 | Screw—No. 8-32 square head set screw for drive drum |
| 35633 | Shaft—Range switch indicator shaft |
| 35637 | Shaft—Tuning knob shaft |
| 35787 | Socket—Phono input socket |
| 36500 | Socket—Tube socket, miniature |
| 31251 | Socket—Tube socket |
| *72679 | Socket—Tube socket, cushion mounted |
| 12007 | Spring—Retaining spring for I-F transformers core and stud assemblies |
| 31261 | Spring—Retaining spring for oscillator coils, core and studs assemblies |
| 31418 | Spring—Tension spring for drive cord or indicator cord |
| 35640 | Support—Drive pulley support complete with one pulley |
| 35639 | Support—Drive pulley support complete with three (3) pulleys |
| 35621 | Switch—Range switch (S1, S2, S3, S4) |
| 33397 | Switch—Tone control switch (S5) |
| 37898 | Transformer—Driver transformer (T1) |
| *72835 | Transformer—Output transformer (T2) |
| 35636 | Transformer—First I. F. transformer (T4, L13, L14, C15, C18) |
| 35628 | Transformer—Second I. F. transformer (T5, L15, L16, C20, C21) |
| 33726 | Washer—"C" washer for idler pulley |
| 2917 | Washer—"C" washer for tuning knob shaft |

### VIBRATOR POWER SUPPLY
RS-115

| STOCK No. | DESCRIPTION |
|---|---|
| 4289 | Body—Fuse connector body |
| 4288 | Cap—Fuse connector cap |
| 39644 | Capacitor—Mica, 470 mmf. (C42, C44) |
| 71008 | Capacitor—Tubular, .008 mfd., 1200 volts (C43) |
| *70641 | Capacitor—Tubular, .01 mfd., 1000 volts (C40) |
| 37877 | Capacitor—Electrolytic, 16 mfd., 350 volts (C41) |
| 37834 | Case—Power supply case less cover |
| 14289 | Clip—Battery clips (1 set) |
| 37925 | Coil—Choke coil (L21) |
| 37836 | Cover—Power supply case cover |
| 4286 | Ferrule—Fuse connector ferrule and bushing |
| 5140 | Fuse—5 ampere |
| 4290 | Insulator—Fuse connector insulator |
| 14409 | Plug—7 contact female plug for power supply cable |
| 34765 | Resistor—100 ohms, ¼ watt (R15) |
| 38896 | Resistor—1200 ohms, 1 watt (R14) |
| 71991 | Resistor—2200 ohms, 1 watt (R16) |
| 12241 | Socket—Vibrator socket |
| 4284 | Spring—Fuse connector spring |
| 35544 | Transformer—Vibrator transformer (T3, C45, L22) |
| 35543 | Vibrator—Plug-in vibrator |
| 4285 | Washer—Fuse connector insulating washer |

### SPEAKER ASSEMBLIES
92519-1

| STOCK No. | DESCRIPTION |
|---|---|
| 70578 | Cone—Cone and voice coil assembly |
| 5118 | Plug—3 prong male plug for speaker cable |
| 70577 | Speaker—6½" P.M. speaker complete with cone and voice coil less plug |

NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.

### MISCELLANEOUS ASSEMBLIES

| STOCK No. | DESCRIPTION |
|---|---|
| 70833 | Board—Baffle board and grille for QB12 & QB13 |
| Y1382 | Cabinet—Plastic cabinet for QB12 & QB13 |
| 71089 | Decal—Trademark decal for QB12 & QB13 |
| 70579 | Decal—Trademark decal for QB11 |
| 35654 | Dial—Glass dial scale |
| 36658 | Extension—Tune control shaft extension for QB11 |
| 37838 | Frame—Dial frame assembly less indicator |
| X1611 | Grille—Cabinet grille cloth for Model QB11 |
| 37396 | Grommet—Rubber grommet for mounting speaker (4 required) for QB12 & QB13 |
| 70839 | Grommet—Rubber grommet for mounting chassis (4 required) for QB12 & QB13 |
| 70580 | Indicator—Station selector indicator |
| 35652 | Knob—Range indicator knob |
| 35651 | Knob—Range switch knob |
| 35650 | Knob—Tone control knob |
| 34489 | Knob—Tuning or volume control knob for QB11 |
| 70663 | Knob—Tuning or volume control knob for QB12 & QB13 |
| 14270 | Spring—Retaining spring for tone control, volume control, range switch or tuning knob |
| 4982 | Spring—Retaining spring for range indicator knob |

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

*This is the first time this stock number has appeared in service data.

## MODEL Q36

### CHASSIS ASSEMBLIES
RC-585

| Stock No. | Description |
|---|---|
| 39791 | Bearing—Tuning knob shaft bearing |
| 37053 | Board—"Antenna-Ground" board |
| 39799 | Bracket—Long bracket complete with three (3) drive cord pulleys |
| 39800 | Bracket—Upper bracket complete with one (1) drive cord pulley |
| 36397 | Calibrator—Drive drum calibrator |
| 12884 | Capacitor—Air trimmer, 2-12 mmf. (C16, C17, C22) |
| 70597 | Capacitor—Ceramic, 8.2 mmf. (C19, C29) |
| 33098 | Capacitor—Ceramic, 10 mmf. (C32) |
| 45466 | Capacitor—Ceramic, 10 mmf. (C9, C41, C46) |
| 39604 | Capacitor—Mica, 10 mmf (C69) |
| 70595 | Capacitor—Ceramic, 12 mmf. (C10, C42) |
| 45465 | Capacitor—Ceramic, 15 mmf. (C14, C23, C44) |
| 39041 | Capacitor—Ceramic, 18 mmf. (C21, C33) |
| 71020 | Capacitor—Ceramic, 18 mmf. (C30) |
| 39616 | Capacitor—Mica, 33 mmf. (C83) |
| 70596 | Capacitor—Ceramic, 33 mmf. (C13, C43) |
| 71022 | Capacitor—Ceramic, 43 mmf. (C24) |
| 39794 | Capacitor, Mica trimmer, consisting of 2 sections of 50-150 mmf. and 3 sections of 2-20 mmf. (C2, C3, C4, C6, C7 and C26, C27, C28, C37, C39) |
| 39622 | Capacitor—Mica, 56 mmf. (C65) |
| 70594 | Capacitor—Ceramic, 56 mmf. (C1, C25) |
| 70599 | Capacitor—Ceramic, 56 mmf. (C36, C49) |
| 70593 | Capacitor—Ceramic, 68 mmf. (C31) |
| 39626 | Capacitor—Mica, 82 mmf. (C67) |
| 71021 | Capacitor—Ceramic, 91 mmf. (C20) |
| 39628 | Capacitor—Mica, 100 mmf. (C50, C51, C71) |
| 39630 | Capacitor—Mica, 120 mmf. (C59, C60) |
| 39632 | Capacitor—Mica, 150 mmf. (C63) |
| 39636 | Capacitor—Mica, 220 mmf. (C12, C45, C47, C61) |
| 39648 | Capacitor—Mica, 680 mmf. (C35) |
| 39664 | Capacitor—Mica, 3300 mmf. (C34) |
| 71006 | Capacitor—Tubular, .0025 mfd., 1600 volts (C73, C74) |
| 70606 | Capacitor—Tubular, .005 mfd., 200 volts (C57, C58) |
| 70627 | Capacitor—Tubular, .005 mfd., 600 volts (C64) |
| 70629 | Capacitor—Tubular, .007 mfd., 600 volts (C62) |
| 70610 | Capacitor—Tubular, .01 mfd., 200 volts (C66) |
| 70631 | Capacitor—Tubular, .01 mfd., 600 volts (C72, C84) |
| 70612 | Capacitor—Tubular, .025 mfd., 200 volts (C56) |
| 70613 | Capacitor—Tubular, .03 mfd., 200 volts (C52, C55, C70, C82) |
| 70615 | Capacitor—Tubular, .05 mfd., 400 volts (C54, C68, C75) |
| 70636 | Capacitor—Tubular, .05 mfd., 600 volts (C15, C53) |
| 70617 | Capacitor—Tubular, 0.1 mfd., 200 volts (C76) |
| 70618 | Capacitor—Tubular, 0.25 mfd., 200 volts (C81) |
| 33879 | Capacitor—Electrolytic, 10 mfd., 300 volts (C79) |
| 34393 | Capacitor—Electrolytic, consisting of 1 section of 20 mfd., 450 volts; 1 section of 15 mfd., 450 volts; and 1 section of 20 mfd., 25 volts (C77, C78, C80) |
| 39797 | Coil—Antenna coil, "A" band (L9, L10) |
| 39796 | Coil—Antenna coil, "B" and 31 meter bands (L6, L7, L8) |
| 39792 | Coil—Antenna or R.F. coil, 25, 19, 16, and 13 meters (L1, L2, L3, L4, L5, L11, L12, L13, L14, L15) |
| 39804 | Coil—Oscillator coil, "A" and "B" bands (L20, L21) |
| 39808 | Coil—Oscillator coil, 13 and 16 meter bands (L25, L26) |
| 39805 | Coil—Oscillator coil, 19 meter bands (L24) |
| 39806 | Coil—Oscillator coil, 25 meter band (L23) |
| 39807 | Coil—Oscillator coil, 31 meter band (L22) |
| 39795 | Coil—R.F. coil, "A" band (L18, L19) |
| 39798 | Coil—R.F. coil, 'B" band and 31 meter band (L16, L17) |
| 39785 | Condenser—Variable tuning condenser (C11, C18, C48) |
| 39788 | Control—Tone control and power switch (R15, S9) |
| 39789 | Control—Volume control (R12) |
| 34662 | Cord—Indicator cord (approx. 63 in. overall length) |
| 35788 | Core—Adjustable core and stud for "A" and "B" band oscillator coil |
| 12006 | Core—Adjustable core and stud for I.F. transformers |
| 31259 | Core—Adjustable core and stud for 13 meter, 16 meter, 19 meter, 25 meter, and 31 meter bands oscillator coils |
| 36396 | Drum—Drive drum less calibrator |
| 18469 | Plate—Bakelite mounting plate for capacitor # 34393 |
| 5040 | Plug—4 contact female plug for speaker or band indicator cable |
| 12493 | Plug—5 contact female plug for speaker or band indicator cable |
| 35973 | Pulley—Drive cord pulley |
| 36637 | Receptacle—A.C. power receptacle |
| 36842 | Resistor—Flexible, wire wound 5 ohms, 1 watt (R5) |
| 39803 | Resistor—Voltage divider consisting of 1 section of 155 ohms, 3 watt; 1 section of 20 ohms, 0.2 watt; 1 section of 8.5 ohms, 0.1 watt; and 1 section of 5000 ohms, 2.5 watt (R29, R30, R31, R32) |
| 36714 | Resistor—15,000 ohms, ½ watt (R11, R24) |
| 30492 | Resistor—22,000 ohms, ¼ watt (R4, R13) |
| 30685 | Resistor—33,000 ohms, ½ watt (R6, R23, R37) |
| 30787 | Resistor, 47,000 ohms, ½ watt (R22) |
| 30495 | Resistor, 47,000 ohms, 1 watt (R1) |
| 14138 | Resistor—68,000 ohms, ¼ watt (R33) |
| 3252 | Resistor, 100,000 ohms, ½ watt (R35) |
| 30180 | Resistor—120,000 ohms, ¼ watt (R39) |
| 14020 | Resistor—150,000 ohms, ¼ watt (R28) |
| 30651 | Resistor—270,000 ohms, ¼ watt (R14) |
| 14983 | Resistor—330,000 ohms, ½ watt (R18) |
| 11988 | Resistor—390,000 ohms, ¼ watt (R36, R38) |
| 30648 | Resistor—470,000 ohms, ¼ watt (R20, R21, R25, R26) |
| 30653 | Resistor—560,000 ohms, ¼ watt (R10) |
| 30652 | Resistor—1 megohm, ¼ watt (R2, R3, R7) |
| 30162 | Resistor—1.2 megohm, ¼ watt (R34) |
| 30649 | Resistor—2.2 megohms, ¼ watt (R8, R9, R16, R19) |
| 70592 | Resistor—3.9 megohms, ¼ watt (R17) |
| 30992 | Resistor—10 megohms, ¼ watt (R27) |
| 14350 | Screw—#8-32 square head set screw for drive drum |
| 39790 | Shaft—Tuning knob shaft and flywheel |
| 31365 | Socket—Lamp socket |
| 35787 | Socket—Phono input socket |
| 31252 | Socket—Tube socket |
| 34864 | Socket—Tuning tube socket |
| 31418 | Spring—Indicator cord spring |
| 12007 | Spring—Retaining spring for I.F. transformers, core and stud assemblies |
| 31261 | Spring—Retaining spring for oscillator coils' core and stud assemblies and for 13 meter band oscillator coil, core and stud |
| 39787 | Switch—Radio-phono switch (S7) |
| 39793 | Switch—Range switch (S1, S2, S3, S4, S5, S6) |
| 35636 | Transformer—First I.F. transformer (L27, L28, C50, C51) |
| 36615 | Transformer—Second I.F. transformer (L29, L30, C59, C60, C61) |
| 39786 | Transformer—Power transformer—105-125 volts, 25 to 60 cycle (T1) (Rating A) |
| 36044 | Transformer—Power transformer—105-125 volts, 50 to 60 cycle (T1) (Rating B) |
| 34183 | Transformer—Power transformer—110-125-150-210-240 volts, 40 to 60 cycle (T1, S8) (Rating D) |
| 33726 | Washer—"C" washer for drive cord pulley |
| 2917 | Washer—"C" washer for tuning shaft |

### SPEAKER ASSEMBLIES
RL-63L3

| Stock No. | Description |
|---|---|
| 13867 | Cap—Dust cap |
| 12079 | Coil—Field coil—1060 ohms |
| 11469 | Coil—Neutralizing coil |
| 71825 | Cone—Cone complete with voice coil |
| 30868 | Plug—2 contact female plug |
| 31539 | Plug—5 prong male plug |
| 37997 | Transformer—Output transformer |

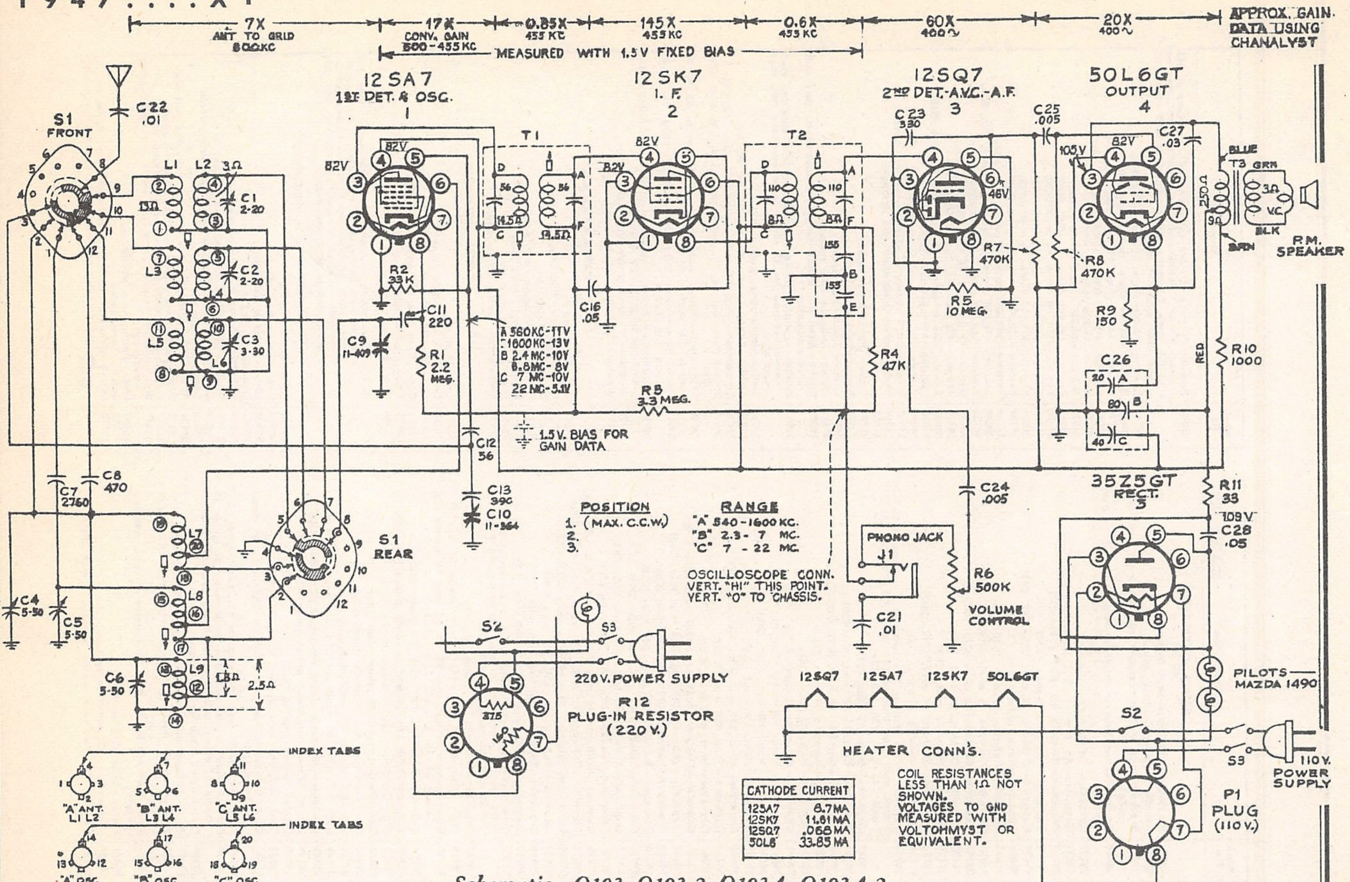
### SPEAKER ASSEMBLIES
RL-63L4

| Stock No. | Description |
|---|---|
| 13867 | Cap—Dust cap |
| 71826 | Coil—Field coil—3300 ohms |
| 11469 | Coil—Neutralizing coil |
| 71825 | Cone—Cone complete with voice coil |
| 30870 | Plug—2 prong male plug |
| 5039 | Plug—4 prong male plug |

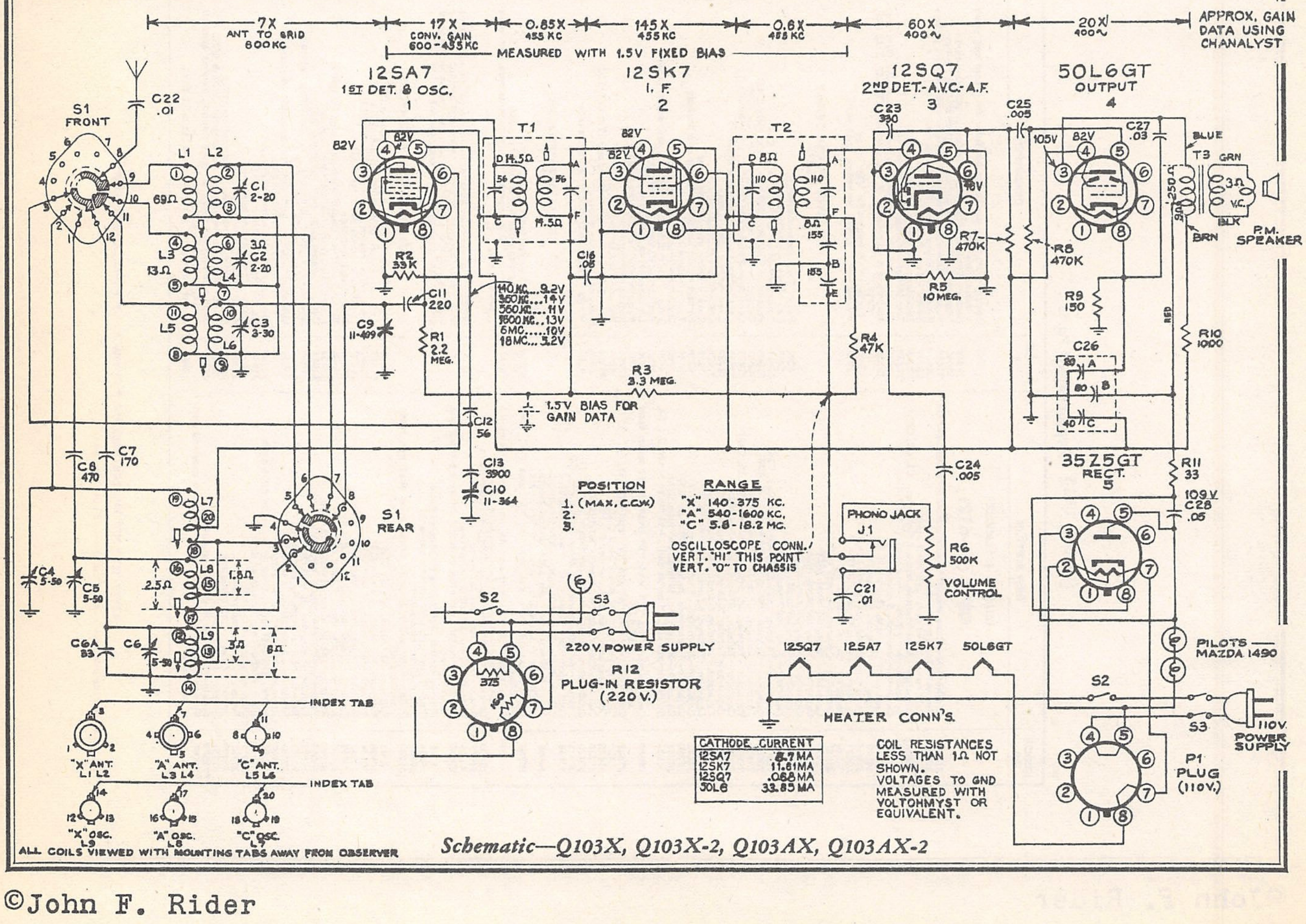
NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.

### MISCELLANEOUS ASSEMBLIES

| Stock No. | Description |
|---|---|
| 39819 | Back—Cabinet back |
| 30716 | Clip—Tuning tube clip |
| 70579 | Decal—Trade mark decal |
| 70665 | Dial—Glass dial scale |
| 70666 | Indicator—Station selector indicator |
| 70664 | Knob—Radio-phono, or range switch knob |
| 70663 | Knob—Tone control, volume control, or tuning knob |
| 31480 | Lamp—Dial lamp |
| 39816 | Plate—Dial back plate less indicator, tube clip and dial |
| 5039 | Plug—4-prong male plug for band indicator cable |
| 12567 | Plug—5-prong male plug for band indicator cable |
| 31482 | Screw—#8-32 square head set screw for radio-phono switch shaft |
| 36658 | Shaft—Radio-phono switch shaft |
| 31365 | Socket—Lamp socket |
| 14270 | Spring—Retaining spring for radio-phono or range switch knobs and for tone control, volume control, or tuning knobs |

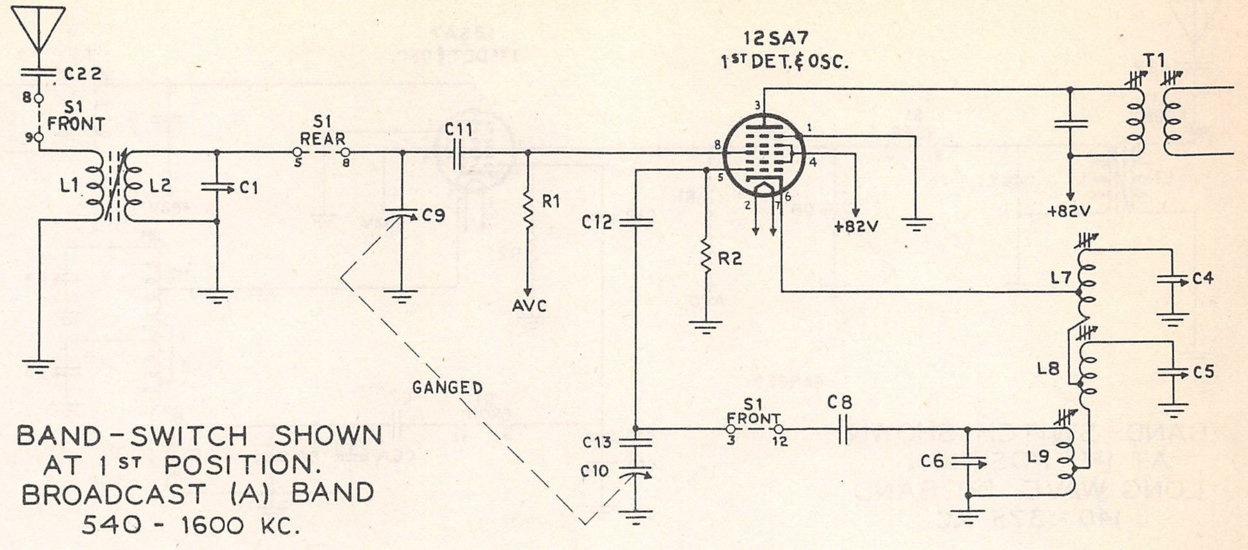

7X ANT TO GRID 600KC
17X CONV. GAIN 600-455KC
0.85X 455KC
145X 455KC
0.6X 455KC
60X 400~
20X 400~
APPROX. GAIN DATA USING CHANALYST
MEASURED WITH 1.5V FIXED BIAS
12SA7 1ST DET. & OSC. 1
12SK7 I.F. 2
12SQ7 2ND DET.-A.V.C.-A.F. 3
50L6GT OUTPUT 4
35Z5GT RECT. 5
S1 FRONT
S1 REAR
T1
T2
T3
P.M. SPEAKER
PHONO JACK J1
R6 500K VOLUME CONTROL
OSCILLOSCOPE CONN. VERT. "HI" THIS POINT. VERT. "O" TO CHASSIS.
1.5V. BIAS FOR GAIN DATA
POSITION 1. (MAX. C.C.W.) 2. 3.
RANGE "A" 540-1600KC. "B" 2.3-7 MC. "C" 7-22 MC.
220V. POWER SUPPLY
R12 PLUG-IN RESISTOR (220 V.)
HEATER CONN'S.
PILOTS MAZDA 1490
110V. POWER SUPPLY
P1 PLUG (110V.)
COIL RESISTANCES LESS THAN 1Ω NOT SHOWN. VOLTAGES TO GND MEASURED WITH VOLTOHMYST OR EQUIVALENT.
CATHODE CURRENT
12SA7 8.7MA
12SK7 11.61MA
12SQ7 .068MA
50L6 33.85MA
INDEX TABS
"A" ANT. L1 L2
"B" ANT. L3 L4
"C" ANT. L5 L6
"A" OSC. L9
"B" OSC. L8
"C" OSC. L7
ALL COILS VIEWED WITH MOUNTING TAB AWAY FROM OBSERVER

*Schematic—Q103, Q103-2, Q103A, Q103A-2*

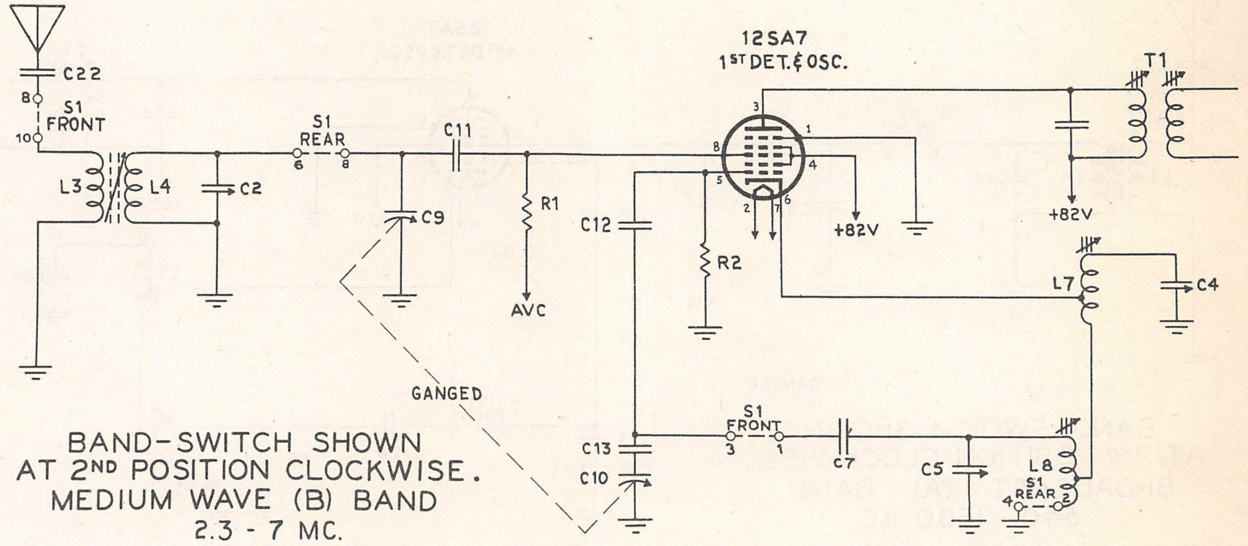

7X ANT TO GRID 600KC
17X CONV. GAIN 600-455KC
0.85X 455KC
145X 455KC
0.6X 455KC
60X 400~
20X 400~
APPROX. GAIN DATA USING CHANALYST
MEASURED WITH 1.5V FIXED BIAS
12SA7 1ST DET. & OSC. 1
12SK7 I.F. 2
12SQ7 2ND DET.-A.V.C.-A.F. 3
50L6GT OUTPUT 4
35Z5GT RECT. 5
S1 FRONT
S1 REAR
P.M. SPEAKER
PHONO JACK J1
R6 500K VOLUME CONTROL
OSCILLOSCOPE CONN. VERT. "HI" THIS POINT VERT. "O" TO CHASSIS
1.5V BIAS FOR GAIN DATA
POSITION 1. (MAX. C.C.W.) 2. 3.
RANGE "X" 140-375 KC. "A" 540-1600 KC. "C" 5.8-18.2 MC.
220V. POWER SUPPLY
R12 PLUG-IN RESISTOR (220 V.)
HEATER CONN'S.
PILOTS MAZDA 1490
110V. POWER SUPPLY
P1 PLUG (110V.)
COIL RESISTANCES LESS THAN 1Ω NOT SHOWN. VOLTAGES TO GND MEASURED WITH VOLTOHMYST OR EQUIVALENT.
CATHODE CURRENT
12SA7 8.7MA
12SK7 11.61MA
12SQ7 .068MA
50L6 33.85MA
INDEX TAB
"X" ANT. L1 L2
"A" ANT. L3 L4
"C" ANT. L5 L6
"X" OSC. L9
"A" OSC. L8
"C" OSC. L7
ALL COILS VIEWED WITH MOUNTING TABS AWAY FROM OBSERVER

*Schematic—Q103X, Q103X-2, Q103AX, Q103AX-2*

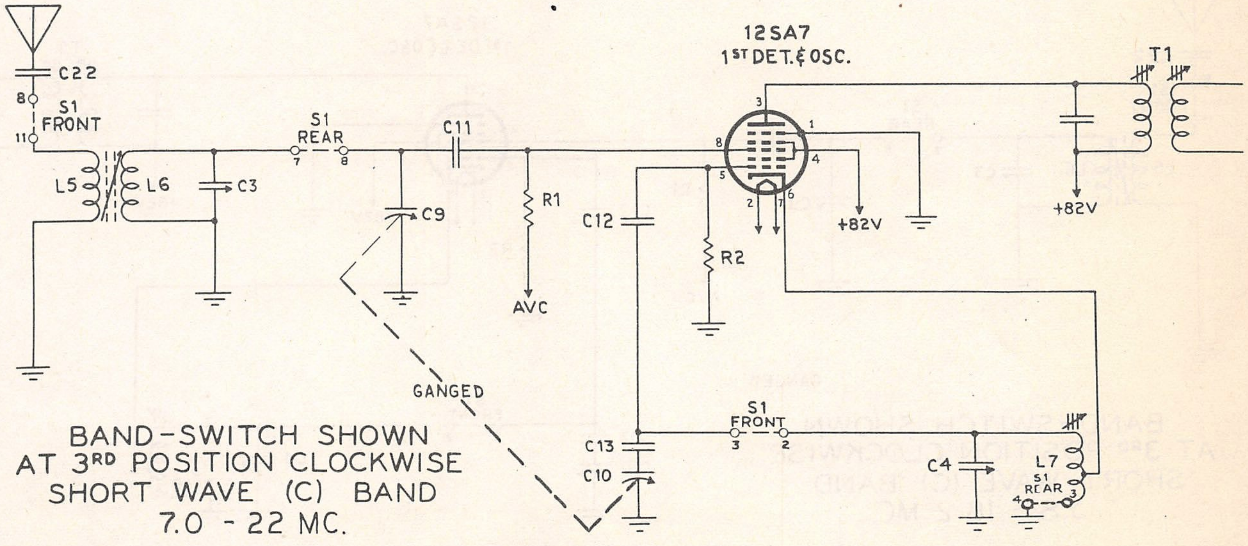
## RCA MFG. CO.


C22
8
S1
FRONT
9
L1
L2
C1
S1
REAR
5
8
C11
C9
R1
AVC
GANGED
12SA7
1ST DET.& OSC.
3
1
8
4
5
2
7
6
+82V
C12
R2
T1
+82V
L7
C4
L8
C5
C13
C10
S1
FRONT
3
12
C8
C6
L9

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST (A) BAND
540 - 1600 KC.


C22
8
S1
FRONT
10
L3
L4
C2
S1
REAR
6
8
C11
C9
R1
AVC
GANGED
12SA7
1ST DET.& OSC.
3
1
8
4
5
2
7
6
+82V
C12
R2
T1
+82V
L7
C4
C13
C10
S1
FRONT
3
1
C7
C5
L8
S1
REAR
4
2

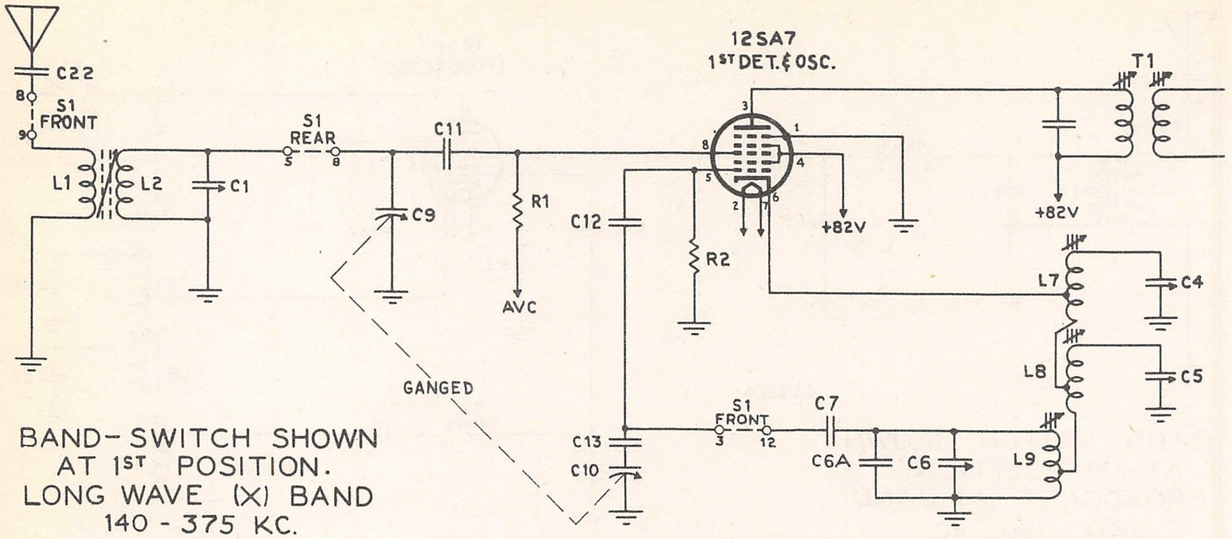
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
MEDIUM WAVE (B) BAND
2.3 - 7 MC.


C22
8
S1
FRONT
11
L5
L6
C3
S1
REAR
7
8
C11
C9
R1
AVC
GANGED
12SA7
1ST DET.& OSC.
3
1
8
4
5
2
7
6
+82V
C12
R2
T1
+82V
C13
C10
S1
FRONT
3
2
C4
L7
S1
REAR
4
3

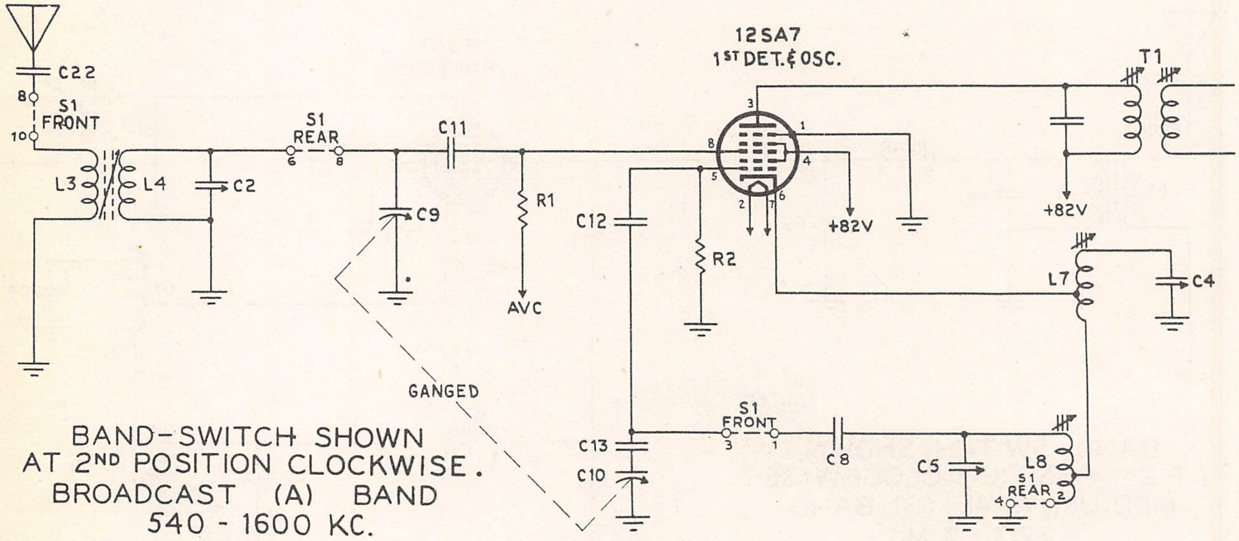
BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE
SHORT WAVE (C) BAND
7.0 - 22 MC.

MODELS Q103X,-2,AX,AX-2

RCA MFG. CO.


C22
8
S1
FRONT
9
L1
L2
C1
S1
REAR
5
8
C11
C9
R1
AVC
GANGED
12SA7
1ST DET. & OSC.
3
1
8
4
5
2
7
6
+82V
C12
R2
T1
+82V
L7
C4
L8
C5
S1
FRONT
3
12
C7
C13
C10
C6A
C6
L9

BAND-SWITCH SHOWN
AT 1ST POSITION.
LONG WAVE (X) BAND
140 - 375 KC.


C22
8
S1
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L3
L4
C2
S1
REAR
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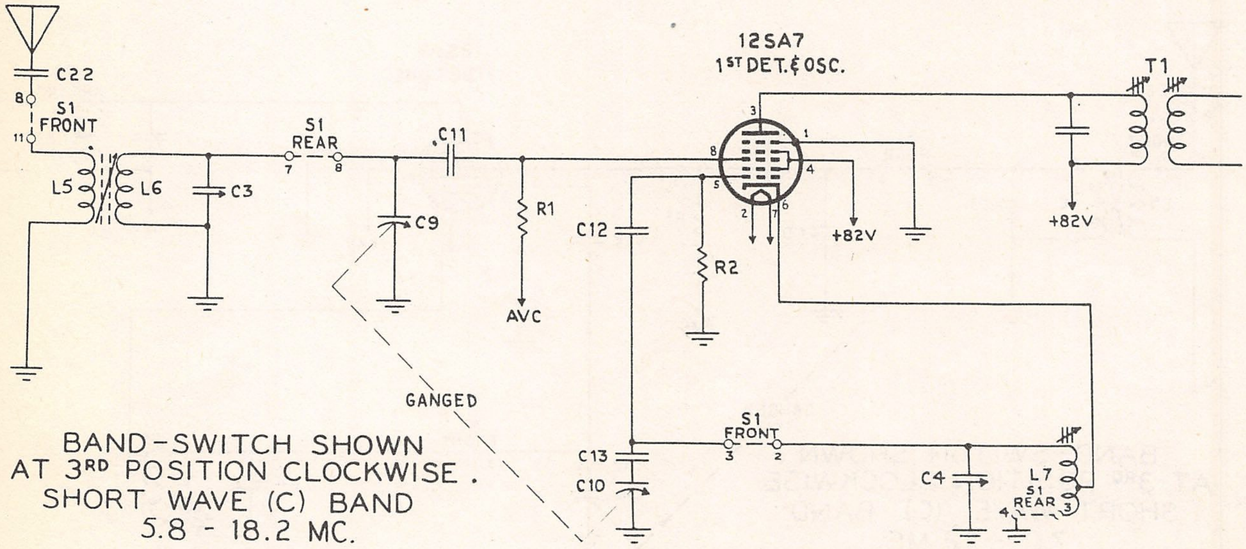
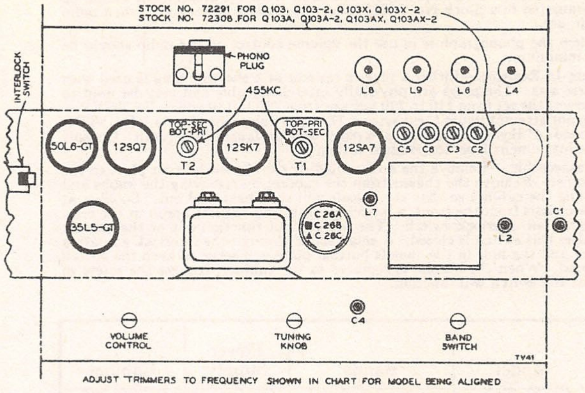
8
C11
C9
R1
AVC
GANGED
12SA7
1ST DET. & OSC.
3
1
8
4
5
2
7
6
+82V
C12
R2
T1
+82V
L7
C4
S1
FRONT
3
1
C8
C5
L8
S1
REAR
4
2
C13
C10

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST (A) BAND
540 - 1600 KC.


C22
8
S1
FRONT
11
L5
L6
C3
S1
REAR
7
8
C11
C9
R1
AVC
GANGED
12SA7
1ST DET. & OSC.
3
1
8
4
5
2
7
6
+82V
C12
R2
T1
+82V
S1
FRONT
3
2
C13
C10
C4
L7
S1
REAR
4
3

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE (C) BAND
5.8 - 18.2 MC.



*Tube and Trimmer Locations*

## Alignment Procedure

**Cathode-Ray Alignment** is the preferable method. Connections for the oscilloscope are shown on the Schematic Circuit Diagram.

**Output Meter Alignment.**—If this method is used, connect the meter across either voice coil, and turn the receiver volume control to maximum.

***Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

**Alignment.**—With the gang condenser in full mesh, the pointer should be set three inches from the left edge of the dial back plate. This point corresponds to the first mark on the dial scale to the left of "550" kc. on "A" band. To find any calibration point it is necessary to draw a line on the dial scale drawing through the desired freq., so that the line passes through the same reading on the top and bottom rule scales. For instance, 1300 kc. on "A" band will correspond to a dial indicator setting of 7¾" from the LEFT EDGE of the dial back plate. Move the indicator the desired distance by turning the tuning knob. ONCE THE INDICATOR HAS BEEN SET AT FULL MESH, MOVE THE INDICATOR ONLY BY TURNING THE TUNING KNOB.

### Alignment Table Q103X, Q103X-2, Q103AX, Q103AX-2

| Steps | Connect high side of test-osc. to— | Tune test osc. to— | Range Switch | Move indicator to— | Adjust following for max. output— |
|---|---|---|---|---|---|
| 1 | 12SK7 I-F grid in series with .01 mfd. condenser | 455 kc | A Band | Quiet point around 600 kc | T2 top and bottom core |
| 2 | 12SA7 1st Det. grid in series with .01 mfd. condenser | | | | T1 top and bottom core |
| 3§ | Antenna lead (blue) in series with a 300 ohm resistor | 15.2 mc | C Band | 15.2 mc | C4 osc.†<br>C3 ant.‡ |
| 4 | | 6.1 mc | | 6.1 mc | L7 osc.*<br>L6 ant. |
| 5 | Repeat steps 3 and 4 until aligned | | | | |
| 6 | Antenna lead in series a 200 mmf. condenser | 1300 kc | A Band | 1300 kc | C5 osc.<br>C2 ant. |
| 7 | | 600 kc | | 600 kc | L8 osc.<br>L4 ant. |
| 8 | | Repeat steps 6 and 7 until aligned | | | |
| 9 | | 350 kc | X Band | 350 kc | C6 osc.<br>C1 ant. |
| 10 | | 150 kc | | 150 kc | L9 osc.<br>L2 ant. |
| 11 | | Repeat steps 9 and 10 until aligned | | | |

**Dial Indicator Adjustment.**—After the set has been aligned, replace it in the cabinet. Turn the tuning knob until the condenser is in full mesh. The indicator should now be under the first mark on the dial scale face to the left of "550" kc on "A" band. If it is not, press out on the metal strip at the bottom of the dial glass. The metal strip will swing out exposing the dial indicator, which may be moved by sliding it along the dial string until it is at the desired point when the gang condenser is fully closed. If the indicator is more than a half inch off, the calibration should be rechecked.

**Alignment.**—The most satisfactory method of aligning or checking the ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

**In exceptional cases, when the set is being serviced in a location where the noise level is high enough** to prevent reception of short-wave stations, a **test-oscillator** may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a **slight error** will produce inaccuracy on the band dials. The **frequency settings** of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

For additional information, refer to booklet "RCA Victor Receiver Alignment."

***Caution:** This is an AC-DC type chassis with one side of the power line connected to the metal base, which is also—B. Connection from the signal generator must have a large (.1 MFD) capacitor in the ground side to prevent damage to the generator attenuator, unless the power source to the receiver is isolated from ground.

### Alignment Table, Q103, Q103-2, Q103A, Q103A-2

| Steps | Connect high side of test-osc. to— | Tune test osc. to— | Range Switch | Move indicator to— | Adjust following for max. output— |
|---|---|---|---|---|---|
| 1 | 12SK7 I-F grid in series with .01 mfd. condenser | 455 kc | A Band | Quiet point around 600 kc | T2 top and bottom core |
| 2 | 12SA7 1st Det. grid in series with .01 mfd. condenser | | | | T1 top and bottom core |
| 3§ | Antenna lead (blue) in series with a 300 ohm resistor | 18.2 mc | C Band | 18.2 mc | C4 osc.†<br>C3 ant.‡ |
| 4 | | 7.2 mc | | 7.2 mc | L7 osc.*<br>L6 ant. |
| 5 | | Repeat steps 3 and 4 until aligned | | | |
| 6 | | 6.1 mc | B Band | 6.1 mc | C5 osc.†<br>C2 ant. |
| 7 | | 2500 kc | | 2500 kc | L8 osc.<br>L4 ant. |
| 8 | Repeat steps 6 and 7 until aligned | | | | |
| 9 | Antenna lead (blue) in series with a 200 mmf condenser | 1300 kc | A Band | 1300 kc | C6 osc.<br>C1 ant. |
| 10 | | 600 kc | | 600 kc | L9 osc.<br>L2 ant. |
| 11 | | Repeat steps 9 and 10 until aligned | | | |

*Use min inductance if two peaks can be found.
†Use min. capacity if two peaks can be found.
‡Use max. capacity if two peaks can be found.
§Bottom shield cover in place after I-F's are aligned.

## Specifications

**Frequency Ranges Chassis No. RC-1044**

| | |
|---|---|
| Standard Broadcast ("A" Band) | 540-1600 kc (555-187 m) |
| Medium Wave ("B" Band) | 2.3-7.0 mc (130-42.2 m) |
| Short Wave ("C" Band) | 7.0-22 mc (42.2-13.6 m) |

**Frequency Ranges Chassis No. RC-1044B**

| | |
|---|---|
| Long Wave ("X" Band) | 140-375 kc (2,222-780 m) |
| Standard Broadcast ("A" Band) | 540-1600 kc (555-187 m) |
| Short Wave ("C" Band) | 5.8-18.2 mc (51.7-16.5 m) |

**Intermediate Frequency**............455 kc

**RCA Tube Complement**

| | |
|---|---|
| (1) RCA-12SA7 | 1st Detector-Oscillator |
| (2) RCA-12SK7 | I-F Amplifier |
| (3) RCA-12SQ7 | 2nd Detector, A.V.C., and A-F Amplifier |
| (4) RCA-50L6GT | Power Output |
| (5) RCA-35Z5GT | Rectifier |

**Power Supply Ratings** (D-C or 50 to 60 cycles A-C)

| | |
|---|---|
| Q103, Q103-2, Q103X, Q103X-2—105-125 volts | 30 watts |
| Q103A, Q103A-2, Q103AX, Q103AX-2—210-250 volts | 60 watts |

**Power Output Rating**

| | |
|---|---|
| Undistorted | .9 watts |
| Maximum | 1.5 watts |

**Loudspeaker**

| | |
|---|---|
| Type | 4 x 6 in. elliptical PM |
| Voice Coil Impedance | 3.4 ohms at 400 cycles |

**Tuning Drive Ratio**............20 to 1

| **Dimensions** (Inches) | Width | Height | Depth |
|---|---|---|---|
| Cabinet (Outside) | 15 | 9¾ | 7 |
| Chassis Base (Outside) | 13 | 2⅛ | 4½ |
| Chassis Overall | 13 | 9¾ | 4½ |
| Weight Net | | | 9 lbs. |
| Weight Shipping | | | 11 lbs. |

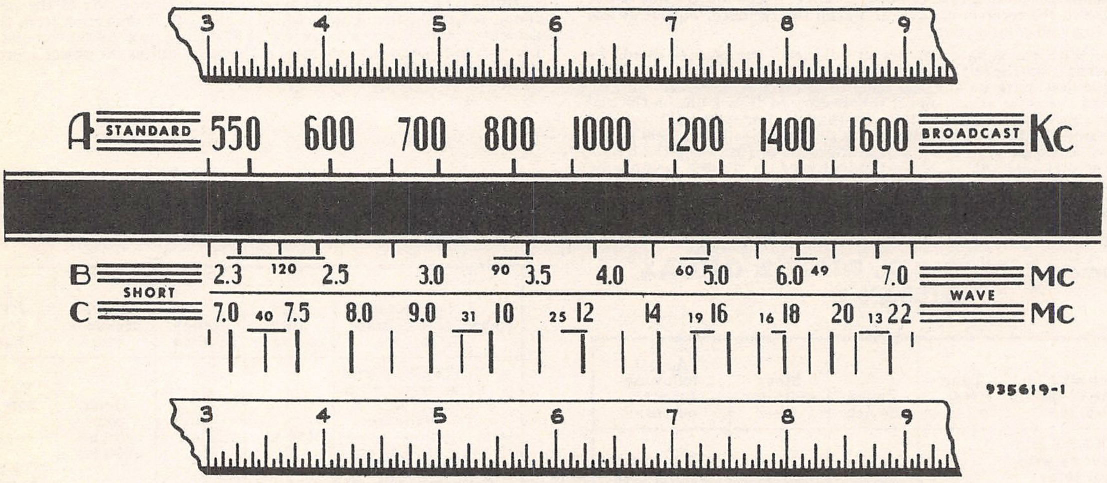
**Phonograph Attachment.**—A jack is provided on the bottom of the chassis for connection to a phonograph. The cable from the attachment should be terminated in a Stock No. 31048 plug. Plug must be removed when radio is in use.

When the phonograph is in use the volume control on the radio should be at minimum.

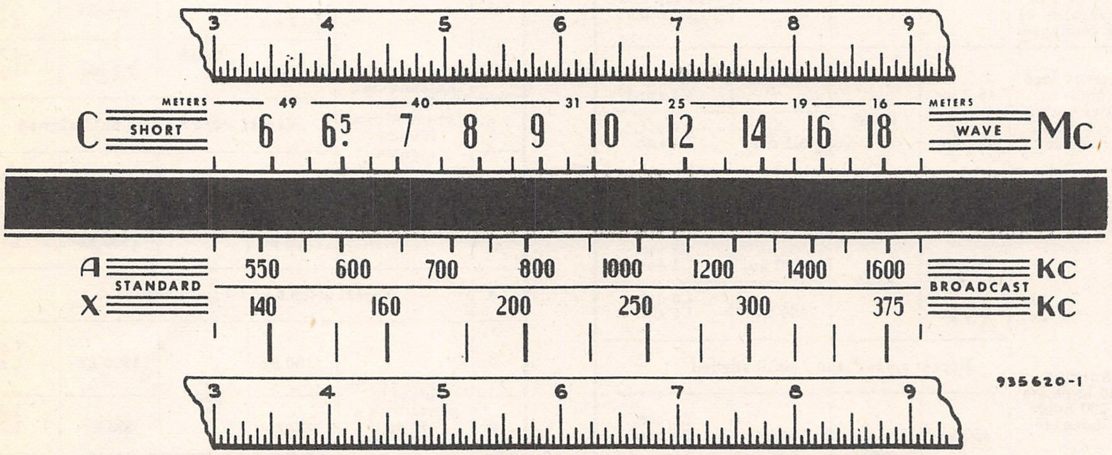
**Plug-In Resistor.**—Either a plug-in resistor or a shorting plug is used with these sets. The plugs are physically interchangeable and may be used to convert the set from 110 to 220 volts or from 220 to 110 volts. DANGER—Do not attempt to use these sets on 220 volts unless the plug-in RESISTOR is used. If the shorting plug is in place, serious damage will result. Consult the instrument label for original rating.

**Disassembly.**—Remove the screws holding the chassis bottom plate to the cabinet. Remove the chassis from the cabinet by removing the knobs and tilting the cabinet so that the chassis will slide back and out. Looking at the chassis from the front, a switch is visible on the left apron in the rear. This is an interlock switch. The set will not function out of the cabinet unless this switch is closed. A small screw through the interlock actuating arm and the hole in the chassis bottom plate will serve to keep the switch closed. When the chassis is replaced in the cabinet, remove the screw so that the switch will function.

| Model | Bands | Power Supply | Cabinet |
|---|---|---|---|
| Q103 | "A"-"B"-"C" | 110V | Brown |
| Q103A | "A"-"B"-"C" | 220V | Brown |
| Q103-2 | "A"-"B"-"C" | 110V | Ivory |
| Q103A-2 | "A"-"B"-"C" | 220V | Ivory |
| Q103X | "X"-"A"-"C" | 110V | Brown |
| Q103AX | "X"-"A"-"C" | 220V | Brown |
| Q103X-2 | "X"-"A"-"C" | 110V | Ivory |
| Q103AX-2 | "X"-"A"-"C" | 220V | Ivory |



Reduced Reproduction of Receiver Dial, RC-1044, and Corresponding Rule Scales

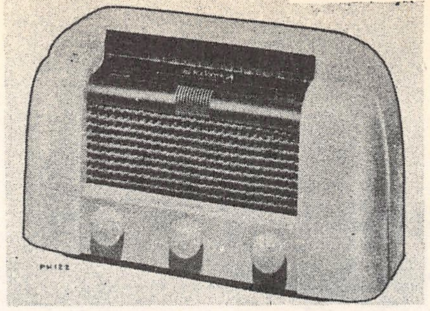


Reduced Reproduction of Receiver Dial, RC-1044B, and Corresponding Rule Scales

The corresponding position of the dial indicator in inches, from the left hand edge of the dial plate, for any frequency can be determined by drawing a line from the frequency to a point on the bottom rule scale passing through the same point on the top rule scale. For example 600 kc on the dial scale corresponds to a dial indicator setting of 4$\frac{1}{16}$" from the left hand edge of the dial plate, etc. Read instructions under "Alignment Procedure."

# RCA MFG. CO.

## MODELS Q103,-2,A,A-2
## MODELS Q103X,-2,AX,AX-2

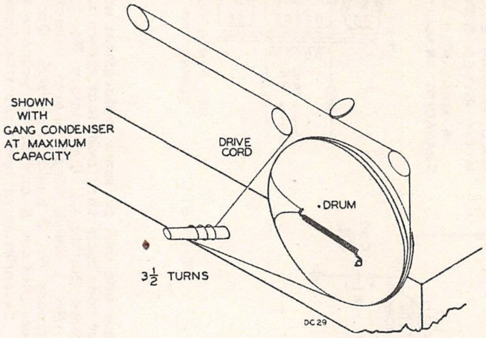


*Q103-2, Q103A-2*
*Q103X-2, Q103AX-2*

**PRECAUTIONARY LEAD DRESS**

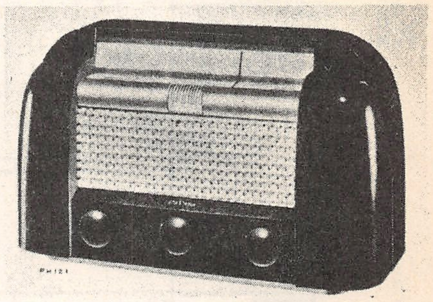
1. Dress output plate capacitor and output transformer leads down next to chassis.
2. Dress 12SQ7 grid resistor down next to chassis, and away from power ground wire to switch.
3. Dress lead from 2nd I-F transformer to volume control down to chassis and away from adjacent parts.
4. Keep grid end of R1 as short as possible.

**POWER SUPPLY POLARITY.**—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.



*Dial-Indicator and Drive Mechanism*

*Q103, Q103A*
*Q103X, Q103AX*



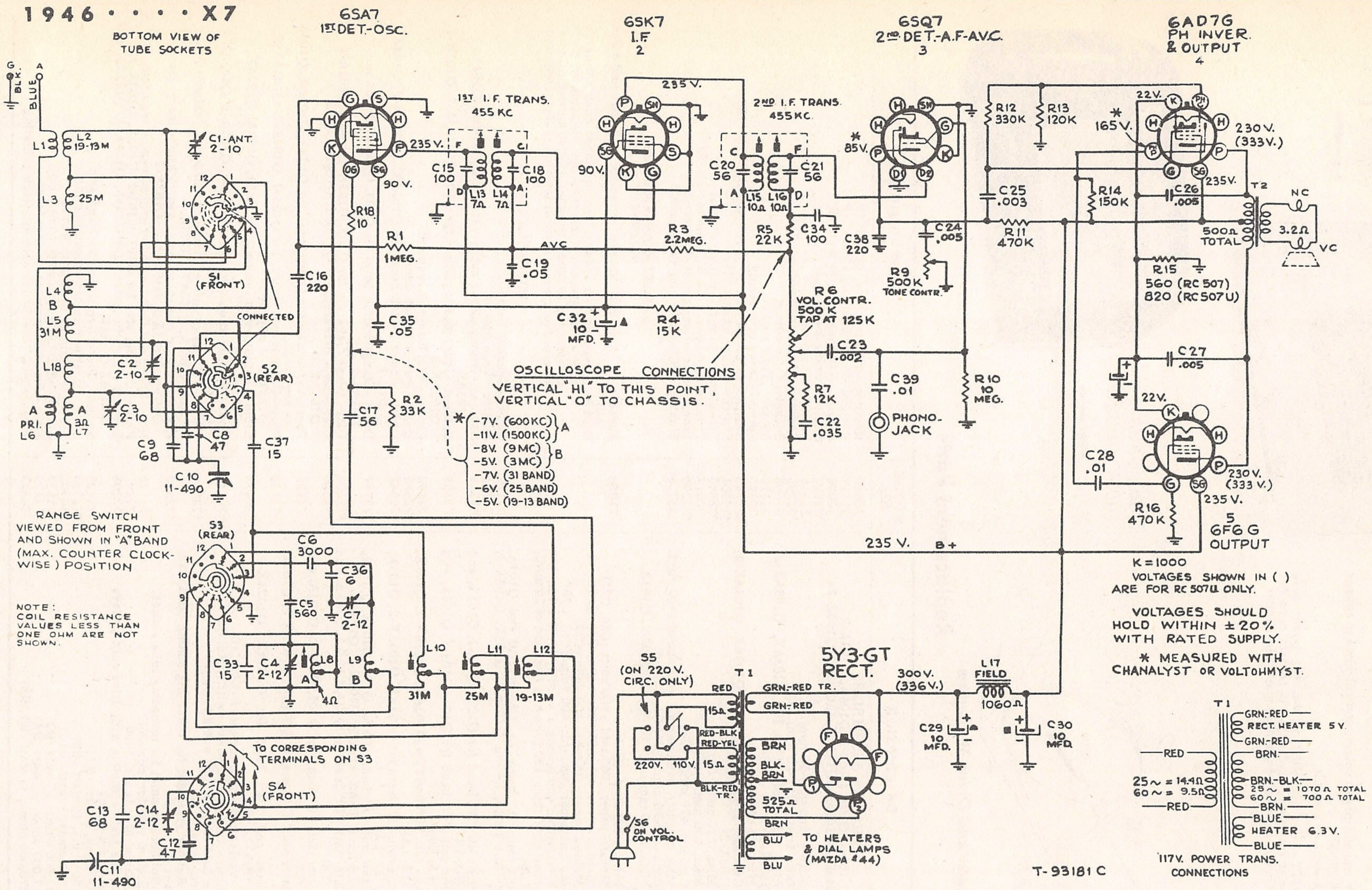
## Replacement Parts

| STOCK NO. | DESCRIPTION |
|---|---|
| | CHASSIS ASSEMBLIES<br>RC-1044—Q103, Q103-2, Q103A, Q103A-2<br>RC-1044B—Q103AX, Q103AX-2, Q103X, Q103X-2 |
| *72306 | Capacitor—Mica trimmer, 3-30 mmf. (C3) |
| *72307 | Capacitor—Mica trimmer, 5-50 mmf. (C4) |
| 39616 | Capacitor—Mica, 33 mmf. (C6A for Q103AX, Q103AX-2, Q103X, Q103X-2) |
| 39622 | Capacitor—Mica, 56 mmf. (C12) |
| *72794 | Capacitor—Ceramic, 170 mmf. (C7 for Q103AX, Q103AX-2, Q103X, Q103X-2) |
| 39636 | Capacitor—Mica, 220 mmf. (C11) |
| 72571 | Capacitor—Mica, 330 mmf. (C23) |
| *72814 | Capacitor—Ceramic, 470 mmf. (C8) |
| *72305 | Capacitor—Mica trimmer, comprising 2 sections of 2-20 mmf. and 2 sections of 5-50 mmf. (C1, C2, C5, C6) |
| *72795 | Capacitor—Mica, 2760 mmf. (C7 for Q103, Q103-2, Q103A, Q103A-2) |
| *72637 | Capacitor—Mica, 3900 mmf. (C13) |
| *71699 | Capacitor—Molded paper, .005 mfd., 400 volts (C24, C25) |
| 71770 | Capacitor—Molded paper, .01 mfd., 400 volts (C21, C22) |
| *72815 | Capacitor—Molded paper, .03 mfd., 400 volts (C27) |
| *71702 | Capacitor—Molded paper, .05 mfd., 400 volts (C16, C28) |
| *72281 | Capacitor—Electrolytic, comprising 1 section of 80 mfd., 150 volts, 1 section of 40 mfd., 150 volts and 1 section of 20 mfd., 25 volts (C26) |
| *72576 | Coil—Antenna coil, "A" band (L1, L2 for Q103 and Q103A, Q103-2, Q103A-2; L3, L4 for Q103AX, Q103X, Q103X-2, Q103AX-2) |
| *72298 | Coil—Antenna coil, "B" band for Q103, Q103-2, Q103A, and Q103A-2 (L3, L4) |
| *72299 | Coil—Antenna coil, "C" band for Q103, Q103-2, Q103A, and Q103A-2 (L5, L6) |
| *72276 | Coil—Antenna coil, "C" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L5, L6) |
| *72297 | Coil—Antenna coil, "X" band for Q103AX, Q103AX-2, Q103X, Q103X-2, (L1, L2) |
| *72575 | Coil—Oscillator coil, "A" band (L9 for Q103, Q103A, Q103-2, Q103A-2, L8 for Q103AX, Q103X, Q103X-2, Q103AX-2) |
| *72302 | Coil—Oscillator coil, "B" band for Q103, Q103-2, Q103A, and Q103A-2 (L8) |
| *72303 | Coil—Oscillator coil, "C" band for Q103, Q103-2, Q103A, and Q103A-2 (L7) |
| *72274 | Coil—Oscillator coil, "C" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L7) |
| *72300 | Coil—Oscillator coil, "X" band for Q103AX, Q103AX-2, Q103X, Q103X-2 (L9) |
| *72294 | Condenser—Variable tuning condenser (C9, C10) |
| 38410 | Control—Volume control and power switch (R6, S2) |
| 34662 | Cord—Drive cord (approx. 56" overall length) |
| 70384 | Drum—Drive drum |
| 72283 | Grommet—Rubber grommet for mounting tuning condenser and speaker |
| 70429 | Grommet—Rubber grommet for mounting tube socket |
| *72547 | Indicator—Station selector indicator |
| 71116 | Lamp—Dial lamp, Mazda No. 1490 |
| *72548 | Plate—Dial back plate complete with drive cord pulleys |
| 36230 | Pulley—Drive cord pulley |
| 71290 | Resistor—33 ohms, 1 watt (R11) |
| 30880 | Resistor—150 ohms, ½ watt (R9) |
| 71916 | Resistor—1000 ohms, 1 watt (R10) |
| 30685 | Resistor—33,000 ohms, ½ watt (R2) |
| 30787 | Resistor—47,000 ohms, ½ watt (R4) |
| 30648 | Resistor—470,000 ohms, ½ watt (R7, R8) |
| 30649 | Resistor—2.2 megohms, ½ watt (R1) |
| 31417 | Resistor—3.3 megohms, ½ watt (R3) |
| 30992 | Resistor—10 megohms, ½ watt (R5) |
| *72577 | Shaft—Tuning knob shaft |
| 71115 | Socket—Lamp socket |
| *72295 | Socket—Phono-input socket (J1) |
| 37605 | Socket—Tube socket |
| 31319 | Socket—Tube socket |
| 70390 | Spring—Drive cord spring |
| *72745 | Switch—Interlock switch, slide type, D.P.D.T. (S3) |
| *72304 | Switch—Range switch (S1) |
| *72545 | Transformer—First I. F. transformer (T1) |
| 70918 | Transformer—Second I. F. transformer (T2) |
| *72296 | Transformer—Output transformer (T3) |
| 33726 | Washer—"C" washer for tuning shaft |
| | SPEAKER ASSEMBLIES<br>922258-2 |
| 71058 | Speaker—4" x 6" P.M. speaker complete with cone and voice coil.<br>NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required. |
| | MISCELLANEOUS |
| 71122 | Baffie—Speaker baffie |
| *71123 | Bottom—Case bottom |
| Y1354 | Cabinet—Brown plastic cabinet for Q103, Q103A, Q103X, Q103AX |
| Y1355 | Cabinet—Ivory plastic cabinet for Q103-2, Q103A-2, Q103X-2, Q103AX-2 |
| *72578 | Clamp—Dial clamp (2 required) |
| *72686 | Decal—Power switch decal |
| *72687 | Decal—Range switch decal for Q103AX, Q103AX-2, Q103X, Q103X-2 |
| *72747 | Decal—Range switch decal for Q103, Q103-2, Q103A and Q103A-2 |
| *72609 | Dial—Glass dial scale for Q103, Q103A, Q103-2, Q103A-2 |
| *72610 | Dial—Glass dial scale for Q103AX, Q103X, Q103X-2, Q103AX-2 |
| 71127 | Foot—Cabinet foot (walnut) for Q103, Q103A, Q103AX, Q103X (4 required) |
| 71128 | Foot—Cabinet foot (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2 (4 required) |
| 70473 | Knob—Tuning knob (walnut) for Q103, Q103A, Q103AX, Q103X |
| 70474 | Knob—Tuning knob (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2 |
| *72549 | Knob—Volume control or range switch knob (walnut) for Q103, Q103A, Q103AX, Q103X |
| *72550 | Knob—Volume control or range switch knob (ivory) for Q103-2, Q103A-2, Q103AX-2, Q103X-2 |
| 71126 | Nut—Speed nut to fasten hand grip screen (4 required) |
| *72291 | Plug—Shorting plug for Q103, Q103-2, Q103X, Q103X-2 |
| *72308 | Resistor—Plug-in resistor for Q103A, Q103A-2, Q103AX and Q103AX-2 (R12) |
| 71125 | Screen—Protective screen for hand grip |
| *72746 | Slide—Interlock switch actuating slide |
| 30900 | Spring—Retaining spring for knobs |
| 71130 | Spring—Retaining spring for front strip |
| 71129 | Strip—Finished strip for cabinet front |
| 34373 | Washer—"C" washer to hold interlock actuating |

*This is the first time this Stock No. has appeared in Service data.

MODEL Q121, Chassis RC507U

## RCA MFG. CO.


1946 • • • • X7
BOTTOM VIEW OF TUBE SOCKETS
6SA7 1ST DET.-OSC.
6SK7 I.F. 2
6SQ7 2ND DET.-A.F.-AVC. 3
6AD7G PH INVER. & OUTPUT 4
5 6F6G OUTPUT
5Y3-GT RECT.
1ST I.F. TRANS. 455 KC
2ND I.F. TRANS. 455 KC.
C1-ANT. 2-10
S1 (FRONT)
S2 (REAR)
S3 (REAR)
S4 (FRONT)
CONNECTED
R6 VOL. CONTR. 500 K TAP AT 125 K
R9 500K TONE CONTR.
PHONO. JACK
R15 560 (RC 507) 820 (RC507U)
500Ω TOTAL
3.2Ω
VC
NC
T2
T1
L17 FIELD 1060Ω
C29 10 MFD.
C30 10 MFD.
300 V. (336 V.)
235 V. B+
OSCILLOSCOPE CONNECTIONS
VERTICAL "HI" TO THIS POINT, VERTICAL "0" TO CHASSIS.
* -7V. (600KC) -11V. (1500KC) A
-8V. (9MC) -5V. (3MC) B
-7V. (31 BAND)
-6V. (25 BAND)
-5V. (19-13 BAND)
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAX. COUNTER CLOCK-WISE) POSITION
NOTE: COIL RESISTANCE VALUES LESS THAN ONE OHM ARE NOT SHOWN.
TO CORRESPONDING TERMINALS ON S3
S5 (ON 220 V. CIRC. ONLY)
S6 ON VOL. CONTROL
TO HEATERS & DIAL LAMPS (MAZDA #44)
K=1000
VOLTAGES SHOWN IN ( ) ARE FOR RC 507U ONLY.
VOLTAGES SHOULD HOLD WITHIN ±20% WITH RATED SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
GRN-RED
RECT. HEATER 5 V.
BRN-BLK
25~ = 1070Ω TOTAL
60~ = 700Ω TOTAL
25~ = 14.4Ω
60~ = 9.5Ω
HEATER 6.3 V.
117V. POWER TRANS. CONNECTIONS
T-93181 C

(See separate diagram for Chassis No. RC-507U Power Supply Circuit)

**Precautionary Lead Dress**

All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches.

All oscillator coil leads must be kept apart from each other and other leads and parts.

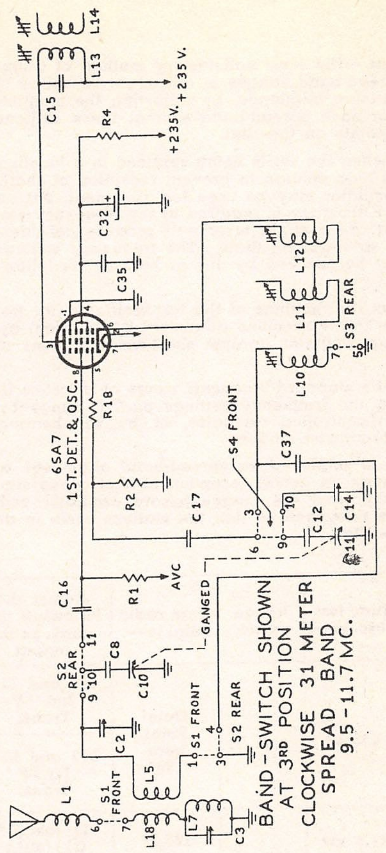
Blue plate lead of 2nd I-F transformer must be dressed down close to chassis and made as short as possible.

Power transformer leads to the 110-220 volt switch must be dressed away from the audio circuits.

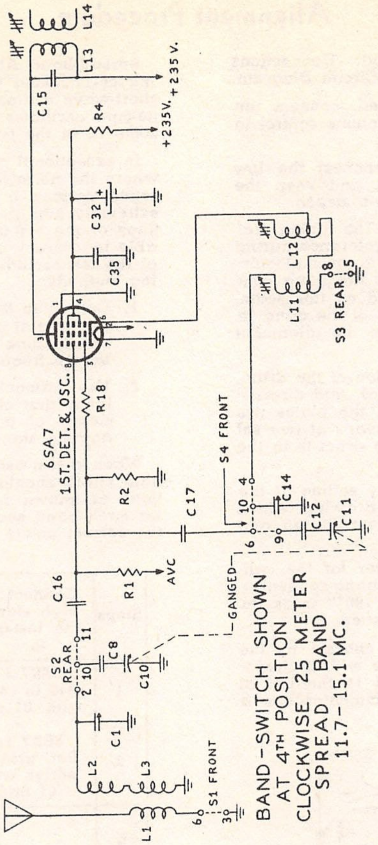
A-C leads to the power switch must be twisted and dressed up towards the end of chassis apron and kept away from the volume control circuits.

**NOTE:** In some sets and on some replacement units, the power transformer color code may vary from that shown above. On universal transformers (Rating C), the primary No. 1 start may be black; primary No. 1 finish black/yellow; primary No. 2 start black/green; primary No. 2 finish black/red. On the 25 and 60 cycle transformers (Ratings A and B) the primary start and finish may be black. Secondaries of the three transformers would be: rectifier filament, yellow; high-voltage, red; high-voltage center tap, red/yellow; amplifier filament, green. In case of doubt, identify windings by resistance or voltage measurements.

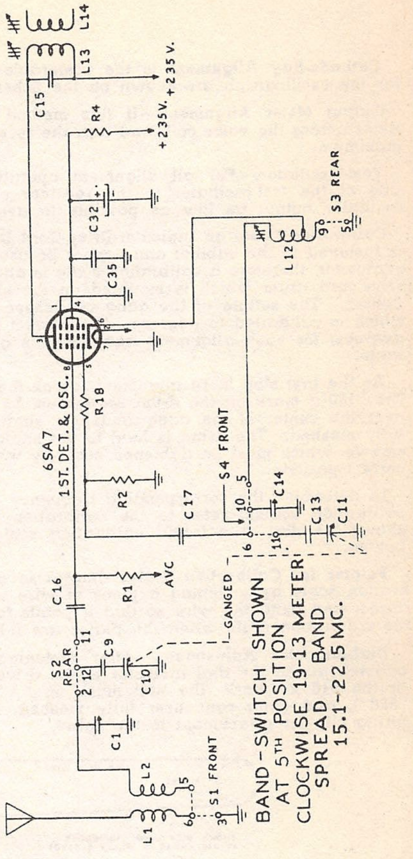
# RCA MFG. CO.


L14
L13
C15
+235 V.
R4
+235V.
C32
C35
L12
L11
L10
S3 REAR
6SA7
1ST. DET. & OSC.
R18
S4 FRONT
C37
R2
C17
C12
C14
C11
C16
R1
AVC
GANGED
S2 REAR
C8
C10
C2
S1 FRONT
S2 REAR
L1
S1 FRONT
L5
L18
L7
C3

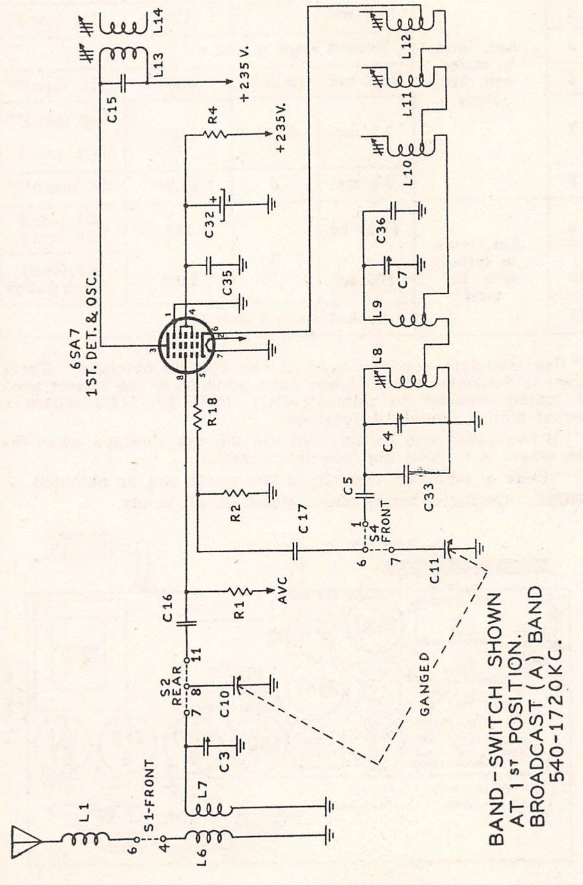
BAND-SWITCH SHOWN
AT 3RD POSITION
CLOCKWISE 31 METER
SPREAD BAND
9.5-11.7 MC.


L14
L13
C15
+235 V.
R4
+235V.
C32
C35
L12
L11
S3 REAR
6SA7
1ST. DET. & OSC.
R18
S4 FRONT
R2
C17
C14
C12
C11
C16
R1
AVC
GANGED
S2 REAR
C8
C10
C1
L2
L3
S1 FRONT
L1

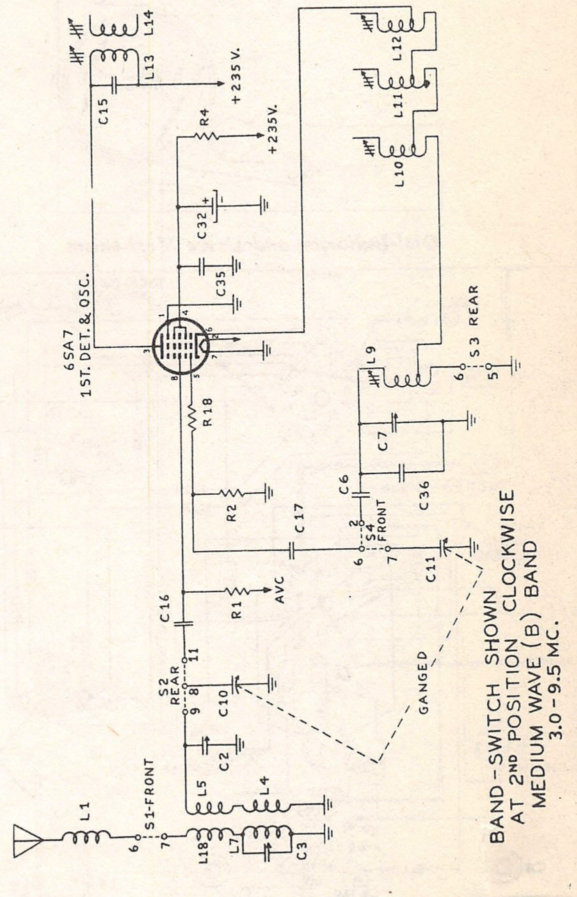
BAND-SWITCH SHOWN
AT 4TH POSITION
CLOCKWISE 25 METER
SPREAD BAND
11.7-15.1 MC.


L14
L13
C15
+235 V.
R4
+235V.
S3 REAR
C32
C35
L12
6SA7
1ST. DET. & OSC.
R18
S4 FRONT
R2
C17
C14
C13
C11
C16
R1
AVC
GANGED
S2 REAR
C9
C10
C1
L2
S1 FRONT
L1

BAND-SWITCH SHOWN
AT 5TH POSITION
CLOCKWISE 19-13 METER
SPREAD BAND
15.1-22.5 MC.


L14
L13
C15
+235 V.
R4
+235V.
C32
C35
L12
L11
L10
C36
C7
L9
L8
6SA7
1ST. DET. & OSC.
R18
C4
C33
C5
R2
C17
S4 FRONT
C11
C16
R1
AVC
S2 REAR
C10
GANGED
C3
L7
L1
S1-FRONT
L6

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST (A) BAND
540-1720KC.


L14
L13
C15
+235 V.
R4
+235V.
L12
L11
L10
C32
C35
6SA7
1ST. DET. & OSC.
S3 REAR
L9
R18
C7
C6
C36
R2
C17
S4 FRONT
C11
C16
R1
AVC
S2 REAR
C10
GANGED
C2
L5
L4
L1
S1-FRONT
L18
L7
C3

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
MEDIUM WAVE (B) BAND
3.0-9.5 MC.

# Alignment Procedure

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown on the Schematic Circuit Diagram.

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

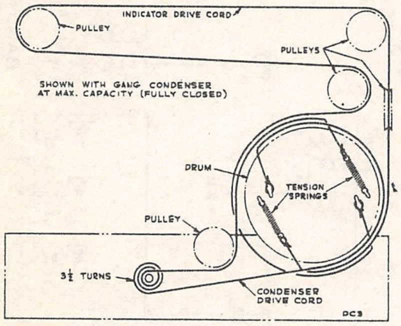
**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

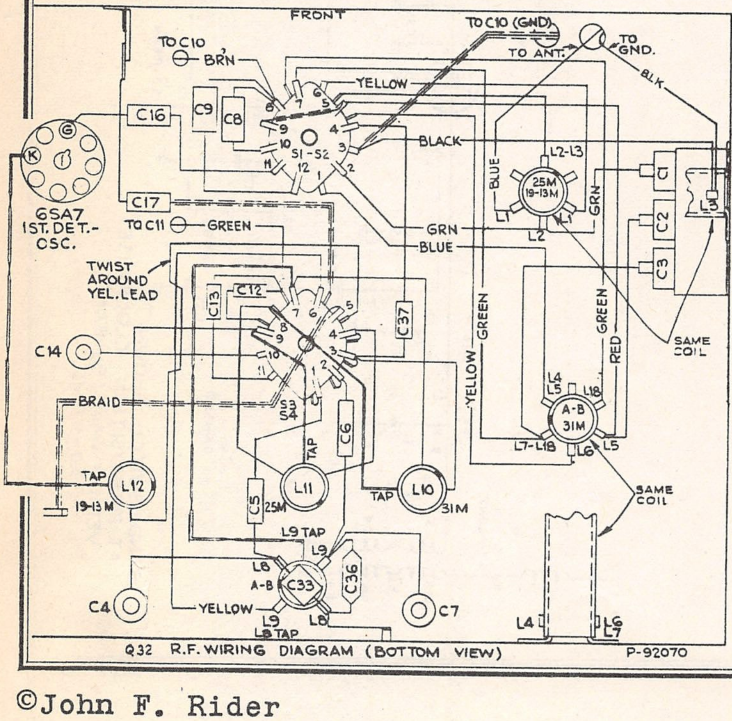
To determine the corresponding frequency for any setting of the calibration scales, refer to the calibration scale drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark (the first mark on "A" band to the left of "550"), and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.


INDICATOR DRIVE CORD
PULLEY
PULLEYS
SHOWN WITH GANG CONDENSER AT MAX. CAPACITY (FULLY CLOSED)
DRUM
TENSION SPRINGS
PULLEY
3½ TURNS
CONDENSER DRIVE CORD
DC3

*Dial-Indicator and Drive Mechanism*


FRONT
TO C10 (GND)
TO ANT.
TO GND.
BLK.
TO C10
BRN
YELLOW
C16
C9
C8
S1-S2
BLACK
6SA7 1ST. DET.-OSC.
C17
TO C11
GREEN
GRN
BLUE
L2-L3
25M 19-13M
L1
L2
C1
C2
C3
L3
TWIST AROUND YEL. LEAD
C12
C13
C37
SAME COIL
C14
BRAID
S3 S4
TAP
C6
L4
L5
L18
A-B 31M
L7-L18
L6
YELLOW
GREEN
RED
TAP
L12
19-13 M
L11
25M
C5
L10
31M
L9 TAP
L9
L8
A-B
C33
C36
C4
YELLOW
L8 TAP
C7
SAME COIL
L4
L6 L7

Q32 R.F. WIRING DIAGRAM (BOTTOM VIEW) P-92070

**Spread-Band Alignment.**—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each spread-band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

**When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.**

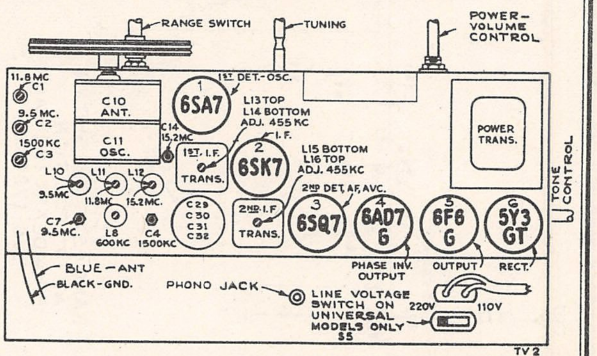
| Steps | Connect the high side of the test-osc. to— | Tune test-osc. to— | Range switch | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|---|
| 1 | 6SK7 I-F grid in series with .01 mfd. | 455 kc | A | Quiet Point near 180° | L15 and L16 2nd I-F Trans. |
| 2 | 6SA7 1st Det. grid in series with .01 mfd. | | | | L13 and L14 1st I-F Trans. |
| 3 | Ant. lead in series with 300 ohms | 11.8 mc | 25 M | 138.5° | L11 (osc.)** C1 (ant.) |
| 4 | | 15.2 mc | | 17° | C14 (osc.)* |
| 5 | | Repeat steps 3 and 4 | | | |
| 6 | | 15.2 mc | 19-13 M | 156° | L12 (osc.)** |
| 7 | | 9.5 mc | 31 M | 156° | L10 (osc.)**<br>C2 (ant.) |
| 8 | | 9.5 mc | B | 11.5° | C7 (osc.)*** |
| 9 | Ant. lead in series with 200 mmf. | 1,500 kc | A | 26° | C4 (osc.) C3 (ant.) |
| 10 | | 600 kc | | 150° | L8 (osc.) (Rock gang) |
| 11 | | Repeat steps 9 and 10 | | | |

* Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

** If two peaks can be obtained use the one obtained when the core screw is farthest out (counter-clockwise).

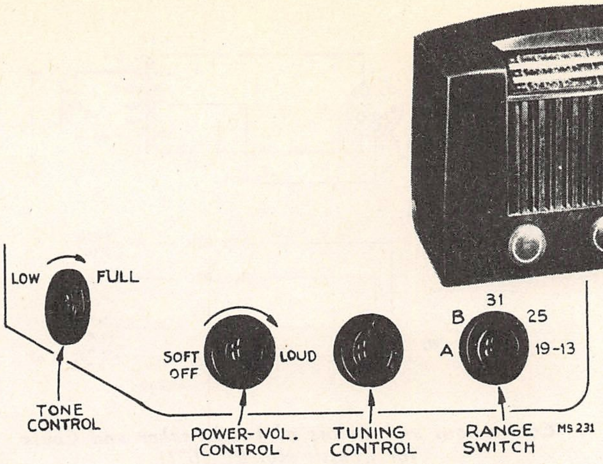
*** Peak at minimum capacity if two peaks can be obtained.

**NOTE:** Oscillator tracks above signal on all bands.

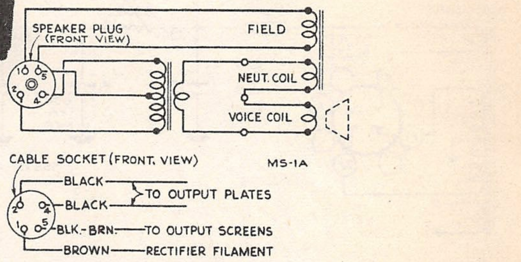

RANGE SWITCH
TUNING
POWER-VOLUME CONTROL
11.8MC C1
9.5MC. C2
1500KC C3
C10 ANT.
C11 OSC.
C14 15.2MC
1ST DET.-OSC.
1 6SA7
L13 TOP L14 BOTTOM ADJ. 455 KC 1ST I.F.
POWER TRANS.
TONE CONTROL
L10 9.5MC
L11 11.8MC
L12 15.2MC
1ST. I.F. TRANS.
2 6SK7
L15 BOTTOM L16 TOP ADJ. 455KC
C29 C30 C31 C32
2ND I.F. TRANS.
2ND DET. AF. AVC.
3 6SQ7
6AD7 G
5 6F6 G
6 5Y3 GT
C7 9.5MC.
L8 600KC
C4 1500KC
PHASE INV. OUTPUT
OUTPUT
RECT.
BLUE—ANT
BLACK—GND.
PHONO JACK
LINE VOLTAGE SWITCH ON UNIVERSAL MODELS ONLY S5
220V
110V
TV2

*Tube and Trimmer Locations*

# RCA MFG. CO.


LOW
FULL
TONE CONTROL
SOFT OFF
LOUD
POWER- VOL. CONTROL
TUNING CONTROL
B
31
25
A
19-13
RANGE SWITCH
MS 231

*Location of Controls*


SPEAKER PLUG (FRONT VIEW)
FIELD
NEUT. COIL
VOICE COIL
MS-1A
CABLE SOCKET (FRONT. VIEW)
BLACK
BLACK
TO OUTPUT PLATES
BLK.-BRN.
TO OUTPUT SCREENS
BROWN
RECTIFIER FILAMENT

*Connections and Colors of Loudspeaker and Cable for Chassis No. RC-507*

## Electrical and Mechanical Specifications

Chassis No. RC-507U differs from Chassis No. RC-507 in that it is equipped with a permanent magnet dynamic loudspeaker. Other than the loudspeaker and required changes to the power supply filter, and output tubes bias circuits, the chassis are identical.

**Frequency Ranges**

| | |
|---|---|
| Standard Broadcast ("A" Band) | 540-1,720 kc (556-174 m) |
| Medium Wave ("B" Band) | 3.0-9.5 mc (100-31.6 m) |
| "31" Meter Spread Band | 9.5-11.7 mc (31.6-25.6 m) |
| "25" Meter Spread Band | 11.7-15.1 mc (25.6-19.9 m) |
| "19-13" Meter Spread Band | 15.1-22.5 mc (19.9-13.3 m) |

**Intermediate Frequency** ........ 455 kc

**Tube Complement**

| | |
|---|---|
| (1) RCA-6SA7 | 1st Detector-Oscillator |
| (2) RCA-6SK7 | I-F Amplifier |
| (3) RCA-6SQ7 | 2nd Detector, A-F Amplifier, A.V.C. |
| (4) RCA-6AD7-G | Phase Inverter, Power Output |
| (5) RCA-6F6-G | Power Output |
| (6) RCA-5Y3-GT | Rectifier |

**Power Output Rating**

| | |
|---|---|
| Undistorted | 3 watts |
| Maximum | 3.5 watts |

**Loudspeaker**

| | |
|---|---|
| Chassis No. RC-507 | Identification No. 92517-1 |
| Type (Electrodynamic) | 6½ inches |
| V-C Impedance at 400 c.p.s. | 3.4 ohms |
| Chassis No. RC-507U | Identification No. 92570-1 |
| Type (P.M. dynamic) | 6½ inches |
| V-C Impedance at 400 c.p.s. | 3.4 ohms |

**Cabinet Dimensions (Inches)**

| | Height | Width | Depth |
|---|---|---|---|
| Q121 (Plastic) | 10⅞ | 16¼ | 7⅝ |

| | |
|---|---|
| Net Weight (pounds) | 21 |
| Shipping Weight (pounds) | 25 |
| Chassis Base Dimensions (inches) | Height, 2¾; Width, 15⅛; Depth, 5¼ |
| Over-all Chassis Height | 9¼ inches |
| Tuning Drive Ratio | 25 to 1 |

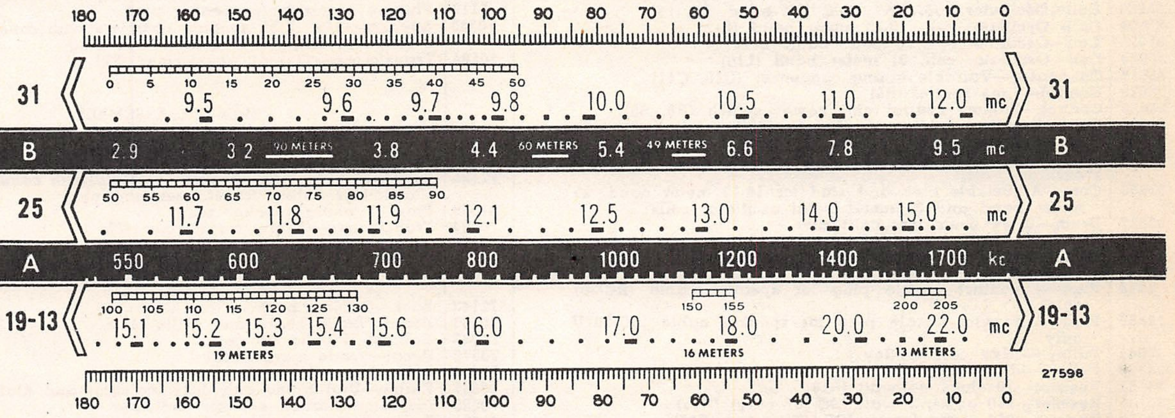
**Power Supply Ratings**

| Symbol | Voltages | Frequency (cycles) | Watts |
|---|---|---|---|
| Rating A | 105 to 125 volts, 117 nominal | 25 to 60 | 65 |
| Rating B | 105 to 125 volts, 117 nominal | 50 to 60 | 65 |
| Rating C | 105 to 125 volts, 117 nominal<br>210 to 250 volts, 234 nominal | 50 to 60 | 65 |

(Shipped in 210-250 volt position)

**Phonograph Attachment.**—A jack is provided on the rear of chassis for connection to a Phonograph Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug.

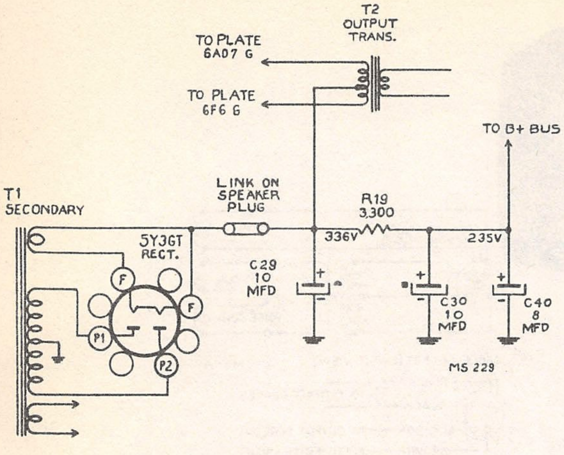
When Phonograph is not in use its plug should be removed. When Phonograph is in use the volume control on the radio should be at minimum and, if necessary, tune set off frequency from any very strong station.


180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
31
0 5 10 15 20 25 30 35 40 45 50
9.5 9.6 9.7 9.8 10.0 10.5 11.0 12.0 mc
B
2.9 3.2 90 METERS 3.8 4.4 60 METERS 5.4 49 METERS 6.6 7.8 9.5 mc
25
50 55 60 65 70 75 80 85 90
11.7 11.8 11.9 12.1 12.5 13.0 14.0 15.0 mc
A
550 600 700 800 1000 1200 1400 1700 kc
19-13
100 105 110 115 120 125 130
150 155
200 205
15.1 15.2 15.3 15.4 15.6 16.0 17.0 18.0 20.0 22.0 mc
19 METERS
16 METERS
13 METERS
27598
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

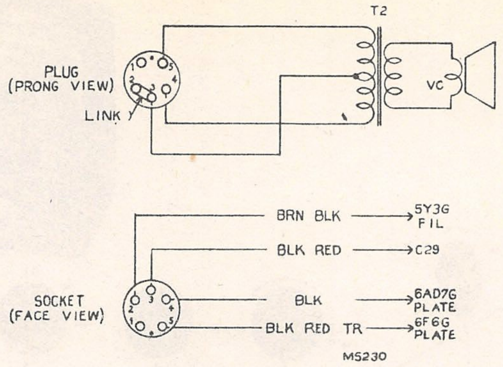
*Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales*

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example 150° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

# RCA MFG. CO.



*Chassis No. RC-507U Power Supply Circuit Diagram*



*Connections and Colors of Loudspeaker and Cable for Chassis No. RC-507U*

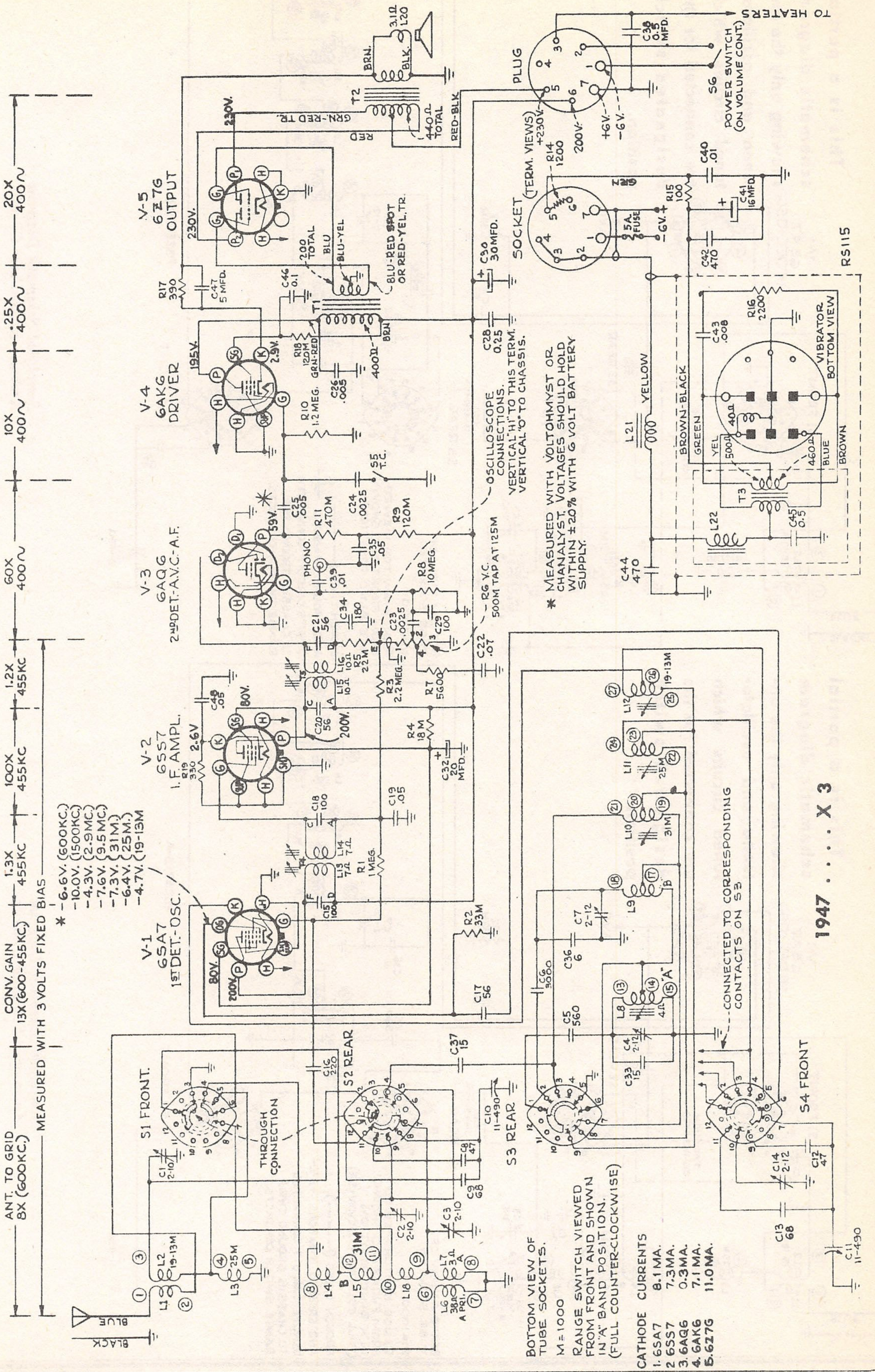
## Replacement Parts

NOTE: The replacement parts listed below are applicable to both chassis except where specifically indicated.

| STOCK No. | DESCRIPTION |
|---|---|
| | **CHASSIS ASSEMBLIES**<br>RC-507 and RC-507U |
| 35622 | Bracket—Flywheel and tuning shaft mounting support |
| 37976 | Bracket—Support bracket for tone control |
| 35642 | Calibrator—Drive drum calibrator |
| 12714 | Capacitor—Air trimmer, 2-12 mmf. (C4, C7, C14) |
| 34654 | Capacitor—Mica trimmer, comprising three sections of 2.5-10 mmf. (C1, C2, C3) |
| 35646 | Capacitor—Ceramic, 6 mmf. (C36) |
| 36012 | Capacitor—Ceramic, 15 mmf. (C37) |
| 39041 | Capacitor—Ceramic, 18 mmf. (C33) |
| 70582 | Capacitor—Ceramic, 47 mmf. (C8, C12) |
| 39622 | Capacitor—Mica, 56 mmf. (C17) |
| 35645 | Capacitor—Ceramic, 68 mmf. (C13) |
| 70586 | Capacitor—Mica, 68 mmf. (C9) |
| 39628 | Capacitor—Mica, 100 mmf. (C15, C18, C34) |
| 39636 | Capacitor—Mica, 220 mmf. (C16, C38) |
| 70667 | Capacitor—Mica, 560 mmf. (C5) |
| 70687 | Capacitor—Mica, 3000 mmf. (C6) |
| 70585 | Capacitor—Tubular, .0015 mfd., 1500 volts (C23) |
| 70644 | Capacitor—Tubular, .0025 mfd., 700 volts (C25) |
| 70627 | Capacitor—Tubular, .005 mfd., 500 volts (C24) |
| 70648 | Capacitor—Tubular, .005 mfd., 1000 volts (C27, C26) |
| 70610 | Capacitor—Tubular, .01 mfd., 400 volts (C28, C39) |
| 70614 | Capacitor—Tubular, .035 mfd., 400 volts (C22) |
| 70615 | Capacitor—Tubular, .05 mfd., 400 volts (C19, C35) |
| 33014 | Capacitor—Electrolytic, comprising 3 sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 25 volts (C29, C30, C31 C32) |
| 72139 | Capacitor—Electrolytic, 8 mfd., 450 volts (RC-507U only) (C40) |
| 35632 | Coil—Antenna coil, "A", "B" and 31 meter bands (L4, L5, L6, L7 L18) |
| 35631 | Coil—Antenna coil, spread band (L1, L2, L3) |
| 35623 | Coil—Oscillator coil, "A" and "B" band (L8, L9) |
| 35624 | Coil—Oscillator coil, 19-13 meter band (L12) |
| 35625 | Coil—Oscillator coil, 25 meter band (L11) |
| 35626 | Coil—Oscillator coil, 31 meter band (L10) |
| 35619 | Condenser—Variable tuning condenser (C10, C11) |
| 35629 | Control—Tone control (R9) |
| 35620 | Control—Volume control and power switch (R6, S6) |
| 32634 | Cord—Drive cord (approx. 28" overall length) |
| 34662 | Cord—Indicator cord (approx. 53" overall length) |
| 35788 | Core—Adjustable core and stud for "A" and "B" band oscillator coil |
| 31259 | Core—Adjustable core and stud for 19-13 meter band, 25 meter band and 31 meter band oscillator coils |
| 35627 | Drum—Drive drum less calibrator |
| 35638 | Flywheel—Tuning shaft flywheel |
| 70930 | Grommet—Rubber grommet for mounting tuning condenser (4 required) |
| 5040 | Plug—4 contact female plug for speaker cable (RC-507 only) |
| 12493 | Plug—5 contact female plug for speaker cable (RC-507U only) |
| 35641 | Pulley—Drive cord pulley |
| 35630 | Pulley—Idler pulley |
| 34761 | Resistor—10 ohms, ¼ watt (R18) |
| 30735 | Resistor—560 ohms, 1 watt (RC-507 only) (R15) |
| 39050 | Resistor—820 ohms, 1 watt (RC-507U only) (R15) |
| 48674 | Resistor—3,300 ohms, 4 watt (RC-507U only) (R19) |
| 30436 | Resistor—12,000 ohms, ¼ watt (R7) |
| 35595 | Resistor—15,000 ohms, 3 watt (R4) |
| 30492 | Resistor—22,000 ohms, ¼ watt (R5) |
| 30685 | Resistor—33,000 ohms, ¼ watt (R2) |
| 30180 | Resistor—120,000 ohms, ¼ watt (R13) |
| 30493 | Resistor—150,000 ohms, ½ watt (R14) |
| 14983 | Resistor—330,000 ohms, ¼ watt (R12) |
| 30648 | Resistor—470,000 ohms, ½ watt (R11, R16) |
| 30652 | Resistor—1 megohm ¼ watt (R1) |
| 30649 | Resistor—2.2 megohms, ¼ watt (R3) |
| 30992 | Resistor—10 megohms, ¼ wdtt (R10) |
| 14350 | Screw—#8-32 square head set screw for drive drum |
| 35633 | Shaft—Extension shaft for range switch |
| 35637 | Shaft—Tuning knob shaft |
| 31364 | Socket—Lamp socket |
| 14278 | Socket—Phono input socket |
| 31251 | Socket—Tube socket |
| 31261 | Spring—Retaining spring for oscillator coils core and studs |
| 31418 | Spring—Tension spring for drive or indicator cord |
| 35640 | Support—Drive cord pulley support complete with one pulley |
| 35639 | Support—Drive cord pulley support complete with three pulleys |
| 35621 | Switch—Range switch (S1, S2, S3, S4) |
| 32827 | Switch—Voltage change switch (S5) |
| 35636 | Transformer—First I-F transformer (L13, L14, C15, C18) |
| 35628 | Transformer—Second I-F transformer (L15, L16, C20, C21) |
| 32852 | Transformer—Power transformer, 117 or 235 volt, 50 to 60 cycle (Rating 'C") (T1) |
| 35588 | Transformer—Power transformer 117 volt, 25 to 60 cycle (Rating "A") (T1) |
| 2917 | Washer—"C" washer to fasten tuning shaft |
| 33726 | Washer—"C" washer to fasten idler pulley |
| | **SPEAKER ASSEMBLY**<br>Stamped 92517-1J<br>(For RC-507 only) |
| 70578 | Cone—Cone and voice coil assembly |
| 5118 | Plug—4 prong male speaker plug |
| 70583 | Speaker—6½" E.M. speaker complete with cone and voice coil, less output transformer and plug |
| 70584 | Transformer—Output transformer (T2) |
| | **SPEAKER ASSEMBLY**<br>Stamped 92570-1J<br>(For RC-507U only) |
| 72425 | Speaker—6½" P.M. speaker complete with cone and voice coil, less output transformer and plug |
| 31539 | Plug—5 prong speaker plug |
| 70584 | Transformer—Output transformer (T2) |
| | **MISCELLANEOUS** |
| *72143 | Back—Cabinet back |
| 70833 | Board—Baffle board and grille cloth |
| Y1382 | Cabinet—Plastic cabinet |
| 70579 | Decal—Trade mark decal |
| 35654 | Dial—Glass dial scale |
| 35647 | Frame—Dial frame only less indicator and dial |
| 70580 | Indicator—Station selector indicator |
| 35651 | Knob—Range switch knob |
| 35652 | Knob—Range indicator knob |
| 35650 | Knob—Tone control knob |
| 34489 | Knob—Tuning or volume control knob |
| 11891 | Lamp—Dial lamp, Mazda 44 |
| 14270 | Spring—Retaining spring for knobs #34489, 35650 or 35651 |
| 4982 | Spring—Retaining spring for knob #35652 |

## RCA MFG. CO.

MODEL QB13, Chassis
RC529A, RC612


V-1
6SA7
1st DET.-OSC.
V-2
6SS7
I.F. AMPL.
V-3
6AQ6
2nd DET.-A.V.C.-A.F.
V-4
6AK6
DRIVER
V-5
6Z7G
OUTPUT
S1 FRONT
S2 REAR
S3 REAR
S4 FRONT
THROUGH CONNECTION
CONNECTED TO CORRESPONDING CONTACTS ON S3
PHONO
T1
T2
T3
L21 YELLOW
L22
BROWN-BLACK
GREEN
YEL
BLUE
BROWN
VIBRATOR BOTTOM VIEW
RS115
SOCKET (TERM. VIEWS)
PLUG
TO HEATERS
POWER SWITCH (ON VOLUME CONT.)
S6
S5 T.C.
5A. FUSE
+6V. -6V.
200V.
+230V.
BLACK
BLUE
GRN-RED TR.
RED
RED-BLK
BRN.
BLK.
3.1Ω 120
440Ω TOTAL
BLU-RED SPOT OR RED-YEL. TR.
BLU-YEL
200 TOTAL
400Ω
1947 . . . . X 3

ANT. TO GRID 8X (600KC.)

CONV. GAIN 13X (600-455KC)

1.3X 455KC

100X 455KC

1.2X 455KC

60X 400∿

10X 400∿

.25X 400∿

20X 400∿

MEASURED WITH 3 VOLTS FIXED BIAS

* -6.6V. (600KC.)
-10.0V. (1500KC.)
-4.3V. (2.9MC.)
-7.6V. (9.5MC.)
-7.3V. (31M.)
-6.4V. (25M.)
-4.7V. (19-13M)

OSCILLOSCOPE CONNECTIONS. VERTICAL "HI" TO THIS TERM. VERTICAL "O" TO CHASSIS.

* MEASURED WITH VOLTOHMYST OR CHANALYST. VOLTAGES SHOULD HOLD WITHIN ±20% WITH 6 VOLT BATTERY SUPPLY.

BOTTOM VIEW OF TUBE SOCKETS.

M=1000

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND POSITION. (FULL COUNTER-CLOCKWISE)

| CATHODE | CURRENTS |
|---|---|
| 1.6SA7 | 8.1MA. |
| 2.6SS7 | 7.3MA. |
| 3.6AQ6 | 0.3MA. |
| 4.6AK6 | 7.1MA. |
| 5.6Z7G | 11.0MA. |

For parts list, see P.16-7

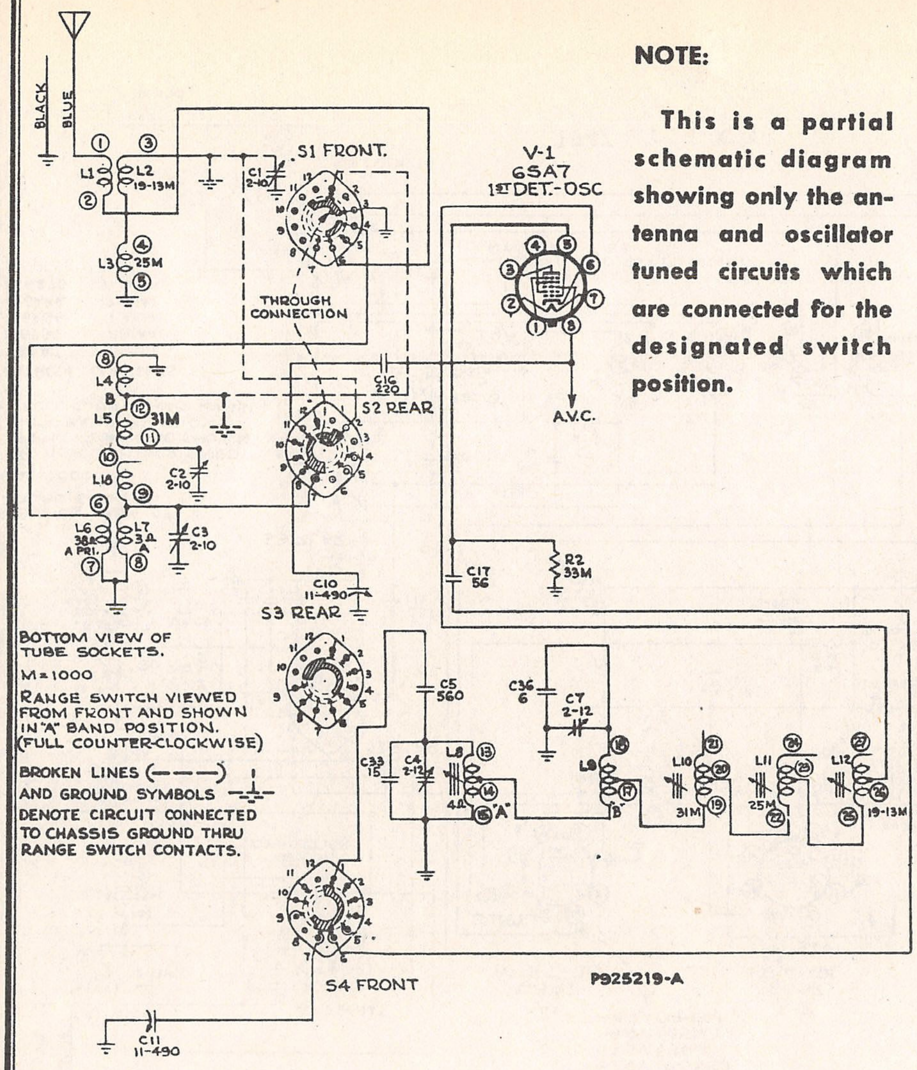
MODEL QB13

# "clarified schematics"

## RCA MFG. CO.

**NOTE:**

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.


BLACK
BLUE
L1
L2 19-13M
L3 25M
①
②
③
④
⑤
S1 FRONT.
C1 2-10
THROUGH CONNECTION
V-1
6SA7
1ST DET.-OSC
A.V.C.
C16 220
S2 REAR
L4
B
L5 31M
L18
C2 2-10
L6 38Ω A PRI.
L7 3Ω A
C3 2-10
C10 11-490
S3 REAR
C17 56
R2 33M
C5 560
C36 6
C7 2-12
C33 15
C4 2-12
L8 4Ω
"A"
L9
"B"
L10 31M
L11 25M
L12 19-13M
S4 FRONT
C11 11-490

BOTTOM VIEW OF TUBE SOCKETS.

M=1000

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "A" BAND POSITION. (FULL COUNTER-CLOCKWISE)

BROKEN LINES (— — —) AND GROUND SYMBOLS DENOTE CIRCUIT CONNECTED TO CHASSIS GROUND THRU RANGE SWITCH CONTACTS.

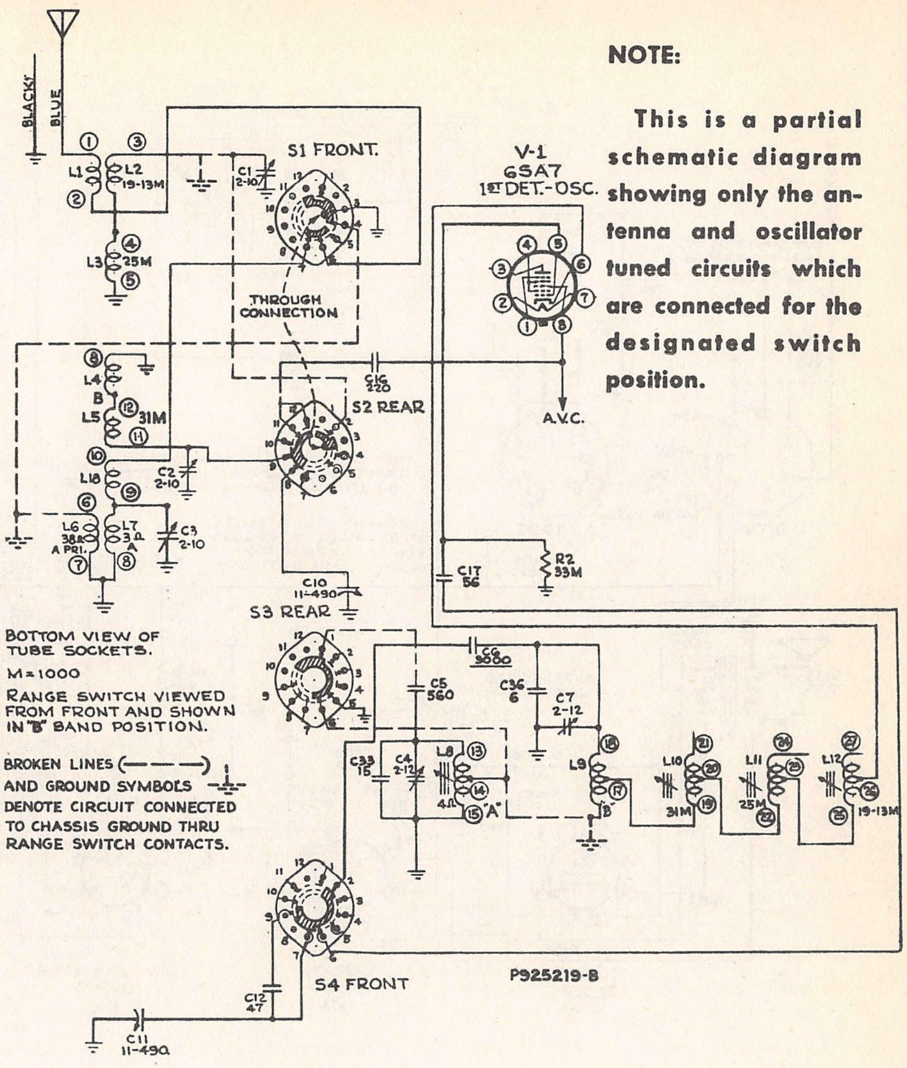
P925219-A

*Simplified Schematic Diagram*
*Antenna & Oscillator Circuits*

**"A Band"**

**NOTE:**

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.


BLACK
BLUE
L1
L2 19-13M
L3 25M
S1 FRONT.
C1 2-10
THROUGH CONNECTION
V-1
6SA7
1ST DET.-OSC.
A.V.C.
C16 220
S2 REAR
L4
B
L5 31M
L18
C2 2-10
L6 38Ω A PRI.
L7 3Ω A
C3 2-10
C10 11-490
S3 REAR
C17 56
R2 33M
C6 3500
C5 560
C36 6
C7 2-12
C33 15
C4 2-12
L8 4Ω
"A"
L9
"B"
L10 31M
L11 25M
L12 19-13M
S4 FRONT
C12 47
C11 11-490

BOTTOM VIEW OF TUBE SOCKETS.

M=1000

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "B" BAND POSITION.

BROKEN LINES (— — —) AND GROUND SYMBOLS DENOTE CIRCUIT CONNECTED TO CHASSIS GROUND THRU RANGE SWITCH CONTACTS.

P925219-B

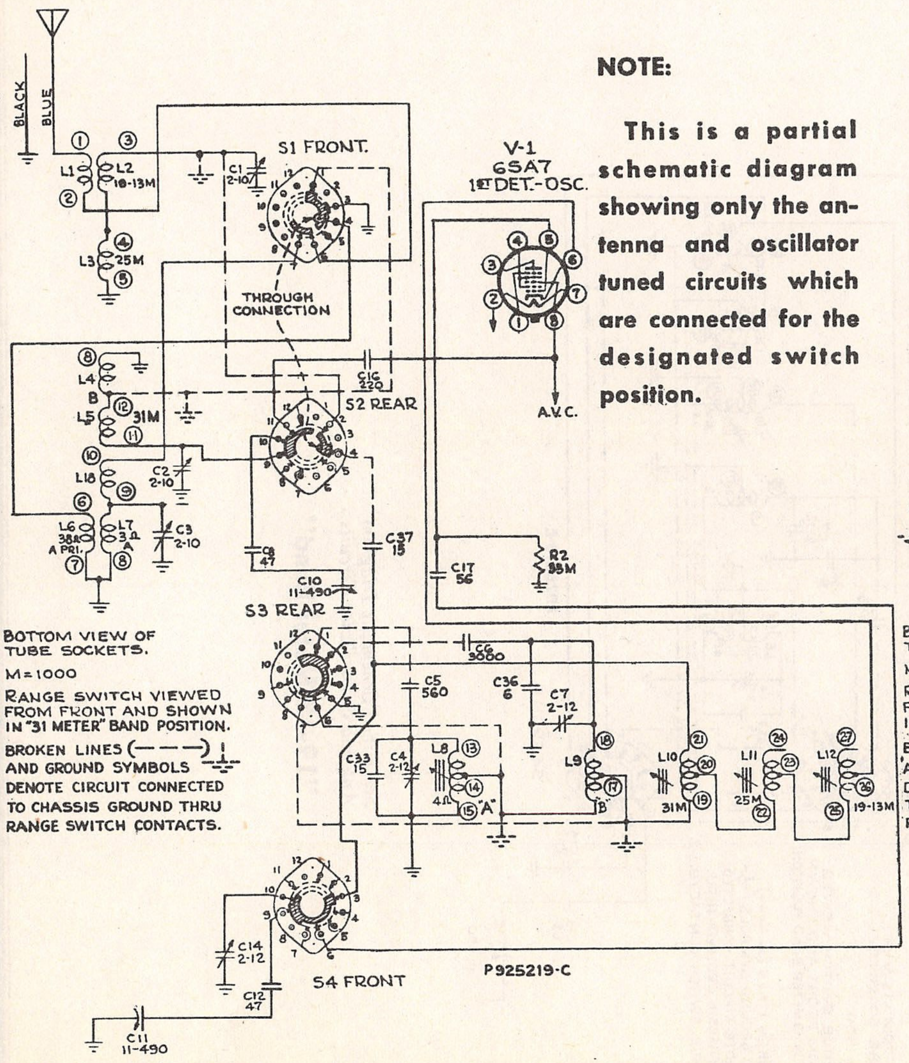
*Simplified Schematic Diagram*
*Antenna & Oscillator Circuits*

**"B Band"**

RCA MFG. CO.

**NOTE:**

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.


BLACK
BLUE
L1
L2 19-13M
L3 25M
C1 2-10
S1 FRONT.
THROUGH CONNECTION
V-1
6SA7
1ST DET.-OSC.
A.V.C.
C16 220
S2 REAR
L4
B
L5 31M
L18
C2 2-10
L6 38Ω A PRI.
L7 3Ω A
C3 2-10
C8 47
C37 15
C17 56
R2 33M
C10 11-490
S3 REAR
C6 3000
C5 560
C36 6
C7 2-12
C33 15
C4 2-12
L8 4Ω "A"
L9 "B"
L10 31M
L11 25M
L12 19-13M
S4 FRONT
C14 2-12
C12 47
C11 11-490
P925219-C

BOTTOM VIEW OF TUBE SOCKETS.

M=1000

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "31 METER" BAND POSITION.

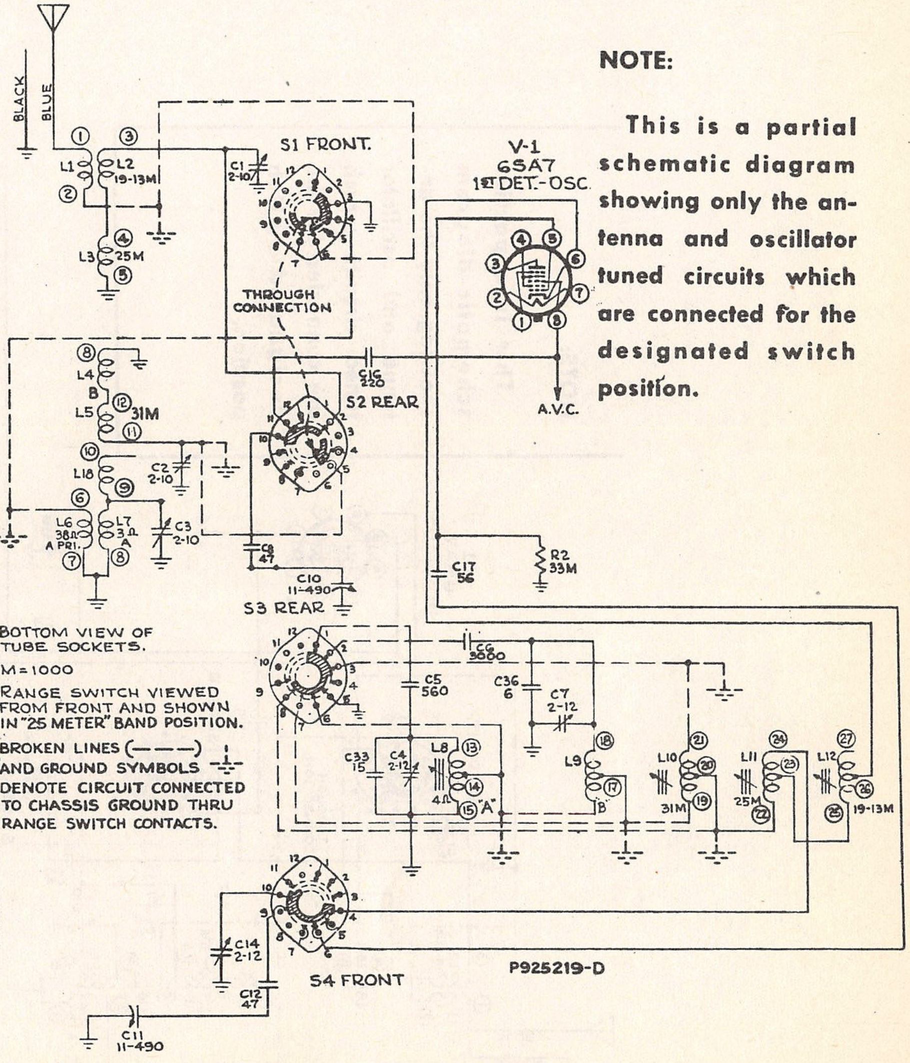
BROKEN LINES (– – – –) AND GROUND SYMBOLS DENOTE CIRCUIT CONNECTED TO CHASSIS GROUND THRU RANGE SWITCH CONTACTS.

*Simplified Schematic Diagram*
*Antenna & Oscillator Circuits*

**"31 Meter Band"**

**NOTE:**

This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.


BLACK
BLUE
L1
L2 19-13M
L3 25M
C1 2-10
S1 FRONT.
THROUGH CONNECTION
V-1
6SA7
1ST DET.-OSC.
A.V.C.
C16 220
S2 REAR
L4
B
L5 31M
L18
C2 2-10
L6 38Ω A PRI.
L7 3Ω A
C3 2-10
C8 47
C17 56
R2 33M
C10 11-490
S3 REAR
C6 3000
C5 560
C36 6
C7 2-12
C33 15
C4 2-12
L8 4Ω "A"
L9 "B"
L10 31M
L11 25M
L12 19-13M
S4 FRONT
C14 2-12
C12 47
C11 11-490
P925219-D

BOTTOM VIEW OF TUBE SOCKETS.

M=1000

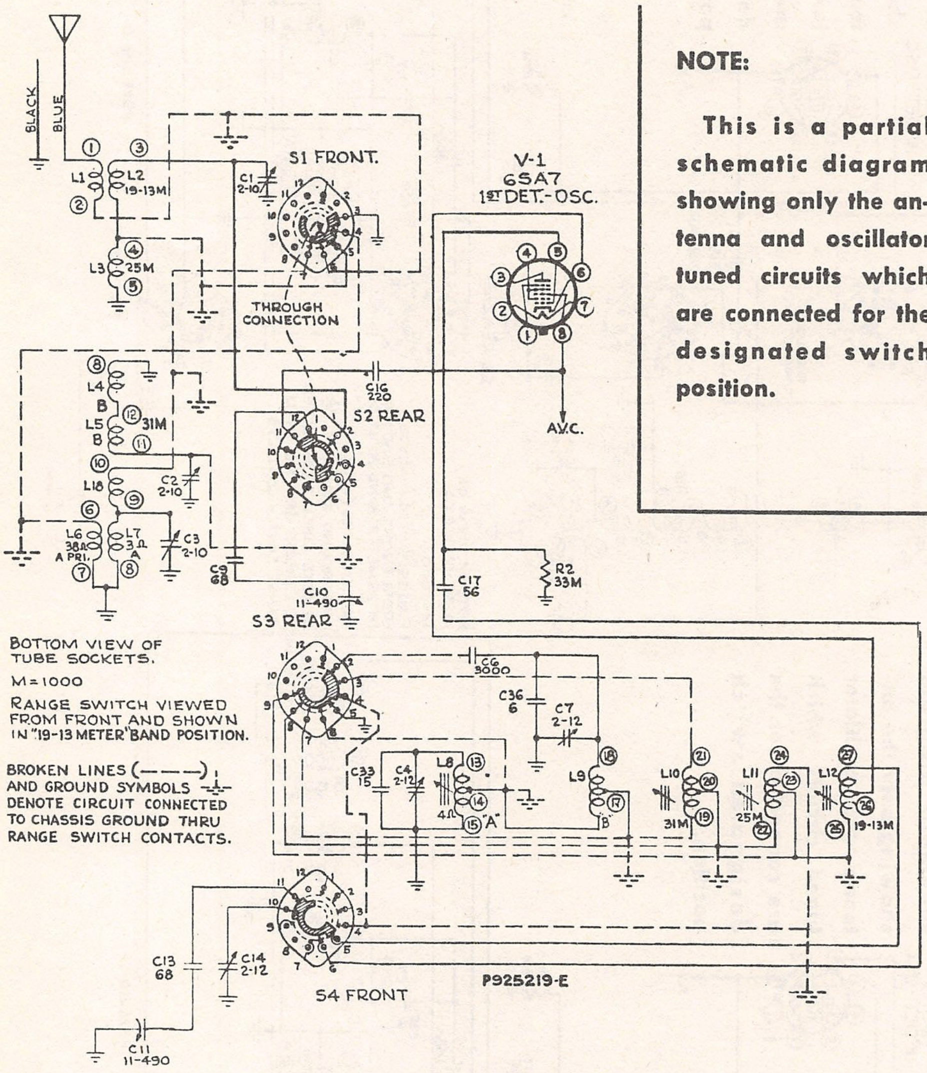
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "25 METER" BAND POSITION.

BROKEN LINES (– – – –) AND GROUND SYMBOLS DENOTE CIRCUIT CONNECTED TO CHASSIS GROUND THRU RANGE SWITCH CONTACTS.

*Simplified Schematic Diagram*
*Antenna & Oscillator Circuits*

**"25 Meter Band"**

## RCA MFG. CO.


BLACK
BLUE
L1
L2 19-13M
L3 25M
S1 FRONT.
C1 2-10
V-1
6SA7
1ST DET.-OSC.
THROUGH CONNECTION
L4
L5 B
31M
L18
C2 2-10
L6 38A A PRI.
L7 3Ω A
C3 2-10
C9 68
C16 220
S2 REAR
A.V.C.
C10 11-490
S3 REAR
C17 56
R2 33M
C6 3000
C36 6
C7 2-12
C33 15
C4 2-12
L8 4Ω "A"
L9 "B"
L10 31M
L11 25M
L12 19-13M
C13 68
C14 2-12
S4 FRONT
P925219-E
C11 11-490

BOTTOM VIEW OF TUBE SOCKETS.

M=1000

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "19-13 METER" BAND POSITION.

BROKEN LINES (— — —), AND GROUND SYMBOLS ⏚ DENOTE CIRCUIT CONNECTED TO CHASSIS GROUND THRU RANGE SWITCH CONTACTS.

**NOTE:**

**This is a partial schematic diagram showing only the antenna and oscillator tuned circuits which are connected for the designated switch position.**

*Simplified Schematic Diagram*
*Antenna & Oscillator Circuits*

**"19-13 Meter Band"**

RCA MFG. CO.

## Alignment Procedure

**Cathode-Ray Alignment** is the preferable method. Connections for the oscilloscope are shown in the diagram.

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

**Receiver Dial with Calibration Scale.**—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial with calibration scale drawing.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a clip for attachment to the cable.

**Spread-Band Alignment.**—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the oscillator coil magnetite-core for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of the test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator, or by zero-beating against standard broadcast stations.

**When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the oscillator coil magnetite-core for each band should be re-touched so that the stations come in at the correct points on the dial.**

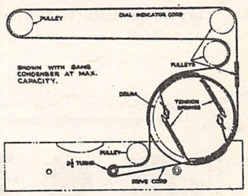
| Steps | Connect the high side of the test-osc. to— | Tune test-osc. to— | Range switch | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|---|
| 1 | I-F grid in series with .01 mfd. | 455 kc | A | Quiet point near 180° | L16—L15 2nd I-F transformer |
| 2 | 1st Det. grid, in series with .01 mfd. | | | | L14—L13 1st I-F transformer |
| 3 | Ant. lead in series with 300 ohms | 11.8 mc | 25M | 138.5° | L11 (osc.)*<br>C1 (ant.) |
| 4 | | 15.2 mc | | 17° | C14 (osc.)*** |
| 5 | | Repeat steps 3 and 4. | | | |
| 6 | | 15.2 mc | 19-13M | 156° | L12 (osc.)* |
| 7 | | 9.5 mc | 31M | 156° | L10 (osc.)*<br>C2 (ant.) |
| 8 | | 9.5 mc | B | 11.5° | C7 (osc.)** |
| 9 | Ant. lead in series with 200 mmf. | 1,500 kc | A | 26° | C4 (osc.)**<br>C3 (ant.) |
| 10 | | 600 kc | | 150° | L8 (osc.)*<br>(Rock gang.) |
| 11 | | Repeat steps 9 and 10. | | | |

*If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

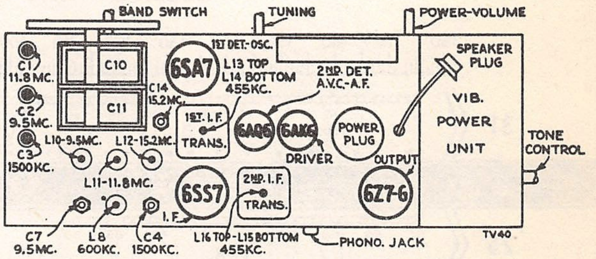
**Use minimum capacity peak if two can be obtained.

***Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

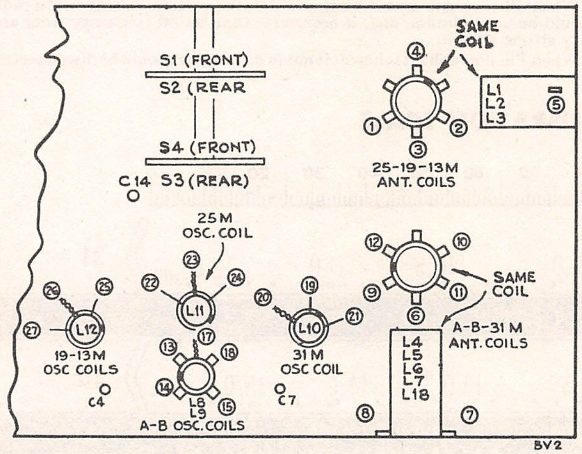
**NOTE:** Oscillator tracks above signal on all bands.


PULLEY
DIAL INDICATOR CORD
PULLEYS
SHOWN WITH GANG CONDENSER AT MAX. CAPACITY.
DRUM
TENSION SPRINGS
PULLEY
2½ TURNS
DRIVE CORD

*Dial-Indicator and Drive Mechanism*


BAND SWITCH
TUNING
POWER-VOLUME
C1 11.8MC.
C2 9.5MC.
C3 1500KC.
C10
C11
6SA7
1ST DET.-OSC.
L13 TOP
L14 BOTTOM
455KC.
C14 15.2MC.
2ND DET. A.V.C.-A.F.
1ST. I.F. TRANS.
6AQ6
6AK6
DRIVER
POWER PLUG
SPEAKER PLUG
VIB. POWER UNIT
TONE CONTROL
L10-9.5MC.
L12-15.2MC.
L11-11.8MC.
6SS7
2ND. I.F. TRANS.
I.F.
OUTPUT
6Z7-6
C7 9.5MC.
L8 600KC.
C4 1500KC.
L16 TOP-L15 BOTTOM 455KC.
PHONO. JACK
TV40

*Tube and Trimmer Locations (Top Chassis View)*

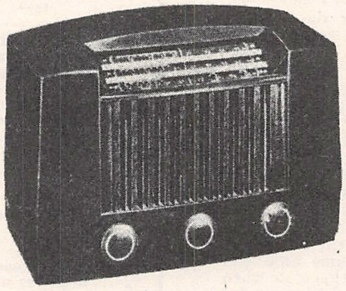

S1 (FRONT)
S2 (REAR
S4 (FRONT)
S3 (REAR)
C14
SAME COIL
L1
L2
L3
25-19-13M ANT. COILS
25M OSC. COIL
L11
SAME COIL
L12
19-13M OSC COILS
C4
L8
L9
A-B OSC. COILS
L10
31 M OSC COIL
C7
A-B-31 M ANT. COILS
L4
L5
L6
L7
L18
BV2

*Coil and Band Switch Locations (Bottom Chassis View)*

**Precautionary Lead Dress.**

1. Twist yellow lead from terminal 14 of L8 to terminal 6 of S3 with the lead from terminal 27 of L12 to terminal 5 of S4.
2. All other oscillator coil leads must be kept apart from each other as well as from other leads and parts. No two leads may be less than ⅛ inch apart.
3. The lead from the tap on 19-13 oscillator coil to pin number 6 (K) of 6SA7 socket should be dressed up and away from all parts as far as possible.
4. Condensers C8, C9 and C16 must be as far away from all metal parts as possible.
5. All leads from the antenna coil to the range switch should be dressed together.
6. The green lead from pin 4 (SG) of 6SA7 socket to pin 6 (SG) of 6SS7 socket should be dressed down against the chassis and away from the I.F. terminals.
7. All leads and parts must clear the tuning flywheel by at least ⅛ inch.
8. The leads to the power switch should be twisted together and dressed away from other leads and parts as much as possible.
9. Capacitor C34 must be mounted edgewise and close to the chassis with the leads as short as possible.
10. The green lead from term. C of 1st I-F trans to pin 4 (G) of 6SS7 must be short and close to chassis under all other leads.

RCA MFG. CO.



## Electrical and Mechanical Specifications

**Frequency Ranges**

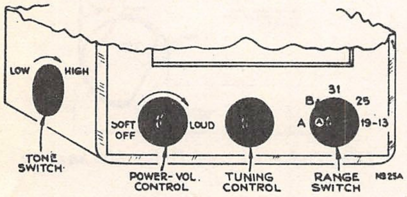
Standard Broadcast ("A" Band)...............540-1,720 kc (555-174 m)
Medium Wave ("B" Band)....................2.9-9.5 mc (103-31.6 m)
"31" Meter Spread Band........................9.5-12 mc (31.6-25 m)
"25" Meter Spread Band.........................11.7-15 mc (25.6-20 m)
"19-13" Meter Spread Band..................15.1-22 mc (19.9-13.6 m)

**Intermediate Frequency**.........................................455 kc

**RCA Tube Complement**

| RC-529A | RC-612 | |
|---|---|---|
| (1) RCA-6SA7 | RCA-6SA7 | 1st-Det.—Osc. |
| (2) RCA-6S7* | RCA-6SS7 | I-F Amplifier |
| (3) RCA-6T7-G* | RCA-6AQ6 | 2nd-Det., A.V.C., and 1st Audio |
| (4) RCA-6J7 | RCA-6AK6 | Driver |
| (5) RCA-6Z7-G | RCA-6Z7G | Power Output |

*In some units, a 6K7 may be substituted for the 6S7 and a 6Q7 in place of the 6T7G.


LOW
HIGH
TONE SWITCH
SOFT OFF
LOUD
POWER-VOL. CONTROL
TUNING CONTROL
31
B
25
A
19-13
RANGE SWITCH
M825A

*Location of Controls*

**Power Supply Rating**

With vibrator power supply unit (RS-115):
6.3 volts, total current drain *RC-529A....................3.35 amperes
RC-612....................3.2 amperes

*If both tube substitutions are made, the total current consumption will be increased to 3.65 Amperes.

| **Power Output** | **RC-529A** | **RC-612** |
|---|---|---|
| Undistorted | 3.1 watts | 2.1 watts |
| Maximum | 4.5 watts | 3.1 watts |

**Loudspeaker (92519-1)**

Type............................6½ inch, permanent-magnet dynamic
Voice-coil Impedance at 400 cycles..........................3.4 ohms

| | | Height | Length | Depth |
|---|---|---|---|---|
| **Cabinet Dimensions** | QB11 | 11⅝" | 17⅛" | 7½" |
| | QB12 & QB13 | 10⅞" | 16¼" | 7⅝" |

| | | |
|---|---|---|
| Net Weight | QB11 | 21.5 lbs. |
| | QB12 & QB13 | 20.0 lbs. |

Tuning Drive Ratio..............................................25:1

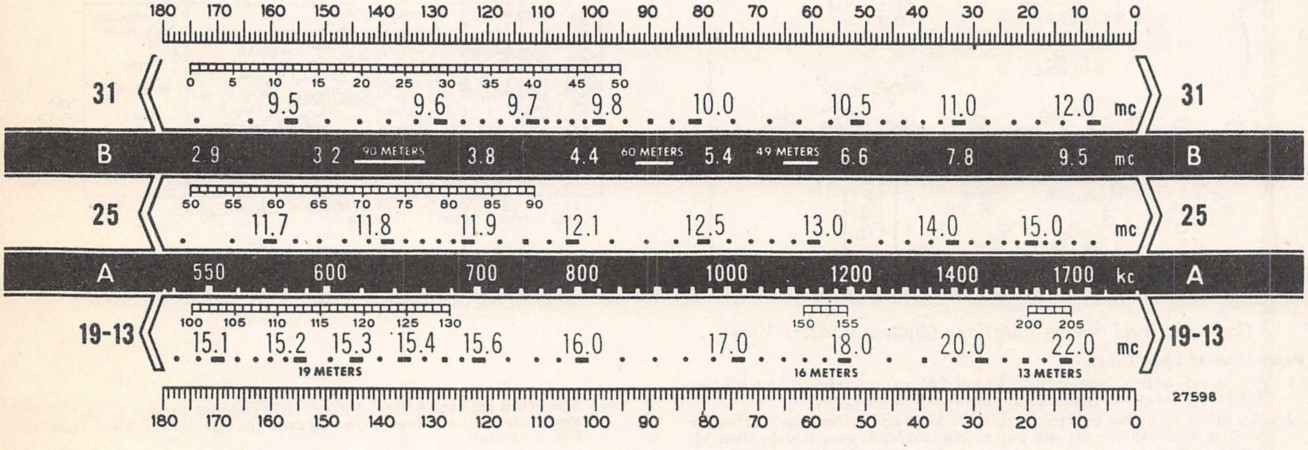
**Phonograph Attachment**

A jack is provided on the rear of chassis for connecting a Phonograph attachment to the audio amplifying circuit.

When Phonograph attachment is in use, the volume control on the radio should be at minimum, and, if necessary, tune set off frequency from any very strong station.

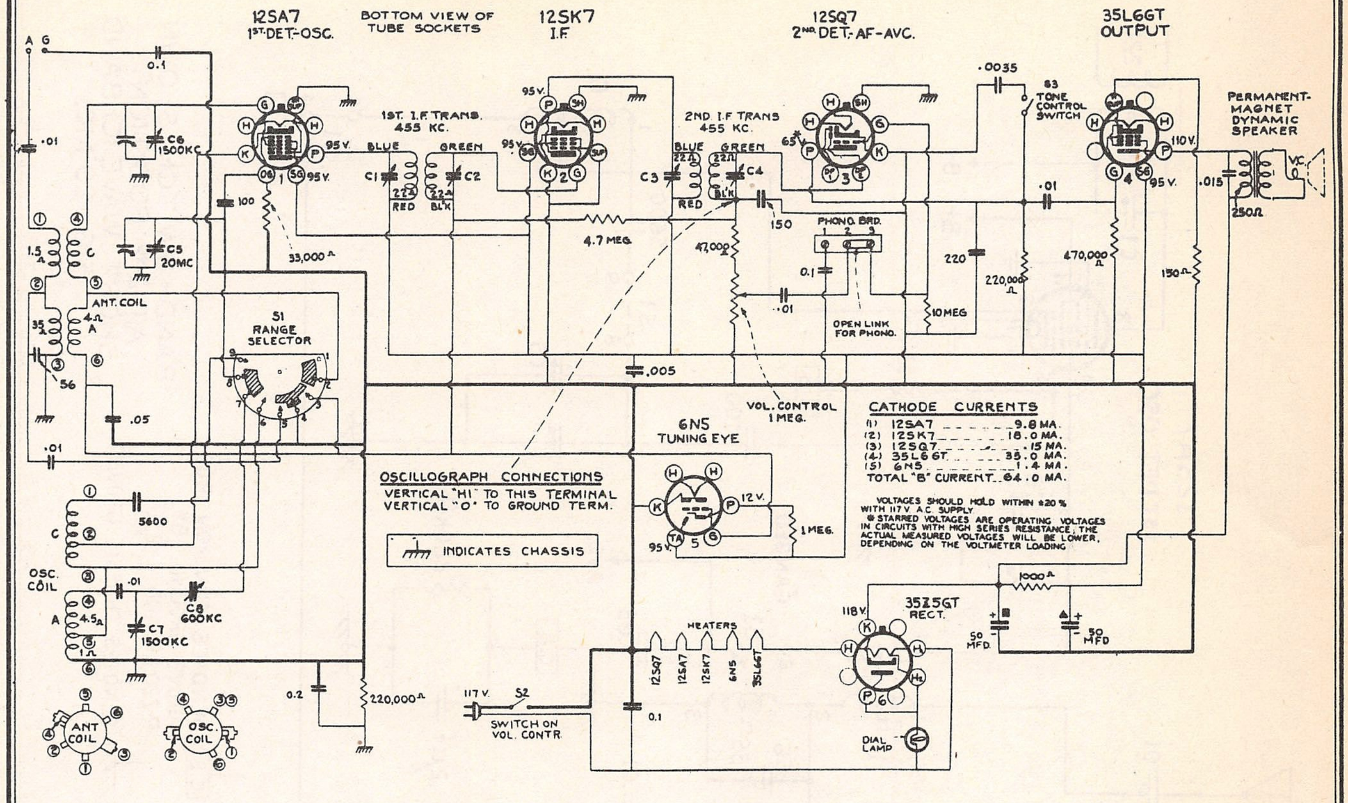
When Phonograph attachment is not in use its plug should be disconnected.

## RECEIVER DIAL WITH CALIBRATION SCALE


180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
31
0 5 10 15 20 25 30 35 40 45 50
9.5 9.6 9.7 9.8 10.0 10.5 11.0 12.0 mc
B
2.9 3.2 90 METERS 3.8 4.4 60 METERS 5.4 49 METERS 6.6 7.8 9.5 mc
25
50 55 60 65 70 75 80 85 90
11.7 11.8 11.9 12.1 12.5 13.0 14.0 15.0 mc
A
550 600 700 800 1000 1200 1400 1700 kc
19-13
100 105 110 115 120 125 130
150 155
200 205
15.1 15.2 15.3 15.4 15.6 16.0 17.0 18.0 20.0 22.0 mc
19 METERS
16 METERS
13 METERS
27598
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

*Reduced Reproduction of Receiver Dial and Corresponding 0-180° Calibration Scales*

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."


12SA7
1ST. DET.-OSC.
BOTTOM VIEW OF TUBE SOCKETS
12SK7
I.F.
12SQ7
2ND. DET.-AF-AVC.
35L6GT
OUTPUT
A G
0.1
.01
C6 1500KC
C5 20MC
1.5Ω
C
35Ω
ANT. COIL
4Ω
A
56
.05
.01
S1
RANGE SELECTOR
100
33,000Ω
95V.
1ST. I.F. TRANS. 455 KC.
BLUE
GREEN
C1
C2
22Ω
RED
BL'K
4.7 MEG.
2ND I.F. TRANS 455 KC.
C3
C4
150
47,000Ω
0.1
.01
PHONO. BRD.
OPEN LINK FOR PHONO.
10MEG
65V.*
.0035
S3 TONE CONTROL SWITCH
220
220,000Ω
.01
470,000Ω
110V.
.015
150Ω
250Ω
PERMANENT-MAGNET DYNAMIC SPEAKER
V.C.
.005
VOL. CONTROL 1 MEG.
6N5
TUNING EYE
12V.
1MEG.
OSCILLOGRAPH CONNECTIONS
VERTICAL "HI" TO THIS TERMINAL
VERTICAL "O" TO GROUND TERM.
INDICATES CHASSIS
CATHODE CURRENTS
(1) 12SA7 9.8 MA.
(2) 12SK7 18.0 MA.
(3) 12SQ7 .15 MA.
(4) 35L6GT 35.0 MA.
(5) 6N5 1.4 MA.
TOTAL "B" CURRENT 64.0 MA.
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. A.C. SUPPLY
* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE; THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING
5600
OSC. COIL
.01
C8 600KC
C7 1500KC
4.5Ω
1Ω
0.2
220,000Ω
117V.
S2
SWITCH ON VOL. CONTR.
HEATERS
12SQ7
12SA7
12SK7
6N5
35L6GT
0.1
118V.
35Z5GT
RECT.
1000Ω
50 MFD.
50 MFD
DIAL LAMP
ANT COIL
OSC. COIL

| STOCK No. | DESCRIPTION |
|---|---|
| | **CHASSIS ASSEMBLIES (RC-474D)** |
| 33719 | Belt—Push button adjusting belts |
| 34024 | Board—"Antenna-Ground" board |
| 34025 | Board—"Radio-Phono" board |
| 33731 | Button—Push button |
| 30766 | Cap—Rubber shield for Magic Eye |
| 33629 | Capacitor—Trimmer capacitor comprising of 2 sections (C7, C8) |
| 12723 | Capacitor—56 mmfd., moulded mica |
| 12720 | Capacitor—100 mmfd., moulded mica |
| 12725 | Capacitor—150 mmfd., moulded mica |
| 12694 | Capacitor—220 mmfd., moulded mica |
| 13895 | Capacitor—5,600 mmfd., moulded mica |
| 30303 | Capacitor—.0035 mfd., 700 volts |
| 33584 | Capacitor—.005 mfd., 1,200 volts |
| 4937 | Capacitor—.01 mfd., 500 volts |
| 11315 | Capacitor—.015 mfd., 400 volts |
| 4870 | Capacitor—.025 mfd., 400 volts |
| 32787 | Capacitor—.05 mfd., 400 volts |
| 4839 | Capacitor—0.1 mfd., 400 volts |
| 34505 | Capacitor—0.2 mfd., 300 volts |
| 34212 | Capacitor—Comprising 2 sections of 50 mfd., each, 150 volts |
| 30716 | Clip—Magic Eye clip |
| 33732 | Coil—Antenna coil |
| 33733 | Coil—Oscillator coil |
| 33635 | Condenser—Tuning condenser and drum assembly |
| 33631 | Control—Volume control and power switch |
| 32634 | Cord—Tuning condenser drive cord |
| 33633 | Indicator—Station selector pointer |
| 11765 | Lamp—Dial lamp—Mazda No. 51 |
| 33734 | Plate—Dial plate complete less condenser and button |
| 30880 | Resistor—150 ohms, ½ watt |
| 30152 | Resistor—1,000 ohms, 1 watt |
| 14284 | Resistor—22,000 ohms, 1/10 watt |
| 13998 | Resistor—22,000 ohms, ¼ watt |
| 12454 | Resistor—33,000 ohms, ¼ watt |
| 12412 | Resistor—47,000 ohms, ¼ watt |
| 12264 | Resistor—220,000 ohms, ¼ watt |
| 12285 | Resistor—470,000 ohms, ¼ watt |
| 30271 | Resistor—4.7 megohm, ¼ watt |
| 13601 | Resistor—10 megohm, ¼ watt |
| 33438 | Screw—Magic Eye clip screw |
| 33725 | Shaft—Tuning knob drive shaft and retainer |
| 31365 | Socket—Dial lamp socket |
| 13871 | Socket—Magic Eye socket |
| 31319 | Socket—Tube socket |
| 31418 | Spring—Tuning condenser drive cord spring |
| 33720 | Spring—Push arm return spring |
| 33946 | Switch—Range switch (S1) |
| 34336 | Switch—Tone control switch (S3) |
| 33722 | Transformer—First i-f transformer (C1, C2) |
| 34026 | Transformer—Second i-f transformer (C3, C4) |
| 33726 | Washer—"C" washer for drive shaft |
| | **SPEAKER ASSEMBLIES (RL 85-2)** |
| 32907 | Cap—Cone center dust cap |
| 34554 | Cone—Speaker cone and voice coil |
| 34803 | Transformer—Output transformer |
| | **MISCELLANEOUS ASSEMBLIES** |
| 31456 | Cover—8-protective covers for push button markers |
| 34270 | Dial—Glass dial scale |
| 33637 | Escutcheon—Dial and button escutcheon |
| 30863 | Knob—Tuning, tone, range or volume control |
| 33973 | Marker—1 set push button markers |
| 30900 | Spring—Retaining spring for knob or button |

**Short-Wave Sensitivity:**

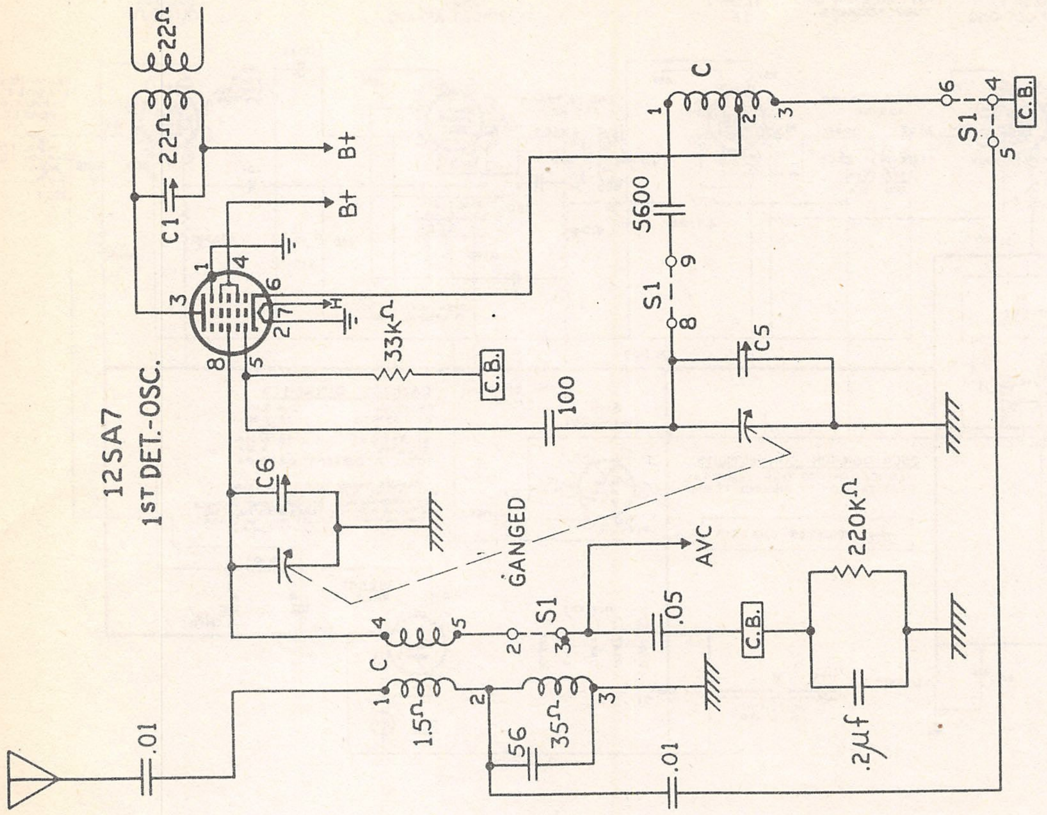
Where insufficient sensitivity is noted on the short-wave band of Model X-60, addition of capacity coupling of 3 or 4 mmfd. between signal and oscillator grids of converter tube will usually restore normal sensitivity to entire band. This coupling can be effected in several ways:

(a) Unsolder one grid lead, take several turns around other lead to give desired capacity, resolder.
(b) Twist several turns of insulated wire around both grid leads to give desired value of capacity coupling.
(c) Install a 3 to 4 mmfd. capacitor between tube grids.

# "clarified schematics"

MODEL X60

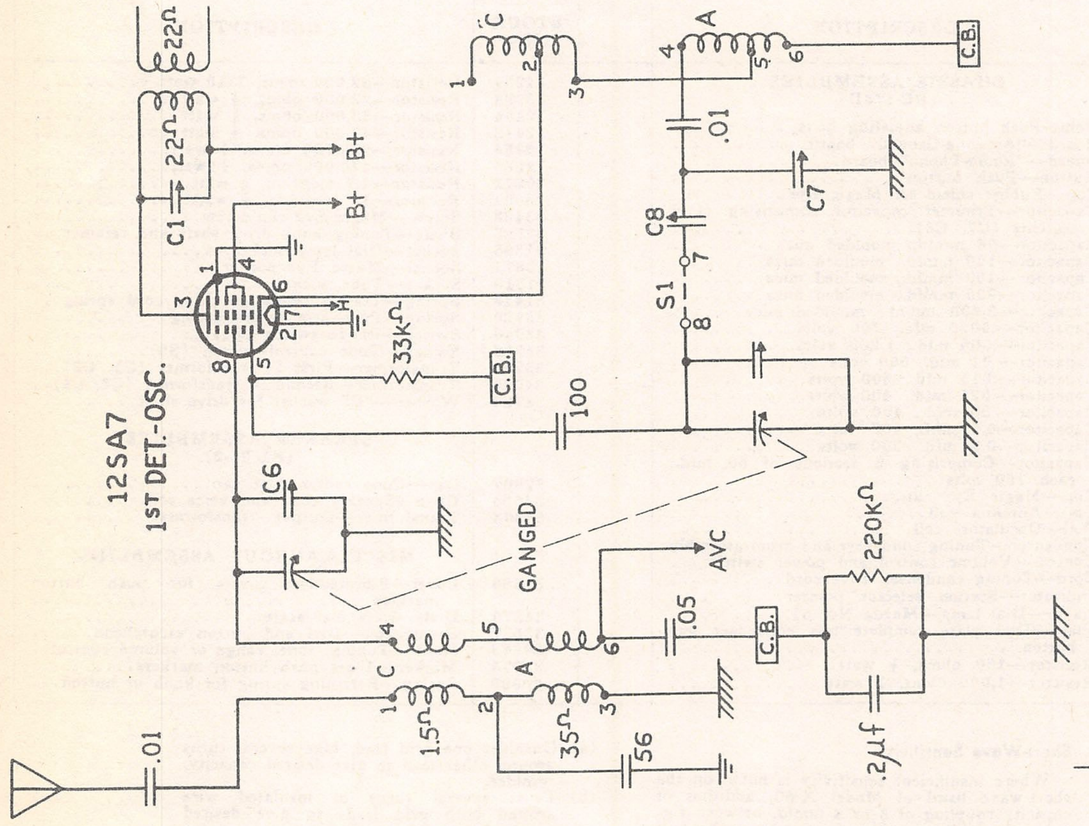
## RCA MFG. CO.


12SA7
1ST DET.-OSC.
C1
22Ω
22Ω
B+
B+
33kΩ
C.B.
100
C6
GANGED
C5
5600
S1
AVC
.05
C.B.
220kΩ
.2μf
C
1.5Ω
35Ω
56
.01
.01
S1
C.B.

BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE (C) BAND
5.6 - 20 MC.

C.B. DENOTES COMMON BUS
ABOVE GROUND BY
R-220KΩ AND C-.2μf.

DENOTES CHASSIS GROUND.


12SA7
1ST DET.-OSC.
C1
22Ω
22Ω
B+
B+
33kΩ
C.B.
100
C6
GANGED
C
A
C.B.
.01
C7
C8
S1
AVC
.05
C.B.
220kΩ
.2μf
1.5Ω
35Ω
56
.01

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST (A) BAND
540 - 1720 KC.

C.B. DENOTES COMMON BUS
ABOVE GROUND BY
R220KΩ AND C-.2μf.

DENOTES CHASSIS GROUND.

## Electrical and Mechanical Specifications

| Frequency Ranges | |
|---|---|
| Standard Broadcast | 540-1,720 kc |
| Short Wave | 5.6-20 mc |
| Intermediate Frequency | 455 kc |
| Number of Push Buttons | Six |

| Tube Complement | |
|---|---|
| (1) RCA-12SA7 | First Detector-Oscillator |
| (2) RCA-12SK7 | I-F Amplifier |
| (3) RCA-12SQ7 | Second Detector, A-F, and A.V.C. |
| (4) RCA-35L6GT | Power Output |
| (5) RCA-6N5 | Magic Eye |
| (6) RCA-35Z5GT | Rectifier |
| Dial Lamp | Mazda No. 51, 7.5 volts, 0.20 amp. |

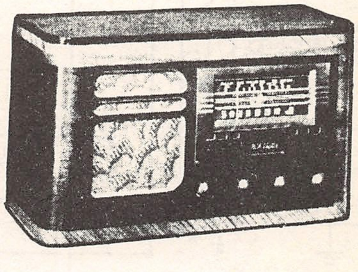
| Power Output (125 volts, 60 cycle supply) | |
|---|---|
| Undistorted | 0.8 watts |
| Maximum | 1.4 watts |

| Power Supply Ratings | |
|---|---|
| A-C Rating | 105-125 volts, 50-60 cycles, 35 watts |
| D-C Rating | 105-125 volts, direct current, 35 watts |

| Loudspeaker (RL 85-2) | |
|---|---|
| Type | 5-inch permanent magnet dynamic |
| V.C. impedance at 400 cycles | 4.5 ohms |

| | Height | Width | Depth |
|---|---|---|---|
| Cabinet Dimensions (inches) | 9⅝ | 16 | 7 |
| Chassis Base Dimensions (inches) | 2-3/16 | 12⅛ | 5¾ |

| | |
|---|---|
| Overall Chassis Height | 6⅝ inches |
| Shipping Weight | 15 pounds |
| Tuning Drive Ratio | 10:1 |



## Adjustments for Push-Button Tuning

The push-buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Pull off the push-buttons and loosen the push-button rods with a small screwdriver.

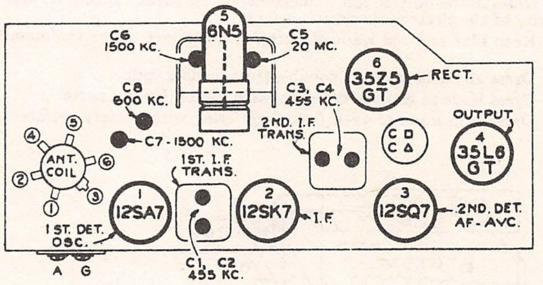
2. Check to be sure the link connection on back of chassis is in "Radio" position (connected between terminals 2 and 3).

3. Press in push-button No. 1 (left) as far as it will go without undue pressure, hold in, retune station with manual control if necessary for best reception, and then carefully tighten up the rod. Do not tighten more than ½ turn after the screw begins to grip or damage to the mechanism may result.

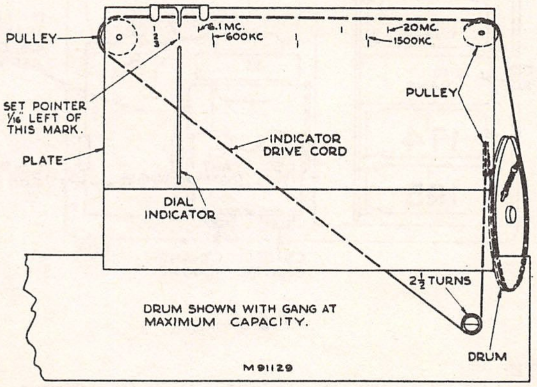
4. Replace the push-button on its shaft.

5. Proceed in a similar manner for the remainder of the push-buttons.

6. Insert the station marker tabs in the recesses above the push-buttons.



*Tube and Trimmer Locations*



*Dial-Indicator and Drive Mechanism*

## Alignment Procedure

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown in the schematic drawing.

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver ground binding post, and keep the output as low as possible to avoid A.V.C. action.

**Calibration Marks.**—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, 6.1 mc, and 20 mc have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

**Dial Indicator Adjustment.**—With the gang condenser in full mesh, the indicator should point 1/16 inch to the left of the mark at the extreme left (low frequency) end of the dial scale.

| Steps | Connect the high side of the test osc. to— | Tune test osc. to— | Turn radio dial to— | Adjust the following for maximum peak output |
|---|---|---|---|---|
| 1 | Antenna terminal | 455 kc | "A" Band Quiet Point between 550-750 kc | C3 and C4 (2nd I-F trans.) |
| 2 | | | | C1 and C2 (1st I-F trans.) |
| 3 | Antenna terminal in series with 300 ohms | 20 mc | "C" Band 20 mc calibration mark | C5 (osc.) * |
| 4 | Antenna terminal in series with 200 mmf. | 1,500 kc | "A" Band 1,500 kc calibration mark | C7 (osc.)<br>C6 (ant.) |
| 5 | | 600 kc | "A" Band 600 kc calibration mark | C8 (osc.)<br>Rock gang |
| 6 | Repeat step 4 | | | |

* Use minimum peak if two can be obtained. Check to determine that C5 has been adjusted properly by tuning receiver to approximately 19.09 mc where a weaker signal should be received.

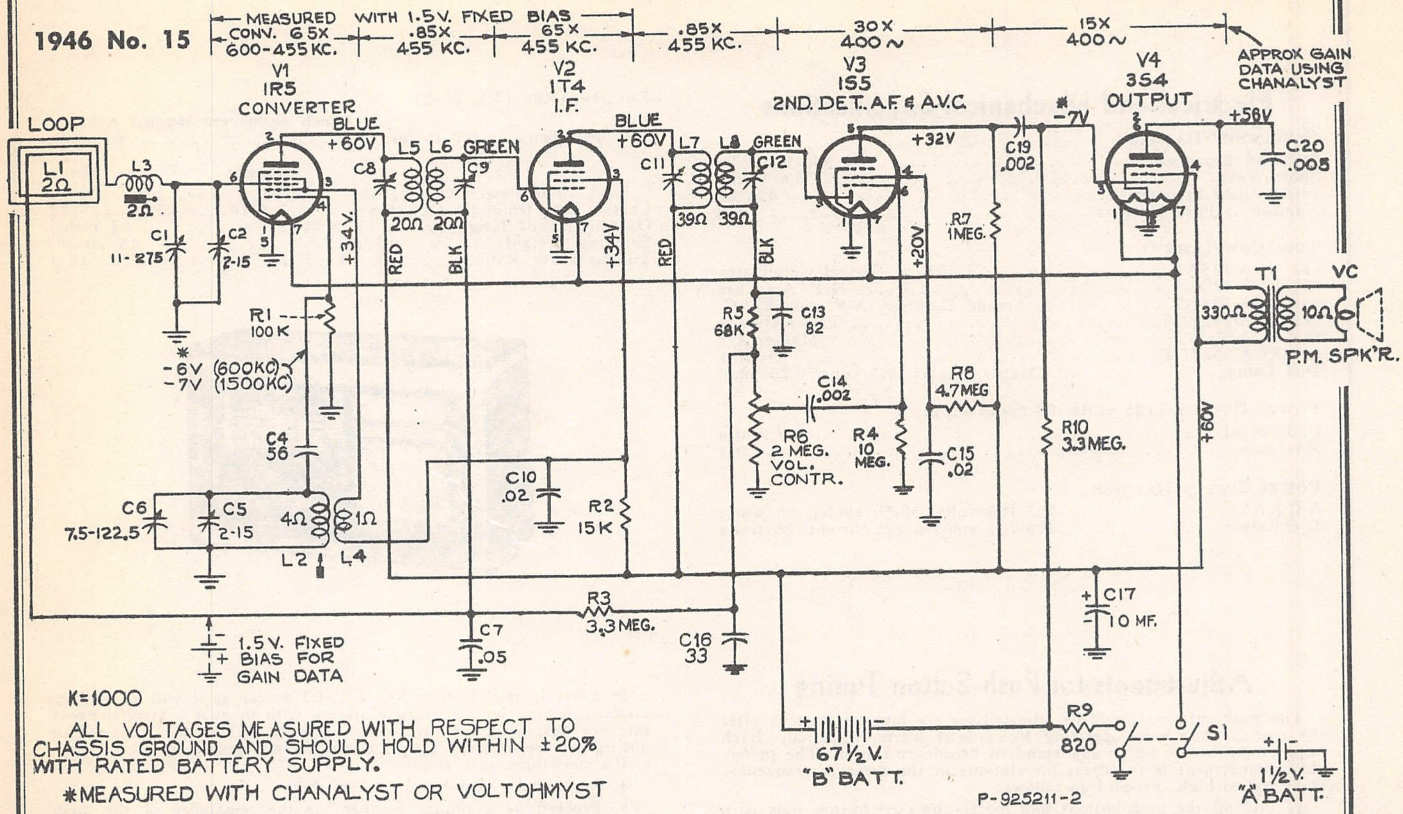
Note: Oscillator tracks above signal on both bands.

MODEL 54B5, Chassis RC1047

# RCA MFG. CO.

IF PEAK 455 KC

**1946 No. 15**


MEASURED WITH 1.5V. FIXED BIAS
CONV. 65X 600-455KC.
.85X 455 KC.
65X 455 KC.
.85X 455 KC.
30X 400~
15X 400~
APPROX GAIN DATA USING CHANALYST
V1 1R5 CONVERTER
V2 1T4 I.F.
V3 1S5 2ND. DET. A.F. & A.V.C.
V4 3S4 OUTPUT
LOOP
L1 2Ω
L3 2Ω
C1 11-275
C2 2-15
BLUE +60V
L5 L6 GREEN
C8 C9
20Ω 20Ω
RED BLK
+34V
BLUE +60V
L7 L8 GREEN
C11 C12
39Ω 39Ω
+32V
*-7V
C19 .002
+56V
C20 .005
R7 1MEG.
+20V
R1 100K
*-6V (600KC) -7V (1500KC)
C4 56
C6 7.5-122.5
C5 2-15
4Ω 1Ω
L2 L4
C10 .02
R2 15K
R3 3.3MEG.
C7 .05
C16 33
R5 68K
C13 82
C14 .002
R6 2 MEG. VOL. CONTR.
R4 10 MEG.
R8 4.7MEG
C15 .02
R10 3.3MEG.
+60V
T1 VC
330Ω 10Ω
P.M. SPK'R.
C17 10 MF.
R9 820
S1
67½V. "B" BATT.
1½V. "A" BATT.
1.5V. FIXED BIAS FOR GAIN DATA
P-925211-2

K=1000

ALL VOLTAGES MEASURED WITH RESPECT TO CHASSIS GROUND AND SHOULD HOLD WITHIN ±20% WITH RATED BATTERY SUPPLY.

*MEASURED WITH CHANALYST OR VOLTOHMYST

## Alignment Procedure

**Test Oscillator.**—Connect test oscillator as indicated in chart keeping the output as low as possible to avoid A V C action.

**Output Meter.**—Connect a high resistance AC voltmeter in series with a .1 mfd capacitor from top lug of TB1 (plate of 3S4) to ground. Turn volume control to maximum position.

Fig. 1 shows the modifications necessary to convert a case into a convenient shield to be used as a substitute for the regular case in the Ant. Osc. alignment.

When using the dummy case for the osc. alignment, the loop assembly must be raised slightly so that osc. trimmer becomes accessible.

| Steps | Connect the high side of test osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | lug of C2, (located on rear of gang) through a .01 mfd. capacitor | 455 kc | Quiet point near 1,600 kc | C11, C12 2nd I-F trans. |
| 2 | | 455 kc | Quiet point near 1,600 kc | C8, C9 1st I-F trans. |
| 3 | **Antenna coupling loop thru 200 mmf. capacitor | 1,600 kc | 1,600 kc | C5 (osc.) |
| 4 | | 1,500 kc | 1,500 kc | C2 (ant.) |
| 5 | | 600 kc | 600 kc | L2 (osc.) (Rock gang) |
| 6 | Repeat steps 4 and 5 for final adjustments. | | | |

*The IF transformers can be aligned with chassis out of case.

**Steps 3, 4 and 5 require a coupling loop from the signal generator to feed a signal into the receiver loop located in the back. This loop should be approximately one turn of 6 x 3½ inches coupled to the signal generator through a 200 mmf. capacitor, and loosely coupled to the receiver loop antenna at about 1¾ inches distance, so as not to disturb the receiver loop inductance. Ground test oscillator through .1 mf. capacitor to receiver chassis.

### CRITICAL LEAD DRESS

1. Dress blue, green and black leads of second IF transformer as direct as possible. If excess lead exists, dress down side of socket and flat against chassis to transformer opening.
2. Cross the green and the black leads inside the first IF transformer can, keeping the green lead to the outside. Load coil bracket is to separate the blue and the green leads.
3. Dress audio coupling capacitor C14 and the lead to the volume control up and underneath shelf supporting the output transformer.
4. Wire in the three capacitors pyramided behind the speaker with enough space behind the battery holder to allow holder to move when battery is replaced. Dress the ground leads of these capacitors to keep from shorting the off-on switch.
5. Observe the outside foil connections on all paper capacitors, also the polarity of the electrolytic capacitor C17.
6. Keep blue and red leads of output transformer above the mounting shelf.
7. Dress all leads as far as possible from loading coil.
8. Dress leads to gang as far as possible from all metal parts.
9. Dress loop leads to keep from interfering with battery replacement.

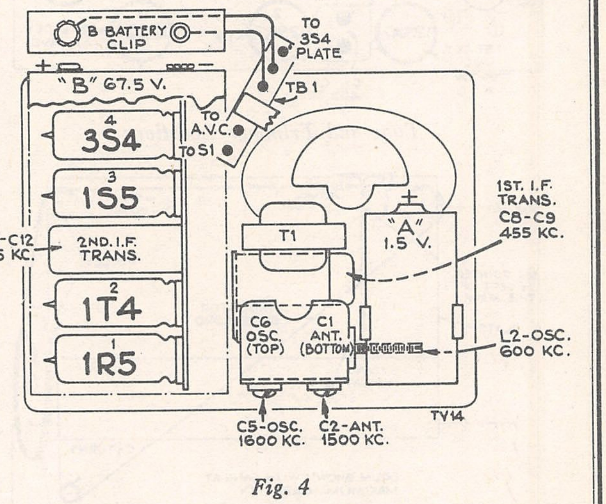

B BATTERY CLIP
TO 3S4 PLATE
TB1
"B" 67.5 V.
TO A.V.C.
TO S1
4 3S4
3 1S5
C11-C12 455 KC.
2ND. I.F. TRANS.
2 1T4
1 1R5
T1
"A" 1.5 V.
1ST. I.F. TRANS. C8-C9 455 KC.
C6 OSC. (TOP)
C1 ANT. (BOTTOM)
L2-OSC. 600 KC.
C5-OSC. 1600 KC.
C2-ANT. 1500 KC.
TY14

*Fig. 4*

NOTE:
A rubber band should be placed around each tube for cushioning. Dirty tube contacts may be mistaken for a defective tube.

## Replacement of Component Parts

**I. To remove tubes:**
- a. Slide back cover towards handle.
- b. Remove both batteries.
- c. Pry tubes out of sockets by gently wedging small screwdriver between base of tubes and sockets.

**II. To replace batteries:**
- a. Slide back cover towards handle.
- b. Remove, either or both, the "A" and "B" battery as the case may warrant. The "B" battery snap fasteners can best be removed by inserting a screwdriver under the snap fastener strip and prying upward.

**III. To remove loop:**
- a. Remove "A" and "B" batteries (see item II).
- b. Unsolder loop leads from terminals on battery holder.
- c. Remove four mounting screws "B" in the four corners as indicated in fig. 2 and lift off.

**IV. To remove chassis:**
- a. Remove loop.
- b. Remove the two screws "H" holding the switch bracket.
- c. Remove the two chassis mounting screws "A", fig. 2.

**V. To remove speaker**
- a. Remove volume control knob by loosening set screw and pull.
- b. Unsolder voice coil leads, and remove the two mounting screws "C", fig. 2.
- c. Slide speaker out.

**VI. To remove output transformer:**
- a. Remove speaker and keep it clear of metal particles.
- b. Drill out mounting rivet, and bend tabs (when replacing use small screw).
- c. Unsolder leads and lift out.

**VII. To remove chassis mounting plate:**
- a. Unsolder copper strip under 3S4 tube.
- b. Remove two screws (F) holding tube shelf to front plate. These screws are located between tubes 1R5 and 1T4, also 3S4 and 1S5. Rubber shock mounts may stick on studs, pry loose.
- c. Remove nut (G) beneath tube shelf below second I-F transformer.
- d. Remove screw (G) beneath the negative terminal of "A" battery holder, and also screw (G) adjacent to volume control below "A" battery holder.
- e. Carefully invert the chassis.
- f. Remove volume control wheel (loosen set screw and pull off).
- g. Lift the mounting plate off.

**VIII. To remove volume control:**
- a. Remove "A" battery holder.
- b. Unsolder volume control leads.
- c. Remove chassis mounting plate (see item VII).
- d. Remove volume assembly by bending tabs and lifting out.

**IX. To remove oscillator coil:**
- a. Remove battery holder.
- b. Remove chassis mounting plate.
- c. Unsolder oscillator coil leads.
- d. Remove coil by unsnapping spring mounting clips from angle bracket.

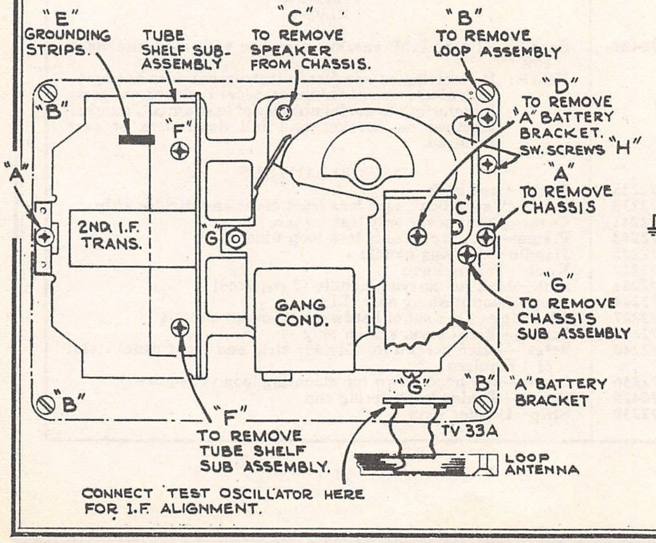
**X. To remove 1st I-F transformer:**
- a. Remove speaker.
- b. Unsolder four leads from 1st I-F transformer.
  1. Blue to plate of 1R5 tube.
  2. Green to grid of 1T4 tube.
  3. Red to B + terminal of 5 lug terminal board adjacent to output transformer.
  4. Black to AVC terminal of same strip as above.
- c. Remove connections as required from two lug terminal board adjacent to 1st I-F transformer to permit this terminal board to be moved to a position free of the 1st I-F transformer.
- d. Unsolder and bend mounting tabs straight on the I-F transformer can. These tabs are immediately below the 2nd I-F transformer on tube shelf.
- e. Slip 1st I-F transformer forward toward volume control and out.

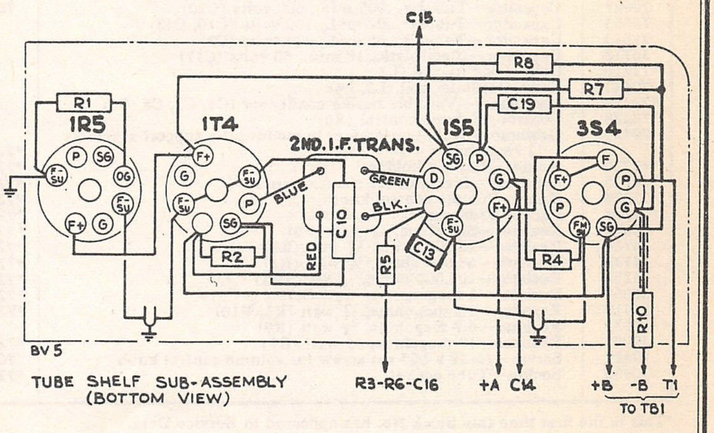
Note: It is possible to fold the 1st I-F transformer out the front of the chassis if the front plate is removed. This will eliminate the unsoldering of leads from the two lug terminal board.

**XI. To remove 2nd I-F transformer:**
- a. Carefully remove the two 0.02 uf C10, C15 capacitors.
- b. Carefully depress the two leads (B+ and A+) near the I-F transformer case mounting lugs and unsolder these tabs from the tube mounting shelf and bend out.
- c. Unsolder the blue (plate of 1T4), green (grid of 1S5), red (B+ on terminal board), and black leads.
- d. Remove 2nd I-F transformer.

**XII. To remove tuning condenser:**
- a. Remove chassis mounting plate (see item VII).
- b. Unsolder leads to tuning gang.
- c. Loosen loading coil if necessary.
- d. Remove two mounting screws and lift out.

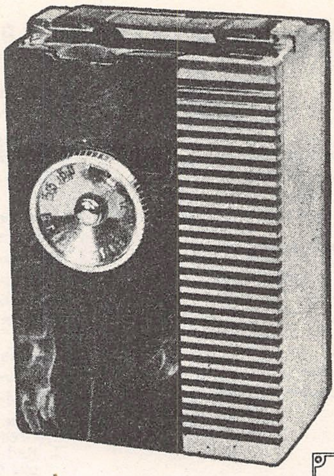
Tools required:
1. One Phillips No. 1 screwdriver.
2. One small insulated alignment tool.
3. Allen wrench for a #6 set screw. (Use to remove volume control wheel.)


"E"
GROUNDING STRIPS.
TUBE SHELF SUB-ASSEMBLY
"C"
TO REMOVE SPEAKER FROM CHASSIS.
"B"
TO REMOVE LOOP ASSEMBLY
"D"
TO REMOVE "A" BATTERY BRACKET.
SW. SCREWS "H"
"A"
TO REMOVE CHASSIS
"G"
TO REMOVE CHASSIS SUB ASSEMBLY
"A" BATTERY BRACKET
"B"
"A"
"F"
2ND I.F. TRANS.
G
C
GANG COND.
"G"
"B"
"F"
TO REMOVE TUBE SHELF SUB ASSEMBLY.
TV 33A
LOOP ANTENNA
CONNECT TEST OSCILLATOR HERE FOR I.F. ALIGNMENT.


C15
R8
R7
C19
R1
1R5
1T4
2ND. I.F. TRANS.
1S5
3S4
P
SG
OG
F-SU
F+
G
BLUE
GREEN
BLK.
RED
C10
D
R2
R5
C13
R4
FM SU
R10
BV5
R3-R6-C16
+A
C14
+B
-B
T1
TO TB1

TUBE SHELF SUB-ASSEMBLY
(BOTTOM VIEW)

# RCA MFG. CO.



## Specifications

**Frequency Range**..............................................550-1,600 kc

**Intermediate Frequency**...................................................455 kc

**Power Supply**

| Type Battery | Current Consumption | Approximate Life (Intermittent Duty) |
|---|---|---|
| "A"—1.5 volt<br>RCA-VS 036 or VS 001 | 0.25 amperes | 5-6 hours |
| "B"—67.5 volts<br>RCA-VS 016 | 8.5 milliamperes | 25-40 hours |

**Power Output**.......Undistorted 0.05 watts.......Maximum 0.12 watts

**Loudspeaker**

Type Permanent-Magnet Dynamic Elliptical...................2 x 3 in.

**Voice Coil Impedance**............................11¾ ohms at 1000 cycles

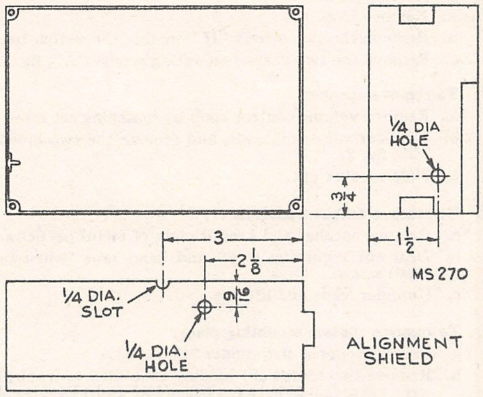


*Fig. 1*

## Replacement Parts

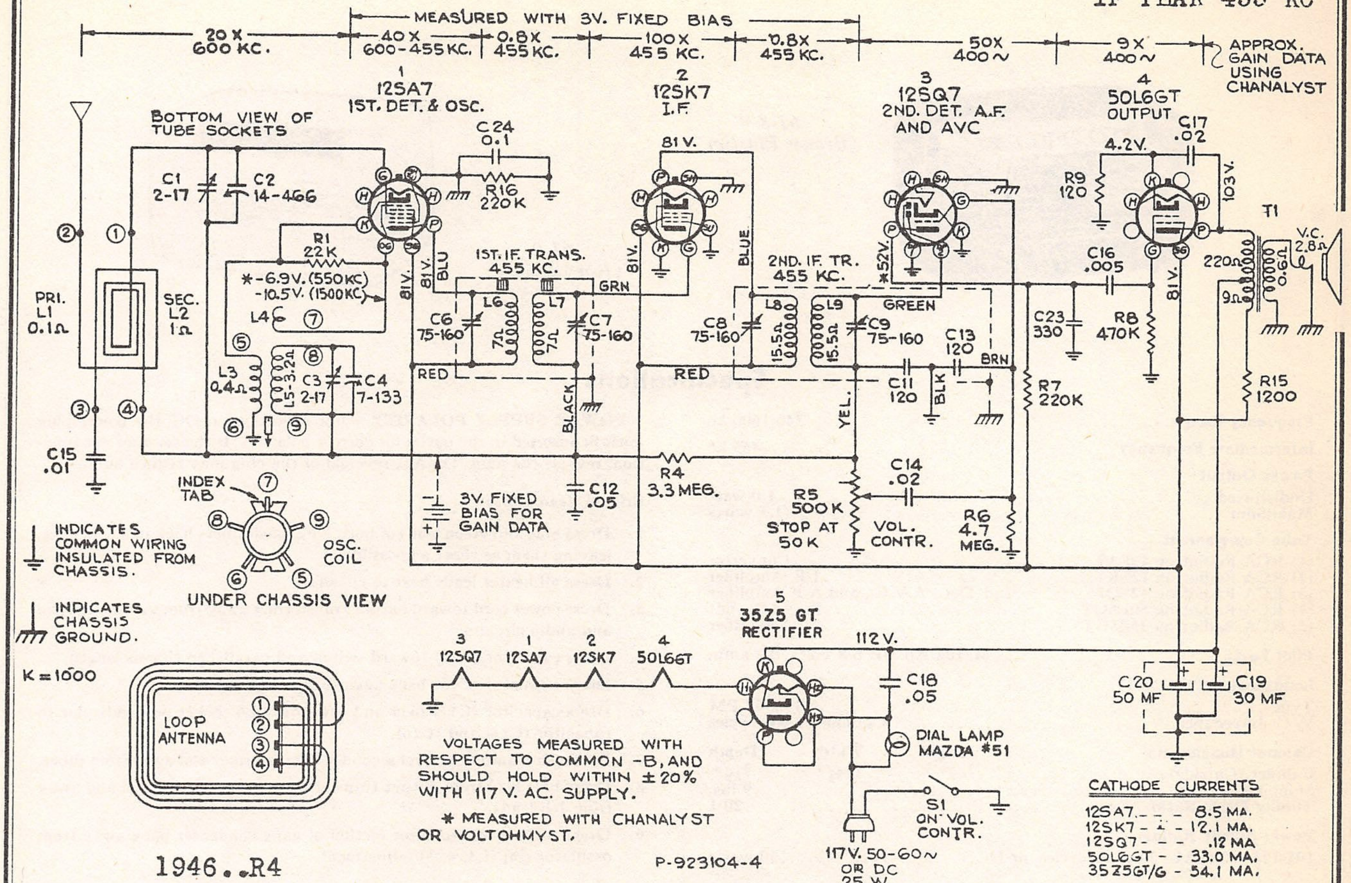
| STOCK No. | DESCRIPTION |
|---|---|
| | **CHASSIS ASSEMBLIES**<br>**RC 1047** |
| 70423 | Band—Rubber band for tubes |
| 70444 | Board—Speaker terminal board (5 contact) |
| 70445 | Board—Terminal board (1 contact) |
| 33111 | Capacitor—Ceramic, 33 mmf. (C16) |
| 71924 | Capacitor—Ceramic, 56 mmf. (C4) |
| 71514 | Capacitor—Ceramic, 82 mmf. (C13) |
| 72315 | Capacitor—Tubular, .002 mfd., 150 volts (C14, C19) |
| 70627 | Capacitor—Tubular, .005 mfd., 600 volts (C20) |
| 70453 | Capacitor—Tubular, .02 mfd., 100 volts (C10, C15) |
| 71013 | Capacitor—Tubular, .05 mfd., 400 volts (C7) |
| 36718 | Capacitor—Electrolytic, 10 mfd., 60 volts (C17) |
| *72215 | Coil—Loading coil (L3) |
| 70443 | Coil—Oscillator coil (L2, L4) |
| *72227 | Condenser—Variable tuning condenser (C1, C2, C5, C6) |
| *72228 | Control—Volume control (R6) |
| 70429 | Grommet—Rubber grommet to mount tube support assembly (2 required) |
| *72229 | Holder—Battery holder |
| *72225 | Insulator—Insulator for chassis panel |
| *72226 | Knob—Volume control knob |
| *72224 | Panel—Front panel |
| 14076 | Resistor—820 ohms, ¼ watt (R9) |
| 36714 | Resistor—15,000 ohms, ¼ watt (R2) |
| 14138 | Resistor—68,000 ohms, ¼ watt (R5) |
| 3252 | Resistor—100,000 ohms, ¼ watt (R1) |
| 30652 | Resistor—1 megohm, ¼ watt (R7) |
| 31417 | Resistor—3.3 megohms, ¼ watt (R3, R10) |
| 30931 | Resistor—4.7 megohms, ¼ watt (R8) |
| 30992 | Resistor—10 megohms, ¼ watt (R4) |
| 70527 | Screw—#6-32 x 5/16" set screw for volume control knob |
| 70436 | Socket—Tube socket |
| *72230 | Support—Tube support less tube socket and transformer |
| *72231 | Switch—Power switch (S1) |
| 70440 | Transformer—Output transformer (T1) |
| 70442 | Transformer—First I. F. transformer (L5, L6, C8, C9) |
| 70437 | Transformer—Second I. F. transformer (L7, L8, C11, C12) |
| | **SPEAKER ASSEMBLY**<br>**92523-3W**<br>**RL95-4** |
| 70428 | Speaker—2 x 3" P.M. speaker complete with cone and voice coil<br>NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required. |
| | **MISCELLANEOUS** |
| *72233 | Back—Case back |
| *72238 | Case—"Jewel Box" case less front cover and divider strip |
| *72241 | Cover—Front cover only less screen |
| *72243 | Frame—Loop frame only less loop winding |
| *72235 | Handle—Carrying handle |
| *72232 | Knob—Tuning knob |
| *72234 | Link—Link for carrying handle (2 required) |
| *72244 | Loop—Loop winding only (L1) |
| *72237 | Mounting—One set of hardware to mount chassis |
| *72242 | Screen—Front cover screen only |
| *72240 | Screw—Drive screws for Divider strip and front panel (total of 4 required) |
| *72236 | Screw—Flat head screw for mounting loop (4 required) |
| 70425 | Spring—Tuning knob spring clip |
| *72239 | Strip—Divider strip |

*This is the first time this Stock No. has appeared in Service Data.

## RCA MFG. CO.

**MODELS 61-8, 61-9,**
**Chassis RC1034**

IF PEAK 455 KC


MEASURED WITH 3V. FIXED BIAS
20 X 600 KC.
40 X 600-455 KC.
0.8 X 455 KC.
100 X 455 KC.
0.8 X 455 KC.
50 X 400 ~
9 X 400 ~
APPROX. GAIN DATA USING CHANALYST
1 12SA7 1ST. DET. & OSC.
2 12SK7 I.F.
3 12SQ7 2ND. DET. A.F. AND AVC
4 50L6GT OUTPUT
BOTTOM VIEW OF TUBE SOCKETS
C1 2-17
C2 14-466
C24 0.1
R16 220K
R1 22K
*-6.9V. (550KC) -10.5V. (1500KC)
1ST. I.F. TRANS. 455 KC.
2ND. I.F. TR. 455 KC.
PRI. L1 0.1Ω
SEC. L2 1Ω
L3 0.4Ω
L4
L5 3.2Ω
C3 2-17
C4 7-133
C6 75-160
C7 75-160
L6 7Ω
L7 7Ω
C8 75-160
L8 15.5Ω
L9 15.5Ω
C9 75-160
C11 120
C13 120
81V.
*52V.
R9 120
4.2V.
C17 .02
103V.
T1
V.C. 2.8Ω
0.6Ω
220Ω
9Ω
C16 .005
C23 330
R8 470K
R7 220K
R15 1200
C15 .01
C12 .05
R4 3.3 MEG.
C14 .02
R5 500K STOP AT 50K VOL. CONTR.
R6 4.7 MEG.
3V. FIXED BIAS FOR GAIN DATA
BLU
BLUE
GRN
GREEN
RED
BLACK
YEL.
BLK
BRN
INDEX TAB
OSC. COIL
UNDER CHASSIS VIEW
INDICATES COMMON WIRING INSULATED FROM CHASSIS.
INDICATES CHASSIS GROUND.
K = 1000
LOOP ANTENNA
3 12SQ7 1 12SA7 2 12SK7 4 50L6GT
5 35Z5 GT RECTIFIER
112V.
C18 .05
DIAL LAMP MAZDA #51
S1 ON VOL. CONTR.
117V. 50-60~ OR DC 25 W.
C20 50 MF
C19 30 MF
VOLTAGES MEASURED WITH RESPECT TO COMMON -B, AND SHOULD HOLD WITHIN ±20% WITH 117 V. AC. SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST.
1946..R4
P-923104-4

CATHODE CURRENTS

| | |
|---|---|
| 12SA7 | 8.5 MA. |
| 12SK7 | 12.1 MA. |
| 12SQ7 | .12 MA |
| 50L6GT | 33.0 MA. |
| 35Z5GT/G | 54.1 MA. |

## Alignment Procedure

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn receiver the volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

**Calibration Scale.**—The glass tuning dial may be removed from the cabinet and mounted above the pointer for reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

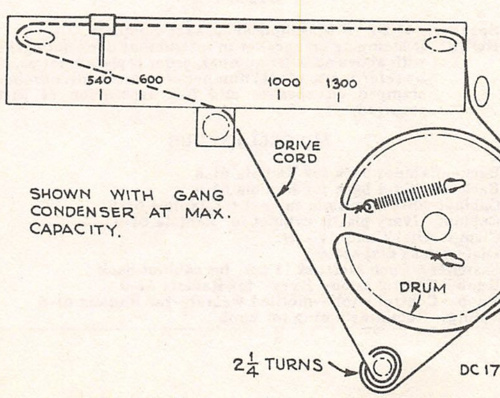
**Dial Backing Plate.**—In the event that only the chassis is returned for service, the marks on the dial backing plate may be used during alignment; refer to the Dial Indicator and Drive Mechanism drawing for corresponding frequencies.

**Dial Pointer.**—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

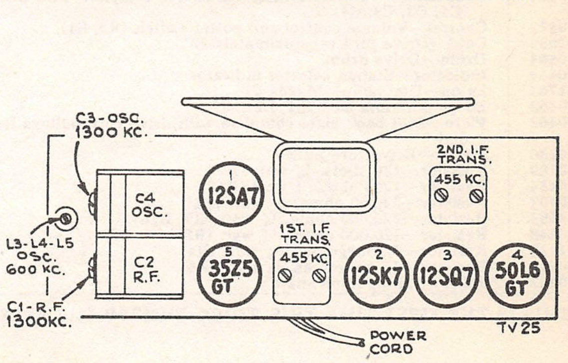
For additional information refer to booklet, "RCA Victor Receiver Alignment."

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 12SK7 I-F grid through 0.1 mfd. capacitor | 455 kc | Quiet-point 1,600 kc end of dial | C8 and C9 2nd I-F transformer |
| 2 | Stator of C2 through 0.1 mfd. | | | *C6 and C7 1st I-F transformer |
| 3 | Ant. lead in series with 200 mmfd. | 1,300 kc | 1,300 kc | C3 (osc.)<br>C1 (ant.) |
| 4 | | 600 kc | 600 kc "A" Band | L5 (osc.)<br>Rock gang |
| 5 | Repeat steps 3 and 4 | | | |

*Do not readjust C8 or C9 when test oscillator is connected to C2.

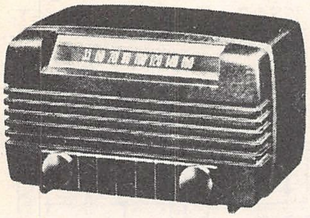

540
600
1000
1300
DRIVE CORD
SHOWN WITH GANG CONDENSER AT MAX. CAPACITY.
DRUM
2¼ TURNS
DC 17

*Dial-Indicator and Drive Mechanism*

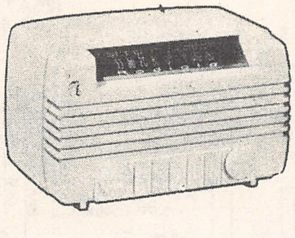

C3-OSC. 1300 KC.
C4 OSC.
C2 R.F.
L3-L4-L5 OSC. 600 KC.
C1-R.F. 1300KC.
1 12SA7
5 35Z5 GT
1ST. I.F. TRANS. 455 KC
2 12SK7
3 12SQ7
4 50L6 GT
2ND. I.F. TRANS. 455 KC.
POWER CORD
TV 25

*Tube and Trimmer Locations*

# RCA MFG. CO.



*61-8*
*(Brown Plastic)*



*61-9*
*(Ivory Plastic)*

## Specifications

| | |
|---|---|
| **Frequency Range** | 540-1600 kc |
| **Intermediate Frequency** | 455 kc |

**Power Output**

| | |
|---|---|
| Undistorted | 1.0 watt |
| Maximum | 1.5 watts |

**Tube Complement**

| | |
|---|---|
| (1) RCA Radiotron 12SA7 | Converter |
| (2) RCA Radiotron 12SK7 | I-F Amplifier |
| (3) RCA Radiotron 12SQ7 | 2nd Det., A.V.C., and A-F Amplifier |
| (4) RCA Radiotron 50L6GT | Power Output |
| (5) RCA Radiotron 35Z5GT | Rectifier |

| | |
|---|---|
| **Pilot Lamp** | Mazda No. 51, 6-8 volts, 0.2 amp. |

**Loudspeaker** (922258-1)

| | |
|---|---|
| Type | 4″ x 6″ PM |
| V. C. Impedance | 3.4 ohms at 400 cycles |

| **Cabinet Dimensions** | **Height** | **Width** | **Depth** |
|---|---|---|---|
| Cabinet (Outside) | 7″ | 11¾″ | 7½″ |

| | |
|---|---|
| Shipping Weight | 9 lbs. |
| Tuning Drive Ratio | 20:1 |

**Power Supply Rating**

| | |
|---|---|
| 105-125 volts, AC, 50 or 60 cycles, or DC | 30 watts |

**POWER SUPPLY POLARITY.**—For operation on DC, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On AC, reversal of the plug may reduce hum.

**Critical Lead Dress**

1. Dress blue and green leads of both I-F transformers back in shield cans, leaving them as short as possible.
2. Dress all heater leads next to chassis.
3. Dress power cord toward output transformer away from volume control and audio circuits.
4. Dress capacitor (C14) toward switch and parallel to chassis length.
5. Dress capacitor (C16) back against rear chassis apron.
6. Dress capacitor (C17) over and towards 50L6 socket perpendicular to capacitor (C14) and (C16).
7. Dress pilot lamp leads over second I-F transformer and away from tubes.
8. Dress blue lead from output transformer against front apron and away from I-F leads.
9. Dress contact on oscillator section of gang condenser back away from oscillator coil (L3, 4, 5) adjustment.

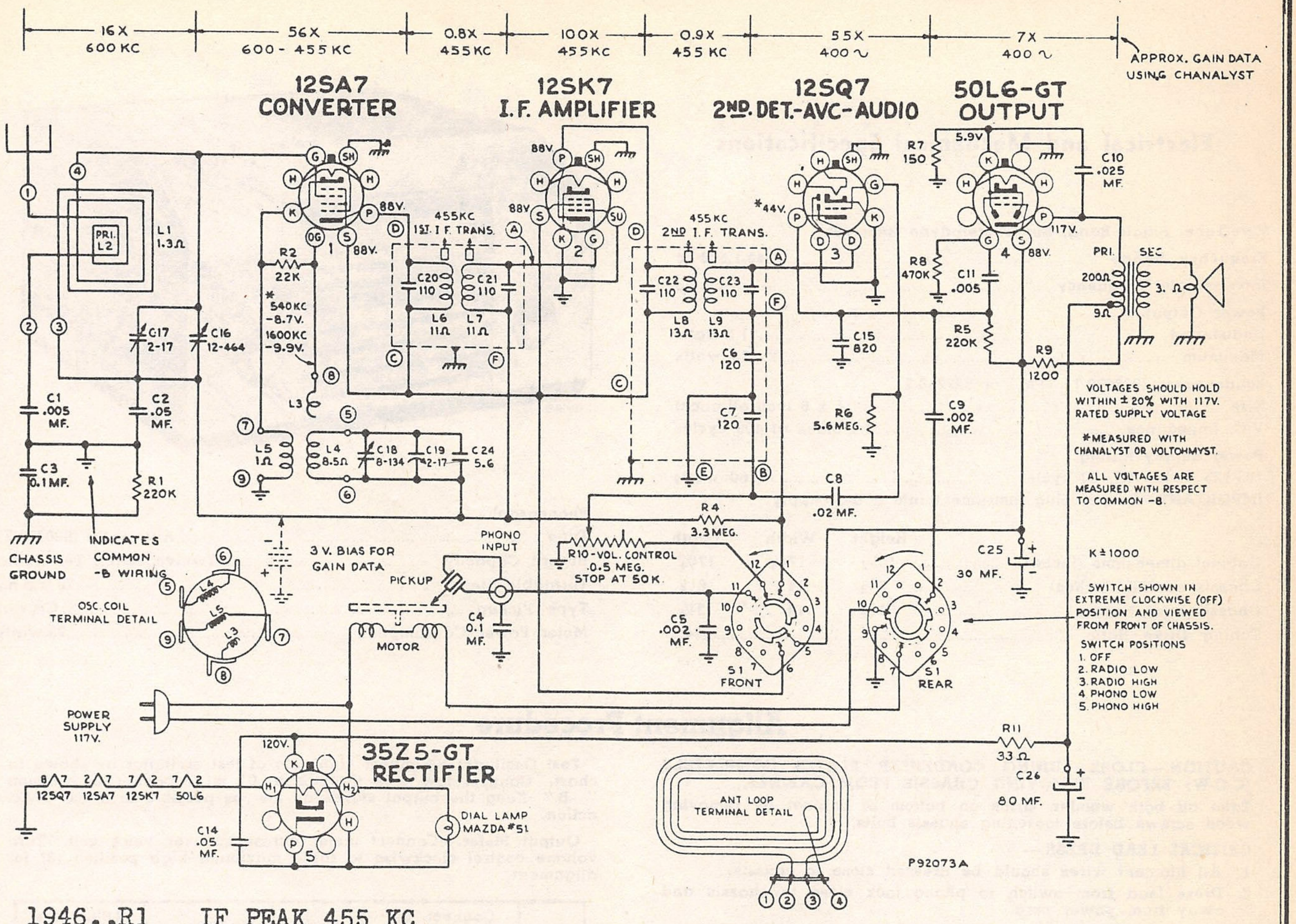
## Replacement Parts

| STOCK No. | DESCRIPTION |
|---|---|
| | **CHASSIS ASSEMBLIES**<br>**RC 1034** |
| 70389 | Bearing—Tuning knob shaft bearing |
| 39640 | Capacitor—Mica, 330 mmf. (C23) |
| 70606 | Capacitor—Tubular, .005 mfd., 400 volts (C16) |
| 70610 | Capacitor—Tubular, .01 mfd., 200 volts (C15) |
| 70611 | Capacitor—Tubular, .02 mfd., 400 volts (C14, C17) |
| 70615 | Capacitor—Tubular, .05 mfd., 400 volts (C12, C18) |
| 70617 | Capacitor—Tubular, 0.1 mfd., 400 volts (C24) |
| 70408 | Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts and 1 section of 30 mfd., 150 volts (C19, C20) |
| 70477 | Coil—Oscillator coil (L3, L4, L5) |
| 70463 | Condenser—Variable tuning condenser complete with drum (C1, C2, C3, C4) |
| 70322 | Control—Volume control and power switch (R5, S1) |
| 32634 | Cord—Drive cord (approximately 38″) |
| 70464 | Drum—Drive drum |
| 70469 | Indicator—Station selector indicator |
| 11765 | Lamp—Dial lamp—Mazda 51 |
| 70468 | Loop—Antenna loop (L1, L2) |
| 70462 | Plate—Dial back plate complete with drive cord pulleys less dial |
| 36230 | Pulley—Drive cord pulley |
| 30189 | Resistor—120 ohms, ¼ watt (R9) |
| 6134 | Resistor—1200 ohms, 1 watt (R15) |
| 30492 | Resistor—22,000 ohms, ¼ watt (R1) |
| 14583 | Resistor—220,000 ohms, ¼ watt (R7, R16) |
| 30648 | Resistor—470,000 ohms, ¼ watt (R8) |
| 31417 | Resistor—3.3 megohms, ¼ watt (R4) |
| 30931 | Resistor—4.7 megohms, ¼ watt (R6) |
| 70467 | Shaft—Tuning knob shaft |
| 34449 | Socket—Lamp socket |
| 37605 | Socket—Tube socket—moulded |
| 70390 | Spring—Drive cord tension spring |
| 70465 | Transformer—First I.F. transformer (L6, L7, C6, C7) |
| 70466 | Transformer—Second I.F. transformer (L8, L9, C8, C9, C11, C13) |
| 70385 | Transformer—Output transformer (T1) |
| 33726 | Washer—"C" washer for tuning knob shaft |
| | **SPEAKER ASSEMBLY**<br>**922258-1** |
| 70470 | Speaker—4″ x 6″ P.M. elliptical speaker complete<br>NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required. |
| | **MISCELLANEOUS** |
| *71794 | Back—Cabinet back for Radiola 61-8 |
| *71795 | Back—Cabinet back for Radiola 61-9 |
| Y1365 | Cabinet—Brown plastic cabinet for Radiola 61-8 |
| Y1366 | Cabinet—Ivory plastic cabinet for Radiola 61-9 |
| 70475 | Clamp—Dial clamp (1 set) |
| *71796 | Dial—Glass dial scale |
| 37831 | Fastener—Push fastener (1 set) for cabinet back |
| 70474 | Knob—Control knob—ivory—for Radiola 61-9 |
| 70473 | Knob—Control knob—mottled walnut—for Radiola 61-8 |
| 30900 | Spring—Retaining spring for knob |

*THIS IS THE FIRST TIME THIS STOCK NUMBER HAS APPEARED IN PRINT.

# RCA MFG. CO.

## MODEL 62-1, Chassis RC1017A, RC-1017B


16X 600 KC
56X 600 - 455 KC
0.8X 455 KC
100X 455 KC
0.9X 455 KC
55X 400 ~
7X 400 ~
APPROX. GAIN DATA USING CHANALYST
12SA7 CONVERTER
12SK7 I.F. AMPLIFIER
12SQ7 2ND. DET.-AVC-AUDIO
50L6-GT OUTPUT
PRI. L2
L1 1.3Ω
C17 2-17
C16 12-464
C1 .005 MF.
C2 .05 MF.
C3 0.1 MF.
R1 220K
R2 22K
*540KC -8.7V. 1600KC -9.9V.
88V.
455KC 1ST. I.F. TRANS.
C20 110
C21 110
L6 11Ω
L7 11Ω
*44V.
455KC 2ND I.F. TRANS.
C22 110
C23 110
L8 13Ω
L9 13Ω
C15 820
C6 120
C7 120
R6 5.6 MEG.
5.9V
R7 150
C10 .025 MF.
117V.
R8 470K
C11 .005
R5 220K
PRI. SEC
200Ω
3. Ω
9Ω
R9 1200
C9 .002 MF.
L3
L5 1Ω
L4 8.5Ω
C18 8-134
C19 2-17
C24 5.6
C8 .02 MF.
R4 3.3 MEG.
R10-VOL. CONTROL .5 MEG. STOP AT 50K.
PHONO INPUT
PICKUP
C4 0.1 MF.
C5 .002 MF.
S1 FRONT
S1 REAR
C25 30 MF.
MOTOR
CHASSIS GROUND
INDICATES COMMON -B WIRING
3 V. BIAS FOR GAIN DATA
OSC. COIL TERMINAL DETAIL
POWER SUPPLY 117V.
35Z5-GT RECTIFIER
120V.
12SQ7 12SA7 12SK7 50L6
C14 .05 MF.
DIAL LAMP MAZDA #51
R11 33Ω
C26 80 MF.
ANT LOOP TERMINAL DETAIL
P92073A
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117V. RATED SUPPLY VOLTAGE
*MEASURED WITH CHANALYST OR VOLTOHMYST.
ALL VOLTAGES ARE MEASURED WITH RESPECT TO COMMON -B.
K = 1000
SWITCH SHOWN IN EXTREME CLOCKWISE (OFF) POSITION AND VIEWED FROM FRONT OF CHASSIS.
SWITCH POSITIONS
1. OFF
2. RADIO LOW
3. RADIO HIGH
4. PHONO LOW
5. PHONO HIGH

1946..R1 IF PEAK 455 KC

## Replacement Parts—Radio Only

| STOCK No. | DESCRIPTION |
|---|---|
| | **CHASSIS ASSEMBLIES**<br>**RC 1017A**<br>**RC 1017B** |
| 70389 | Bearing—Tuning knob shaft bearing |
| 70407 | Button—Plug button (2 required) |
| 70997 | Capacitor—Mica, 5.6 mmf. (C24) |
| 39650 | Capacitor—Mica, 820 mmf. (C15) |
| 70601 | Capacitor—Tubular, .002 mfd., 400 volts (C5, C9) |
| 70606 | Capacitor—Tubular, .005 mfd., 400 volts (C1, C11) |
| 70611 | Capacitor—Tubular, .02 mfd., 400 volts (C8) |
| 70612 | Capacitor—Tubular, .025 mfd., 400 volts (C10) |
| 70615 | Capacitor—Tubular .05 mfd., 400 volts (C2, C14) |
| 70617 | Capacitor—Tubular, 0.1 mfd., 400 volts (C3, C4) |
| *72312 | Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 80 mfd., 150 volts (C25, C26) |
| 70403 | Coil—Oscillator coil |
| 70383 | Condenser—Variable tuning condenser complete with drum |
| 72756 | Control—Volume control |
| 32634 | Cord—Drive cord (approx. 48" overall length) |
| 70392 | Cord—Power cord |
| 70384 | Drum—Drive drum |
| 70397 | Gear—Power or radio-phono switch gear |
| 70395 | Gear—Volume control gear and spring assembly |
| 70404 | Indicator—Station selector indicator |
| 70391 | Insulator—Bakelite insulator for phono input socket |
| 11765 | Lamp—Dial lamp |
| *72311 | Loop—Antenna loop |
| 70382 | Plate—Dial back plate complete with pulleys less dial |
| 30868 | Plug—2 contact female plug for "AC" cable |
| 36230 | Pulley—Drive cord pulley |
| *72313 | Resistor—33 ohms, 1 watt (R11) |
| 30880 | Resistor—150 ohms, ¼ watt (R7) |
| 6134 | Resistor—1200 ohms, 1 watt (R9) |
| 30492 | Resistor—22,000 ohms, ¼ watt (R2) |
| 14583 | Resistor—220,000 ohms, ¼ watt (R1, R5) |
| 30648 | Resistor—470,000 ohms, ¼ watt (R8) |
| 12928 | Resistor—3.3 megohms, ¼ watt (R4) |
| 31455 | Resistor—5.6 megohms, ¼ watt (R6) |
| 14974 | Screw—#8-32 x. 3/16" long set screw for lower gear |
| 70388 | Shaft—Tuning knob shaft |
| 34449 | Socket—Lamp socket |
| 35787 | Socket—Phono input socket |
| 27605 | Socket—Tube socket—moulded |
| 70390 | Spring—Drive cord tension spring |
| 70396 | Spring—Volume control gear tension spring |
| 70394 | Switch—Power or radio phono switch |
| 70386 | Transformer—First I.F. transformer |
| 70387 | Transformer—Second I.F. transformer |
| 70385 | Transformer—Output transformer |
| 33726 | Washer—"C" washer for tuning knob shaft |
| 70406 | Washer—Spring washer for volume control |
| | **SPEAKER ASSEMBLY**<br>**922279-1** |
| 70405 | Speaker—4" x 6" P.M. speaker complete |
| 70470 | Speaker—4" x 6" elliptical P.M. speaker complete with cone and voice coil |
| | **SPEAKER ASSEMBLY**<br>**922258-2** |
| 71058 | Speaker—4" x 6" P.M. elliptical speaker complete with cone and voice coil |
| | NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required. |
| | **MISCELLANEOUS** |
| 70398 | Clamp—Dial clamps (1 set) |
| 70709 | Dial—Glass dial |
| 71595 | Feet—Rubber feet (4 required) |
| 70707 | Hinge—Lid hinge (2 required) |
| 70401 | Knob—Power switch and radio-phono switch knob |
| 70400 | Knob—Tuning knob |
| 70399 | Knob—Volume control knob |
| 71815 | Mounting—One set of hardware consisting of four springs, two spring washers and two rubber washers to mount record changer |
| 14270 | Spring—Retaining spring for knobs |
| 71824 | Stud—Stud and screw to mount lid hinge (1 set) |
| 39545 | Support—Lid support |

* THIS IS THE FIRST TIME THIS STOCK NUMBER HAS APPEARED IN PRINT.

RECORD CHANGER: RCA 960260-2, RCD.CH.P.15-17

# RCA MFG. CO.

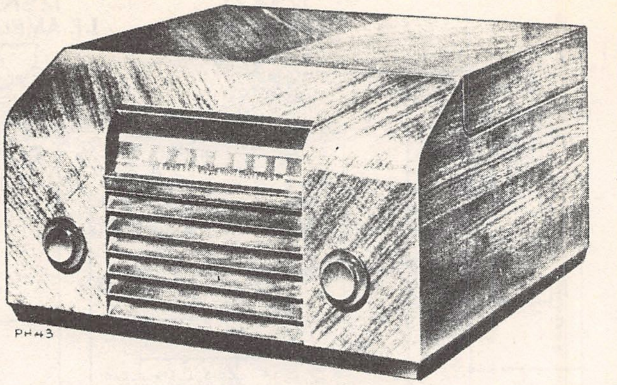
## Electrical and Mechanical Specifications

**Five-Tube, Single-Band, Superheterodyne Receiver**

| | |
|---|---|
| **Frequency Range** | 540-1,600 kc |
| **Intermediate Frequency** | 455 kc |
| **Power Output** | |
| Undistorted | 1.5 watts |
| Maximum | 2.4 watts |
| **Loudspeaker** (922279-1) "PM" or 922258-2 | |
| Size | 4 x 6 inch, elliptical |
| V.C. Impedance | 3.4 ohms at 400 cycles |
| **Power Supply Rating** | |
| 105-125 volts, AC, 60 cycles | 60 watts |

**IMPORTANT** Do not plug instrument into a d-c supply.

| | Height | Width | Depth |
|---|---|---|---|
| Cabinet dimensions (inches) | 10½ | 17¼ | 17¼ |
| Chassis overall (inches) | 6⅝ | 14 | 6¼ |
| Chassis base (inches) | 1⅝ | 14 | 3¾ |
| Tuning Drive Ratio | | | 14:1 |



**Phonograph**

| | |
|---|---|
| Type | Automatic (960260-2) |
| Record Capacity | Twelve 10-in., Ten 12-in. |
| Turntable Speed | 78 r.p.m. |
| Type Pickup | Crystal |
| Motor Power Consumption | 25 watts |

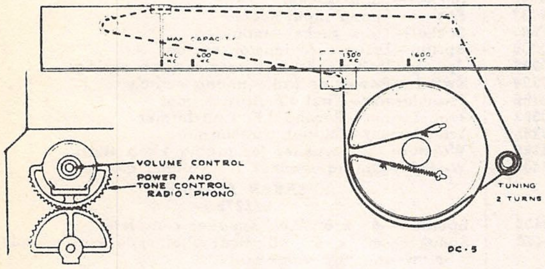
## Alignment Procedure

**CAUTION.—CLOSE TUNING CONDENSER PLATES COMPLETELY (C-C-W) BEFORE REMOVING CHASSIS FROM CABINET.**

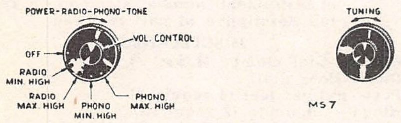
Take off both wooden strips on bottom of cabinet by removing wood screws before loosening chassis bolts.

**CRITICAL LEAD DRESS.—**

1. All filament wires should be dressed close to chassis.
2. Dress lead from switch to phono jack close to chassis and away from power cord.
3. Dress capacitor between 12SQ7 grid and terminal board away from chassis and away from other parts.
4. Dress all exposed leads away from each other and away from chassis to prevent short circuits.
5. In instrument assembly the lead from the rear section of gang to loop shall be dressed away from chassis and other wires to loop.


MAX CAPACITY
540 KC
600 KC
1300 KC
1600 KC
VOLUME CONTROL
POWER AND TONE CONTROL RADIO - PHONO
TUNING 2 TURNS
DC-5

**Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator pointer to left (max. cap.) mark on dial back plate.**


POWER-RADIO-PHONO-TONE
VOL. CONTROL
OFF
RADIO MIN. HIGH
RADIO MAX. HIGH
PHONO MIN. HIGH
PHONO MAX. HIGH
TUNING
MS7

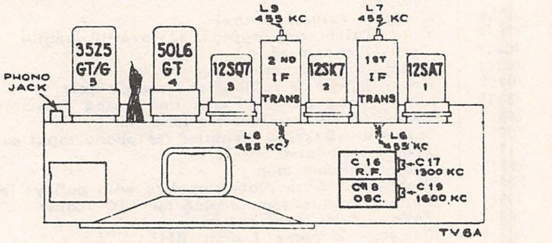
*Control Positions*

**Test Oscillator.**—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf capacitor to common "—B." Keep the output signal as low as possible to avoid a.v.c. action.

**Output Meter.**—Connect meter across speaker voice coil. Turn volume control clockwise to radio maximum high position (3) for alignment.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | I.F. grid, in series with .01 mfd. | 455 kc | Quiet point 1600 kc end of dial | L8 and L9 2nd I.F. transformer |
| 2 | 1st Det. grid in series with .01 mfd. | | | L6 and L7 1st I.F. transformer |
| NOTE.—ANTENNA LOOP AND RECORD CHANGER MUST BE IN CABINET | | | | |
| 3 | Antenna terminal in series with 220 mmfd. | 1600 kc | Gang at minimum | C19 (osc.) |
| 4 | Radiated signal | 1300 kc | Signal frequency | C17 (ant.) |
| 5 | Repeat steps 3 and 4. | | | |

* Do not readjust L8 or L9 when test oscillator is connected to 1st Det.


L9 455 KC
L7 455 KC
PHONO JACK
35Z5 GT/G 5
50L6 GT 4
12SQ7 3
2ND IF TRANS
12SK7 2
1ST IF TRANS
12SA7 1
L8 455 KC
L6 455 KC
C16 R.F.
C18 OSC.
C17 1300 KC
C19 1600 KC
TV6A

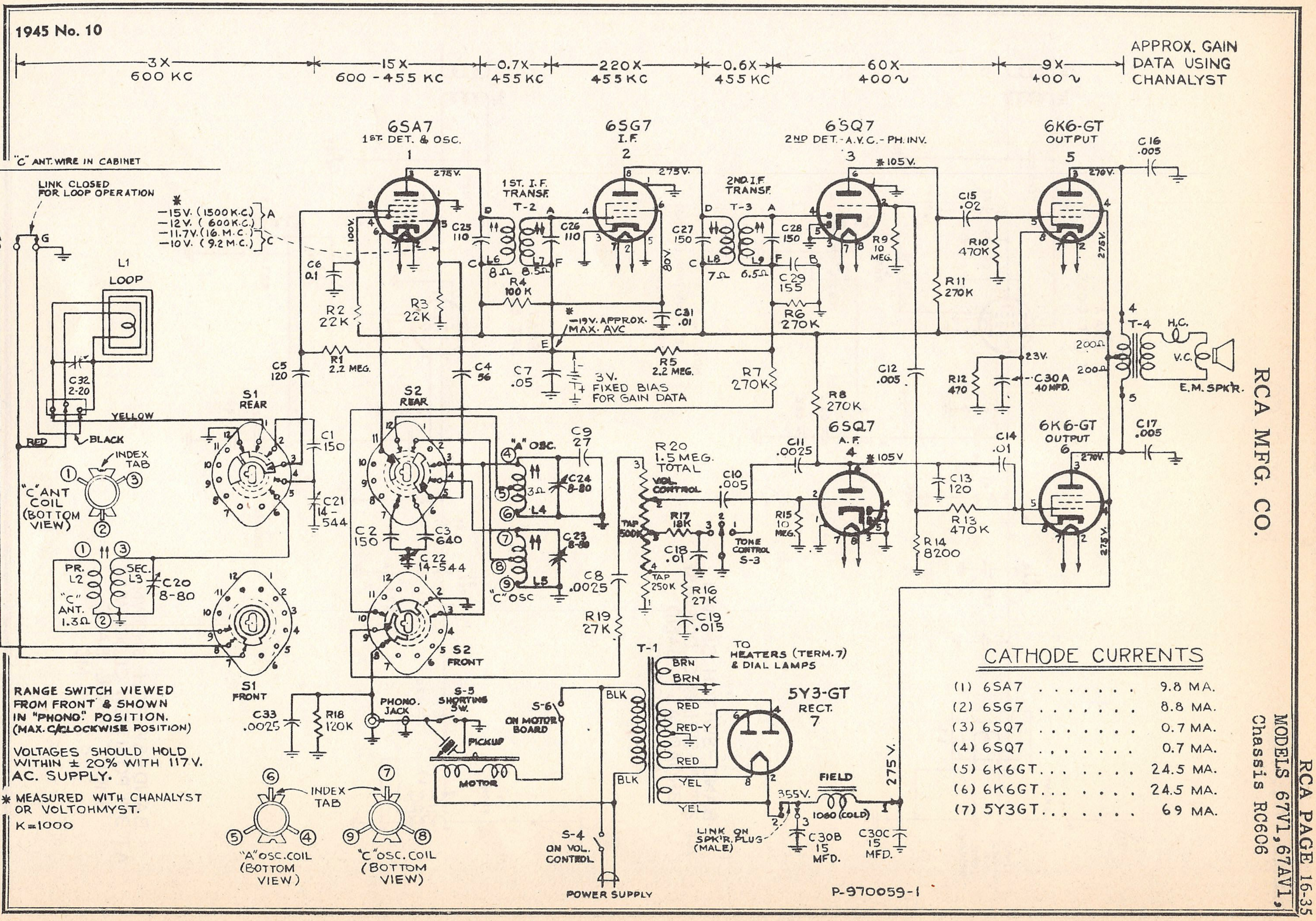
**Power Supply.—Although this model employs an ac-dc chassis, it is not suitable for use on d.c., as this would damage the motor.**

**Reversal of plug in outlet receptacle may reduce hum.**

MODELS 67V1,67AV1,
Chassis RC606

RCA MFG. CO.

1945 No. 10


APPROX. GAIN DATA USING CHANALYST
3X 600 KC
15X 600 - 455 KC
0.7X 455 KC
220X 455 KC
0.6X 455 KC
60X 400 ∿
9X 400 ∿
6SA7 1ST. DET. & OSC. 1
6SG7 I.F. 2
6SQ7 2ND DET.-A.V.C.-PH. INV. 3
6K6-GT OUTPUT 5
6SQ7 A.F. 4
6K6-GT OUTPUT 6
5Y3-GT RECT. 7
"C" ANT. WIRE IN CABINET
LINK CLOSED FOR LOOP OPERATION
A
G
L1 LOOP
C32 2-20
YELLOW
BLACK
RED
* -15V. (1500 K.C.) -12V. (600 K.C.) A
-11.7V. (16 M.C.) -10V. (9.2 M.C.) C
275V.
100V.
C6 0.1
R2 22K
R3 22K
C25 110
1ST. I.F. TRANSF. T-2
L6 8Ω
L7 8.5Ω
R4 100K
C26 110
C27 150
C31 .01
80V.
*-19V. APPROX. MAX. AVC
E
2ND I.F. TRANSF. T-3
L8 7Ω
L9 6.5Ω
C28 150
C29 155
R6 270K
R9 10 MEG.
*105V.
C15 .02
R10 470K
R11 270K
C16 .005
270V.
275V.
T-4
H.C.
V.C.
E.M. SPK'R.
200Ω
23V.
C30A 40 MFD.
R12 470
C17 .005
C5 120
R1 2.2 MEG.
C4 56
C7 .05
3V. FIXED BIAS FOR GAIN DATA
R5 2.2 MEG.
R7 270K
C12 .005
R8 270K
S1 REAR
C1 150
C21 14-544
"C" ANT COIL (BOTTOM VIEW)
INDEX TAB
PR. L2
SEC. L3
C20 8-80
"C" ANT. 1.3Ω
S1 FRONT
S2 REAR
C2 150
C3 640
C22 14-544
S2 FRONT
"A" OSC.
C9 27
C24 8-80
3Ω
L4
C23 8-80
L5
"C" OSC
R20 1.5 MEG. TOTAL VOL. CONTROL
TAP 500K
R17 18K
C18 .01
TAP 250K
R16 27K
C19 .015
C10 .005
TONE CONTROL S-3
C11 .0025
R15 10 MEG.
C8 .0025
R19 27K
C13 120
C14 .01
R13 470K
R14 8200
T-1
BRN
TO HEATERS (TERM. 7) & DIAL LAMPS
RED
RED-Y
YEL
BLK
355V.
FIELD 1060 (COLD)
275V.
C30B 15 MFD.
C30C 15 MFD.
LINK ON SPK'R. PLUG (MALE)
C33 .0025
R18 120K
PHONO. JACK
S-5 SHORTING SW.
PICKUP
S-6 ON MOTOR BOARD
MOTOR
S-4 ON VOL. CONTROL
POWER SUPPLY
"A" OSC. COIL (BOTTOM VIEW)
"C" OSC. COIL (BOTTOM VIEW)
P-970059-1

RANGE SWITCH VIEWED FROM FRONT & SHOWN IN "PHONO." POSITION. (MAX. C/CLOCKWISE POSITION)

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC. SUPPLY.

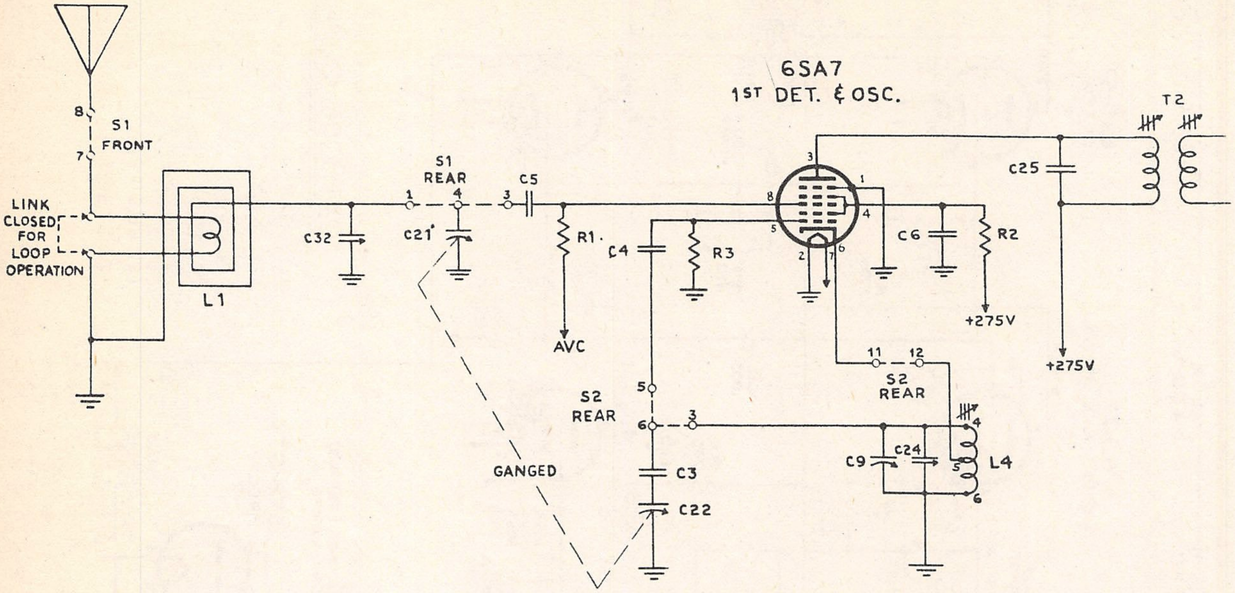
* MEASURED WITH CHANALYST OR VOLTOHMYST.

K=1000

## CATHODE CURRENTS

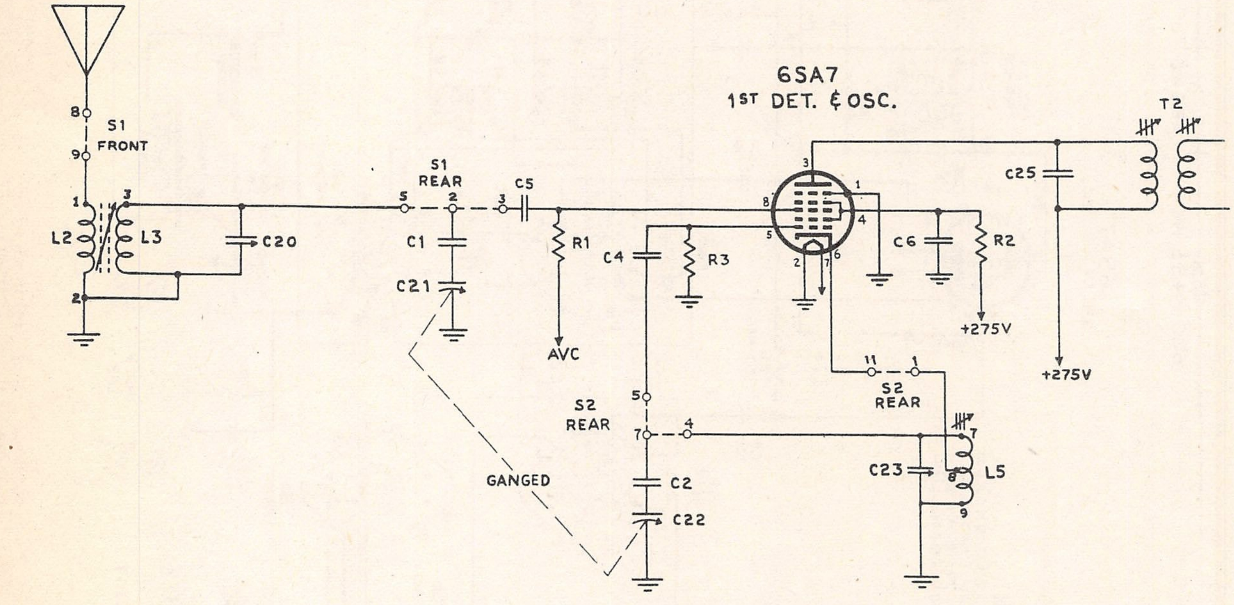
| | | |
|---|---|---|
| (1) | 6SA7 | 9.8 MA. |
| (2) | 6SG7 | 8.8 MA. |
| (3) | 6SQ7 | 0.7 MA. |
| (4) | 6SQ7 | 0.7 MA. |
| (5) | 6K6GT | 24.5 MA. |
| (6) | 6K6GT | 24.5 MA. |
| (7) | 5Y3GT | 69 MA. |

RECORD CHANGER: RCA 960260-1, RCD.CH.P.15-17

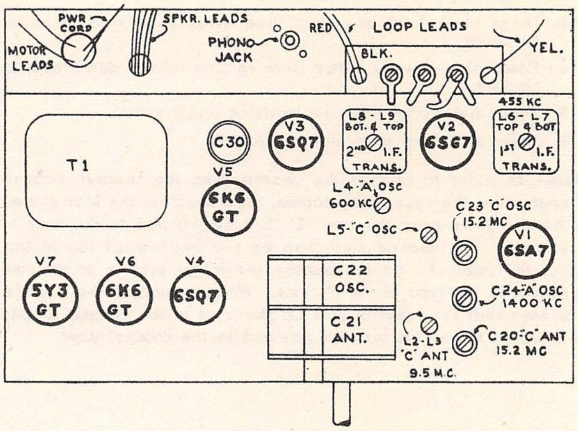

6SA7
1ST DET. & OSC.
T2
8
S1
FRONT
7
LINK
CLOSED
FOR
LOOP
OPERATION
L1
C32
S1
REAR
1
4
3
C5
C21
R1
C4
R3
AVC
C6
R2
+275V
C25
+275V
11
12
S2
REAR
5
6
3
L4
C9
C24
GANGED
C3
C22

BAND-SWITCH SHOWN
AT $2^{ND}$ POSITION CLOCKWISE.
BROADCAST BAND
540 - 1600 KC.

NOTE:
1ST POSITION (PHONO)
NOT SHOWN.


6SA7
1ST DET. & OSC.
T2
8
S1
FRONT
9
1
3
L2
L3
2
C20
S1
REAR
5
2
3
C5
C1
C21
R1
C4
R3
AVC
C6
R2
+275V
C25
+275V
11
1
S2
REAR
5
7
4
L5
C23
GANGED
C2
C22

BAND-SWITCH SHOWN
AT $3^{RD}$ POSITION CLOCKWISE.
SHORT WAVE BAND
9.2 - 16 MC.

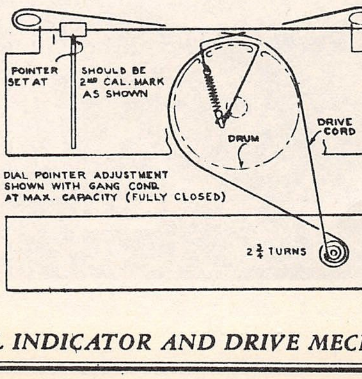

PWR CORD
MOTOR LEADS
SPKR. LEADS
PHONO JACK
RED
LOOP LEADS
BLK.
YEL.
T1
C30
V3 6SQ7
L8 - L9 BOT. & TOP 2ND I.F. TRANS.
V2 6SG7
455 KC L6 - L7 TOP & BOT 1ST I.F. TRANS.
V5 6K6 GT
L4-"A" OSC 600 KC
C23 "C" OSC 15.2 MC
L5-"C" OSC
V1 6SA7
V7 5Y3 GT
V6 6K6 GT
V4 6SQ7
C22 OSC.
C21 ANT.
C24-"A" OSC 1400 KC
L2-L3 "C" ANT 9.5 M.C.
C20-"C" ANT 15.2 MC

*TOP VIEW*

| Steps | Connect high side of test oscillator to— | Tune test oscillator to— | Turn radio dial to— | Adjust the following for maximum peak output |
|---|---|---|---|---|
| 1 | 6SG7 grid in series with .01 mfd. | 455 kc. | Broadcast Quiet Point at 550 kc. end of dial | L8, L9 (2nd I-F Trans.) |
| 2 | 6SA7 grid in series with .01 mfd. | | | L6, L7 (1st I-F Trans.) |
| 3 | Yellow lead on loop in series with 200 mmfd. (link closed) | 1,400 kc. | Broadcast 1400 kc. | C24 (osc.) |
| 4 | | 600 kc. | Broadcast 600 kc. | L4 (osc.) Rock gang |
| 5 | | Repeat steps 3 and 4. | | |
| 6 | Antenna terminal in series with 47 mmfd. | 15.2 mc. | Short Wave 15.2 mc. | C23 (osc.)*<br>C20 (ant.) |
| 7 | | 9.5 mc. | Short Wave 9.5 mc. | L5 (osc.)<br>L3 (ant.) |
| 8 | | Repeat steps 6 and 7 | | |
| 9 | Install and connect chassis in cabinet with link closed. Tune in a radiated signal of 1400 kc. on broadcast band and peak C32 on loop. | | | |

* Use minimum capacity peak if two can be obtained. Check for selection of correct peak by tuning the receiver to approximately 14.3 mc., where a weaker signal should be received.

Oscillator tracks 455 kc. above signal on both bands.


POINTER SET AT
SHOULD BE 2ND CAL. MARK AS SHOWN
DRUM
DRIVE CORD
DIAL POINTER ADJUSTMENT SHOWN WITH GANG COND. AT MAX. CAPACITY (FULLY CLOSED)
2 3/4 TURNS

DIAL INDICATOR AND DRIVE MECHANISM

## Alignment Procedure

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action

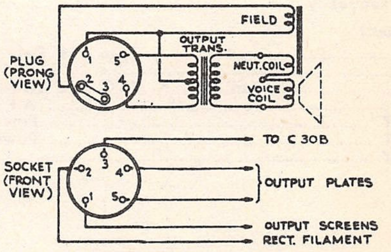
**Calibration Scale.**—The dial scale printed in this service note may be temporarily attached to the chassis for quick reference during alignment.

**Using Printed Dial Scale.**—

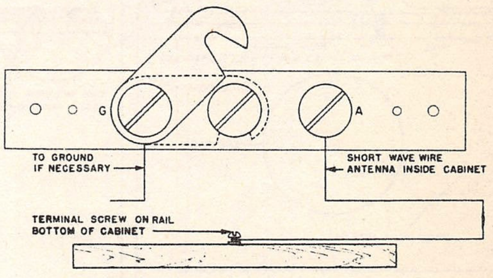
1. Cut out the printed dial scale, or, better still, make a tracing of the scale.
2. With gang at full mesh the pointer should be set to the second reference mark from the left hand end of the dial backing plate.
3. Place the printed dial scale or the tracing under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the dial scale in place.

**Note.**—It is not recommended that the glass dial scale in the cabinet be removed as an alignment reference. This glass dial scale is fastened to the bezel with sheet metal lugs bent over the scale to hold it in place. Removing the glass dial scale will necessitate bending the lugs, resulting in their weakening and subsequent breakage.

**"C" Band Reception.**—For best reception on "C" band with an outside antenna, adjust the trimmer screw of C20 on the antenna coil. Turn screw carefully with an insulated screwdriver (RCA Stock No. 31031) while the receiver is tuned to a station in the 31-meter band. If returning to internal antenna at any time, close the link on the center terminal and readjust "C" band antenna trimmer C20 for best reception on 31-meter band.


FIELD
OUTPUT TRANS.
NEUT. COIL
VOICE COIL
PLUG (PRONG VIEW)
1
2
3
4
5
TO C 30B
SOCKET (FRONT VIEW)
OUTPUT PLATES
OUTPUT SCREENS
RECT. FILAMENT

*SPEAKER CONNECTIONS*

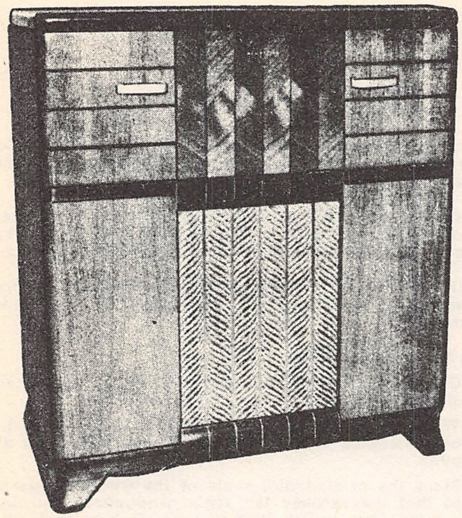

G
A
TO GROUND IF NECESSARY
SHORT WAVE WIRE ANTENNA INSIDE CABINET
TERMINAL SCREW ON RAIL BOTTOM OF CABINET

EXTERNAL ANTENNA CONNECTIONS

FIG. 3

*WHEN USING EXTERNAL ANTENNA, OPEN LINK AND CONNECT LEAD-IN TO TERMINAL SCREW.*

# RCA MFG. CO.



**Critical Lead Dress:**

1. Dress speaker cable leads down next to chassis.
2. Dress output plate capacitors next to chassis.
3. Dress plate lead of output tube away from grid of audio amplifier.
4. Dress all a-c leads away from volume control down next to chassis.
5. Dress R16 away from a-c leads at on-off switch.
6. Dress R2 away from side of chassis.

**Note.**—In order to remove the chassis from the cabinet, remove the knobs and the connecting cables, then unscrew the four slotted hex head screws from the two "L" brackets bolted to the rear of the chassis. The chassis may then be slid out toward the bottom rear of the cabinet. Do not remove the hinge screws or the two large nuts in the rear of the chassis. When replacing the chassis, make sure that the tapered pins on the front of the chassis fit into the holes on the metal runners screwed to the cabinet door.

## Specifications

**Circuit Description**

The receiver is a seven tube superheterodyne employing push-pull power output. AVC is applied to the converter and i-f tubes. The broadcast band utilizes a standard loop antenna, and the short wave antenna is a wire tacked in the cabinet.

**Dimensions**

| | Cabinet | Chassis (overall) |
|---|---|---|
| Height (inches) | 34 | 5⅝ |
| Width (inches) | 31 | 11⅛ |
| Depth (inches) | 16¼ | 8 |
| Tuning Drive Ratio | | 14:1 |

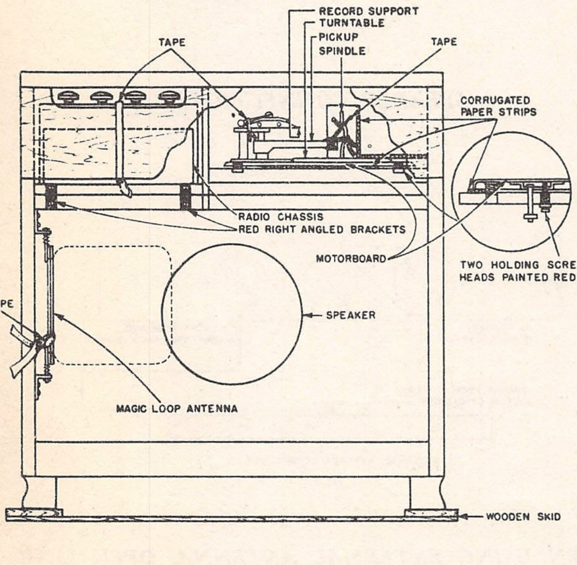
**Frequency Ranges**

| | |
|---|---|
| Standard Broadcast "A" | 540-1,600 kc |
| Short Wave "C" | 9.2-16 mc |

| | |
|---|---|
| **Intermediate Frequency** | 455 kc |

**Tube Complement**

| | |
|---|---|
| (1) RCA-6SA7 | 1st Det., Oscillator |
| (2) RCA-6SG7 | I-F Amplifier |
| (3) RCA-6SQ7 | 2nd Det., A. V. C. and Phase Inverter |
| (4) RCA-6SQ7 | A-F Amplifier |
| (5) RCA-6K6-GT | Power Output |
| (6) RCA-6K6-GT | Power Output |
| (7) RCA-5Y3-GT | Rectifier |


RECORD SUPPORT
TURNTABLE
PICKUP
SPINDLE
TAPE
TAPE
CORRUGATED PAPER STRIPS
RADIO CHASSIS
RED RIGHT ANGLED BRACKETS
MOTORBOARD
TWO HOLDING SCREWS HEADS PAINTED RED
TAPE
SPEAKER
MAGIC LOOP ANTENNA
WOODEN SKID

*BACK VIEW*

**Power Supply Rating (including Phono Motor)**

| | |
|---|---|
| 105-125 volts, 60 cycles | 95 watts |
| **Pilot Lamps** | (2) Mazda No. 51, 6-8 volts, 0.2 amp. |
| **Compartment Lamp** | (1) Mazda No. 55, 6-8 volts, 0.4 amp. |

**Loudspeaker**

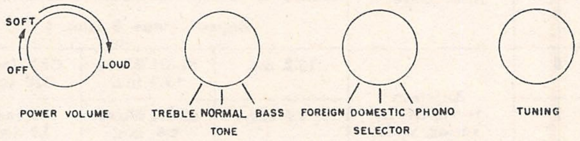
| | |
|---|---|
| Electrodynamic | 92566-1W |
| Size | 12-inch |
| V. C. impedance at 400 cycles | 2.2 ohms |

**Power Output Rating**

| | |
|---|---|
| Undistorted | 5 watts |
| Maximum | 6.5 watts |

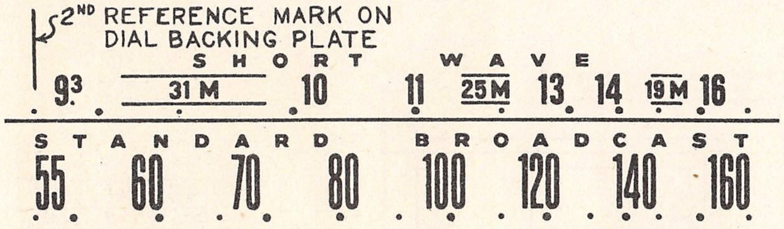
**Phonograph**

| | |
|---|---|
| Type | Automatic 960260-1 |
| Record Capacity | Twelve 10-in., Ten 12-in. |
| Turntable | 78 r.p.m. type |
| Type Pickup | Crystal |
| Motor Power consumption (115 v., 60 cycles) | 30 watts |


SOFT
OFF
LOUD
POWER VOLUME
TREBLE NORMAL BASS
TONE
FOREIGN DOMESTIC PHONO
SELECTOR
TUNING

*FRONT PANEL CONTROLS*

MODELS 67V1,67AV1



*The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.*

## Replacement Parts

For Automatic Mechanism Parts refer to Service Data for Model 960260-1

| STOCK No. | DESCRIPTION |
|---|---|
| | **CHASSIS ASSEMBLIES** (RC 606) |
| *71601 | Board—"Ant. ground" board |
| *71606 | Bracket—Dial bracket with drive cord pulley (L. H.) |
| *71605 | Bracket—Dial bracket with drive cord pulley (R. H.) |
| *71615 | Capacitor—Ceramic, 27 mmf. (C9) |
| 71924 | Capacitor—Ceramic, 56 mmf. (C4) |
| *71610 | Capacitor—Mica trimmer, 3 sections 8-80 mmf. (C20, C23, C24) |
| *71614 | Capacitor—Ceramic, 120 mmf. (C5, C13) |
| *71612 | Capacitor—Silvered mica 150 mmf. (C1, C2) |
| *71613 | Capacitor—Mica, 640 mmf. (C3) |
| 70623 | Capacitor—Tubular, .0025 mfd., 600 volts (C8, C11, C33) |
| 70648 | Capacitor—Tubular, .005 mfd., 1000 volts (C16, C17) |
| 70627 | Capacitor—Tubular, .005 mfd., 600 volts (C10, C12) |
| 70631 | Capacitor—Tubular, .01 mfd., 600 volts (C14, C18, C31) |
| 71135 | Capacitor—Tubular, .015 mfd., 600 volts (C19) |
| *70632 | Capacitor—Tubular, .02 mfd., 600 volts (C15) |
| 70615 | Capacitor—Tubular, .05 mfd., 400 volts (C7) |
| 70617 | Capacitor—Tubular, 0.1 mfd., 400 volts (C6) |
| 37888 | Capacitor—Comprising 2 sections 15 mfd., 450 volts, and 1 section 40 mfd., 25 volts (C30A, C30B, C30C) |
| *71633 | Coil—"A" band oscillator coil (L4) |
| *71632 | Coil—"C" band antenna coil (L2, L3) |
| *71634 | Coil—"C" band oscillator coil (L5) |
| *71600 | Condenser—Variable tuning condenser (C21, C22) |
| 70342 | Control—Volume control and power switch (R20, S4) |
| 32334 | Cord—Drive cord (approx. 45" overall length) |
| *71609 | Drum—Drive drum |
| *72069 | Grommet—Rubber grommet for rear mounting feet |
| *71608 | Indicator—Station selector indicator |
| *71607 | Plate—Dial back plate |
| 38832 | Plug—Pin plug for loop lead |
| 12493 | Plug—Speaker cable plug, 5 contact (female) |
| 36230 | Pulley—Drive cord pulley mounted on dial bracket |
| *71611 | Resistor—470 ohms, 2 watt (R12) |
| 14250 | Resistor—8,200 ohms, ½ watt (R14) |
| 3219 | Resistor—18,000 ohms, ½ watt (R17) |
| 30492 | Resistor—22,000 ohms, ½ watt (R3) |
| 48925 | Resistor—22,000 ohms, 2 watt (R2) |
| 30409 | Resistor—27,000 ohms, ½ watt (R16, R19) |
| 3252 | Resistor—100,000 ohms, ½ watt (R4) |
| 30180 | Resistor—120,000 ohms, ½ watt (R18) |
| 30651 | Resistor—270,000 ohms, ½ watt (R6, R7, R8, R11) |
| 30648 | Resistor—470,000 ohms ½ watt (R10, R13) |
| 30649 | Resistor—2.2 megohms, ½ watt (R1, R5) |
| 30992 | Resistor—10 megohms, ½ watt (R9, R15) |
| *71604 | Shaft—Tuning shaft |
| 35787 | Socket—Input socket |
| 30868 | Socket—Motor cable socket, 2 contact (female) (67V1) |
| 31364 | Socket—Pilot lamp socket |
| 31251 | Socket—Tube socket |
| 31418 | Spring—Indicator cord tension spring |
| *71602 | Switch—Range switch (S1, S2) |
| *71603 | Switch—Tone control switch (S3) |
| *71625 | Transformer—First I-F transformer T2 (L6, L7, C25, C26) |
| *71631 | Transformer—Second I-F transformer T3 (L8, L9, C27, C28, C29) |

| STOCK No. | DESCRIPTION |
|---|---|
| 31380 | Transformer—Power transformer 117 volts 50/60 cycle (T1) |
| 35969 | Washer—"C" washer for tuning shaft |
| | **SPEAKER ASSEMBLIES** (92566-1W) (RL70R2) |
| 13867 | Cap—Dust cap |
| *71147 | Clamp—Clamp to hold metal cone suspension (2 required) |
| 12079 | Coil—Field coil—1,060 ohms |
| 11469 | Coil—Neutralizing coil |
| 36145 | Cone—Cone complete with voice coil |
| 31539 | Plug—5 prong male plug for speaker |
| 71148 | Speaker—12" E. M. speaker complete with cone and voice coil less output transformer and plug |
| *71145 | Suspension—Metal cone suspension |
| 36671 | Transformer—Output transformer (T4) |
| | NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required. |
| | **MISCELLANEOUS ASSEMBLIES** |
| *71859 | Bar—Grille bar |
| 70545 | Bracket—Antenna loop mounting bracket complete with spring (2 required) |
| *71819 | Bracket—Door check mounting bracket |
| 36461 | Button—Plug button |
| 38684 | Capacitor—Mica trimmer 2-20 mmf. (C32) |
| *71820 | Check—Radio compartment door check assembly less spring |
| X1615 | Cloth—Grille cloth |
| 70547 | Cover—Compartment lead cover |
| *71769 | Decal—Control function decal |
| *71768 | Decal—Trade mark decal |
| *71817 | Dial—Glass dial scale |
| *71816 | Escutcheon—Dial scale escutcheon less dial |
| 11889 | Grommet—Rubber grommet to cushion chassis front apron (2 required) |
| *71766 | Hinge—Cabinet lid hinge |
| *71764 | Hinge—Cabinet door hinge (2 required) |
| 13103 | Jewel—Pilot lamp cap |
| *71822 | Knob—Range switch or tone switch knob |
| 71821 | Knob—Volume control or tuning knob |
| 5117 | Lamp—Compartment lamp |
| 11765 | Lamp—Dial lamp |
| *71813 | Loop—Antenna loop complete (L1, C32) |
| *71815 | Mounting—One set of hardware to mount record changer —consisting of four springs, two spring washers and two rubber washers |
| *71858 | Pull—Door pull |
| 37800 | Shade—Compartment lamp shade |
| 36422 | Socket—3 contact socket (female) for loop leads |
| *71818 | Spring—Door check spring |
| 30900 | Spring—Retaining spring for knobs |
| *71765 | Support—Cabinet lid support |
| *71814 | Washer—Rubber washer for door check |

* THIS IS THE FIRST TIME THIS STOCK NUMBER HAS APPEARED IN PRINT.

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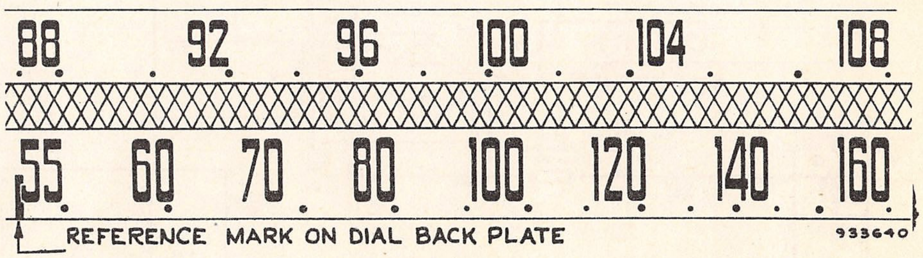
MODELS 68R1,68R2,68R3,68R4



*The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.*

## Replacement Parts

| STOCK No. | DESCRIPTION |
|---|---|
| | **CHASSIS ASSEMBLY** RC608 |
| 72058* | Board—"F.M.—Antenna—Ground" board |
| 72046* | Capacitor—Mica trimmer, 2.5-13 mmf. (C33) |
| 38357 | Capacitor—Mica trimmer, 2-20 mmf. (C34) |
| 71808 | Capacitor—Mica trimmer, 3-35 mmf. (C31) |
| 72334* | Capacitor—Mica trimmer, 4-70 mmf. (C37) |
| 72570* | Capacitor—Ceramic, 27 mmf. (C1) |
| 39042 | Capacitor—Ceramic, 47 mmf. (C28) |
| 71924 | Capacitor—Ceramic, 56 mmf. (C7) |
| 71614 | Capacitor—Ceramic 120 mmf. (C6, C19, C30) |
| 72571* | Capacitor—Mica, 330 mmf. (C2) |
| 72639* | Capacitor—Mica, 390 mmf. (C8) |
| 70602 | Capacitor—Tubular, .0025 mfd., 400 volts (C25, C23) |
| 71087* | Capacitor—Molded paper, .003 mfd., 1000 volts (C29) |
| 72490* | Capacitor—Tubular, .005 mfd., 200 volts (C11, C15, C16, C17) |
| 71553 | Capacitor—Tubular, .005 mfd., 400 volts (C9, C10, C13, C14) |
| 70606 | Capacitor—Tubular, .005 mfd., 400 volts (C20) |
| 70648 | Capacitor—Tubular, .005 mfd., 1000 volts (C21) |
| 71923 | Capacitor—Tubular, .01 mfd., 200 volts (C22, C24) |
| 71925 | Capacitor—Tubular, .01 mfd., 400 volts (C3, C4, C5, C12) |
| 71551 | Capacitor—Tubular, .05 mfd., 200 volts (C26) |
| 72121 | Capacitor—Electrolytic, 5 mfd., 50 volts (C18) |
| 72271* | Capacitor—Electrolytic comprising (C60A, C60B, C60C, C60D)<br>1 section of 30 mfd., 450 volts,<br>1 section of 15 mfd., 450 volts,<br>1 section of 15 mfd., 350 volts and<br>1 section of 40 mfd., 25 volts |
| 72335* | Coil—F.M. Antenna Coil (L1, L2) |
| 72336* | Coil—F.M. Oscillator Coil (L3) |
| 72574* | Coil—Filament choke Coil (L8) |
| 36031 | Coil—Loop primary Coil (L5, L6) |
| 72333* | Coil—Oscillator Coil—"A" band (L7) |
| 72059* | Condenser—Variable tuning condenser, less mounting bracket and trimmers (C32, C35, C36, C61) |
| 38404 | Control—Volume control and power switch (R40, S2) |
| 34662 | Cord—Drive cord (approx. 80" overall length) |
| 70392 | Cord—Power cord |
| 71799 | Grommet—Rubber grommet for mounting R.F. shelf (3 req'd) |
| 72069 | Grommet—Rubber grommet for rear mounting feet (2 req'd) |
| 72061* | Indicator—Station selector indicator |
| 72159* | Loop—Antenna loop complete (L4, L5, L6, C34, R34) |
| 72142 | Plate—Dial back plate complete with pulleys |
| 12493 | Plug—5 contact female plug for speaker cable |
| 36230 | Pulley—Drive cord pulley |
| 30732 | Resistor—47 ohms, ½ watt (R30) |
| 30189 | Resistor—120 ohms, ½ watt (R13) |
| 53005 | Resistor—220 ohms, 2 watts (R26) |
| 19233 | Resistor—680 ohms, 1 watt (R23) |
| 34766 | Resistor—1000 ohms, ½ watt (R5, R15) |
| 72762* | Resistor—1500 ohms, 1 watt (R10) |
| 19525 | Resistor—3300 ohms, 2 watts (R24, R25) |
| 38888 | Resistor—8200 ohms, 1 watt (R4) |
| 71914 | Resistor—10,000 ohms, 1 watt (R3) |
| 36714 | Resistor—15,000 ohms, ½ watt (R16) |
| 39158 | Resistor—18,000 ohms, 2 watts (R7) |
| 71989 | Resistor—22,000 ohms, 1 watt (R9) |
| 30492 | Resistor—22,000 ohms, ½ watt (R2, R6, R17) |

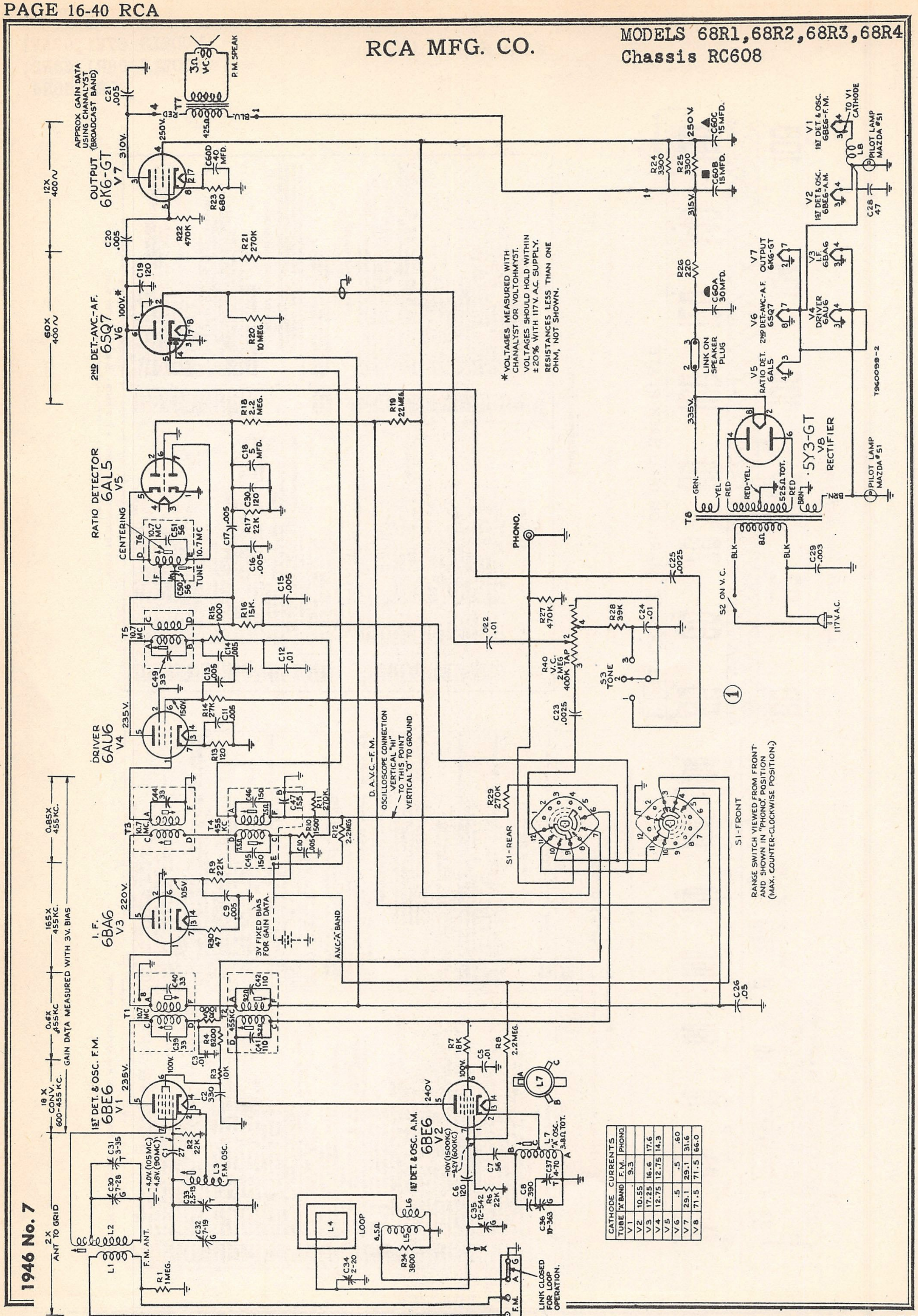
| STOCK No. | DESCRIPTION |
|---|---|
| 30409 | Resistor—27,000 ohms, ½ watt (R14) |
| 30147 | Resistor—39,000 ohms, ½ watt (R28) |
| 30651 | Resistor—270,000 ohms, ½ watt (R11, R21, R29) |
| 30648 | Resistor—470,000 ohms, ½ watt (R22, R27) |
| 30652 | Resistor—1 megohm, ½ watt (R1) |
| 30649 | Resistor—2.2 megohms, ½ watt (R8, R12, R18) |
| 30992 | Resistor—10 megohms, ½ watt (R20) |
| 71917 | Resistor—22 megohms, ½ watt (R19) |
| 72055* | Shaft—Tuning knob shaft |
| 35787 | Socket—Input socket, Phono. |
| 31364 | Socket—Lamp socket |
| 72516* | Socket—Tube socket—miniature |
| 31251 | Socket—Tube socket—Octal |
| 31418 | Spring—Tension spring for drive cord |
| 72060* | Switch—Range switch (S1) |
| 71603 | Switch—Tone switch (S3) |
| 71625 | Transformer—First I.F. Transformer—A.M. (T2, C41, C42) |
| 72593* | Transformer—First I.F. Transformer—F.M. (T1, C39, C40) |
| 71631 | Transformer—Second I.F. Transformer—A.M. (T4, C45, C46, C47) |
| 72723* | Transformer—Second I.F. Transformer—F.M. (T3, C44) |
| 71935 | Transformer—Driver transformer (T5, C49) |
| 71975 | Transformer—Power transformer—117 volt, 60 cycle (T8) |
| 71934 | Transformer—Ratio detector transformer (T6, C50, C51) |
| 35969 | Washer—"C" washer for tuning shaft |
| | **SPEAKER ASSEMBLIES** 92573-1K |
| 72728* | Cone—Cone and voice coil assembly |
| 31539 | Plug—5 prong male plug for speaker |
| 72332* | Transformer—Output transformer (T7) |
| | NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required. |
| | **MISCELLANEOUS ASSEMBLIES** |
| 71864 | Antenna—Di-pole antenna |
| 72537* | Back—Cabinet back for Model 68R1 |
| 72538* | Back—Cabinet back for Model 68R2 |
| 72509* | Back—Cabinet back for Model 68R3, 68R4 |
| 72539* | Baffle—Baffle and grille assembly for 68R1, 68R2 |
| Y1396 | Cabinet—Brown plastic cabinet for Model 68R1 |
| Y1397 | Cabinet—Ivory plastic cabinet for Model 68R2 |
| 72536* | Clip—Spring clip for dial (1 set) for 68R1 and 68R2 |
| 72337* | Clip—Spring clip for dial for 68R3, 68R4 |
| X1631 | Cloth—Grille cloth for 68R3 |
| X1644 | Cloth—Grille cloth for 68R4 |
| 72653* | Dial—Glass dial scale for 68R1, 68R2, 68R3 |
| 72813* | Dial—Glass dial scale for 68R4 |
| 36153 | Fastener—Push fastener for cabinet back for 68R1, 68R2 |
| 71595 | Feet—Rubber feet (4 req'd) for 68R3, 68R4 |
| 71821 | Knob—Control knob—maroon for Model 68R1, 68R3, 68R4 |
| 70474 | Knob—Control knob—ivory—for Model 68R2 |
| 11765 | Lamp—Dial lamp—Mazda No. 51 |
| 30900 | Spring—Retaining spring for knobs |

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

*This is the first time this Stock No. has appeared in print

# RCA MFG. CO.

## MODELS 68R1,68R2,68R3,68R4
## Chassis RC608


OUTPUT 6K6-GT V7
2ND DET.-AVC-A.F. 6SQ7 V6
RATIO DETECTOR 6AL5 V5
DRIVER 6AU6 V4
I.F. 6BA6 V3
1ST DET. & OSC. F.M. 6BE6 V1
1ST DET. & OSC. A.M. 6BE6 V2
5Y3-GT V8 RECTIFIER
P.M. SPEAK.
3Ω VC
425Ω
T7
T8
T1 10.7 MC
T2 455 KC
T3 10.7 MC
T4 455 KC
T5 10.7 MC
T6 10.7 MC
CENTERING
TUNE
L1 F.M. ANT.
L2
L3 F.M. OSC.
L4 LOOP
L5
L6
L7 "A" OSC. 3.8Ω TOT.
L8
PHONO.
S1-REAR
S1-FRONT
S2 ON V.C.
S3 TONE
R40 V.C. 2 MEG 400K TAP
117V.A.C.
PILOT LAMP MAZDA #51
LINK ON SPEAKER PLUG
LINK CLOSED FOR LOOP OPERATION.
F.M. A G
GRN. YEL RED RED-YEL. 525Ω TOT. RED BRN BRN BLK 8Ω BLK
250V. 310V. 100V.* 235V. 150V 220V. 105V 235V. 100V. 240V 250V 315V. 335V.
-4.0V.(105MC) -4.8V.(90MC)
-10V.(1500KC) -12V.(600KC)
C21 .005 C20 .005 C19 120 C60D 40 MFD. C60C 15 MFD. C60B 15 MFD. C60A 30 MFD.
R23 680 R22 470K R21 270K R20 10 MEG R18 2.2 MEG. R19 22 MEG. R24 3300 R25 3300 R26 220
C18 5 MFD. C30 120 R17 22K C17 .005 C51 56 C50 56 C16 .005 C15 .005 R16 15K R15 1000
C14 .005 C12 .01 C13 .005 C49 33 R14 27K C11 .005 R13 120
C44 33 C46 150 C47 155 R11 270K R10 500 R12 2.2MEG C10 .005 C45 150 R9 22K C9 .005 R30 47
C40 33 C42 110 C39 33 C41 110 R4 8200 C3 .01 R3 10K C2 330 R2 22K C1 27 C31 3-35 C30 7-28 C33 2.5-13 C32 7-19 R1 1MEG.
R7 18K R8 2.2MEG. C5 .01 C7 56 R6 22K C6 120 C8 390 C37 4-70 C36 10-363 C35 12-542 C34 2-20 R34 3800 6.5Ω
C22 .01 C23 .0025 C24 .01 C25 .0025 C26 .05 R27 470K R28 39K R29 270K C28 47 C29 .003
D.A.V.C.-F.M.
A.V.C.-"A" BAND
3V FIXED BIAS FOR GAIN DATA.
APPROX. GAIN DATA USING CHANALYST (BROADCAST BAND)
12X 400∿
60X 400∿
0.85X 455KC.
165X 455KC.
0.6X 455KC
18X CONV. 600-455 KC.
2X ANT. TO GRID
GAIN DATA MEASURED WITH 3V. BIAS
V1 1ST DET. & OSC. 6BE6-F.M.
V2 1ST DET. & OSC. 6BE6-A.M.
V3 I.F. 6BA6
V4 DRIVER 6AU6
V5 RATIO DET. 6AL5
V6 2ND DET.-AVC.-A.F. 6SQ7
V7 OUTPUT 6K6-GT
TO V1 CATHODE
T960099-2
①

OSCILLOSCOPE CONNECTION VERTICAL "HI" — TO THIS POINT VERTICAL "O" TO GROUND

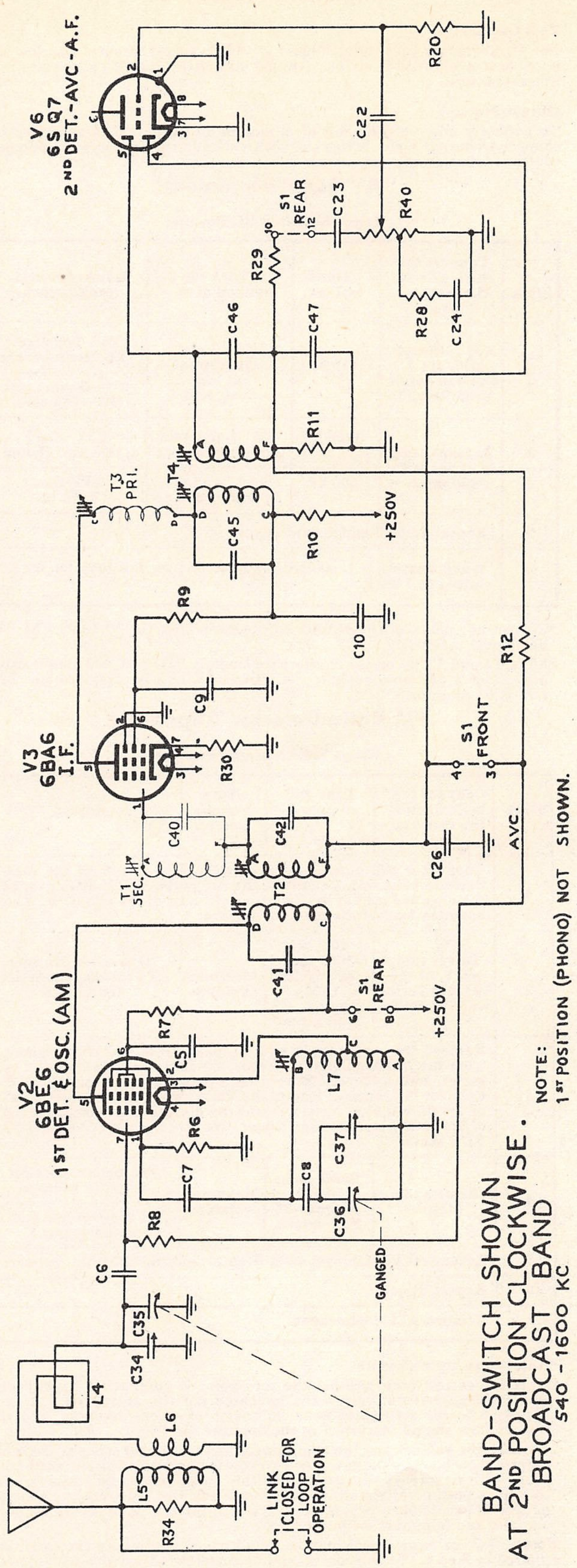
*VOLTAGES MEASURED WITH CHANALYST OR VOLTOHMYST. VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. A.C. SUPPLY. RESISTANCES LESS THAN ONE OHM, NOT SHOWN.

RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN "PHONO." POSITION (MAX. COUNTER-CLOCKWISE POSITION.)

| CATHODE CURRENTS | | | |
|---|---|---|---|
| TUBE | "A" BAND | F.M. | PHONO. |
| V1 | | 9.3 | |
| V2 | 10.55 | | |
| V3 | 17.25 | 16.6 | 17.6 |
| V4 | 12.75 | 12.75 | 14.3 |
| V5 | | | |
| V6 | .5 | .5 | .60 |
| V7 | 29.1 | 29.1 | 31.6 |
| V8 | 71.5 | 71.5 | 66.0 |

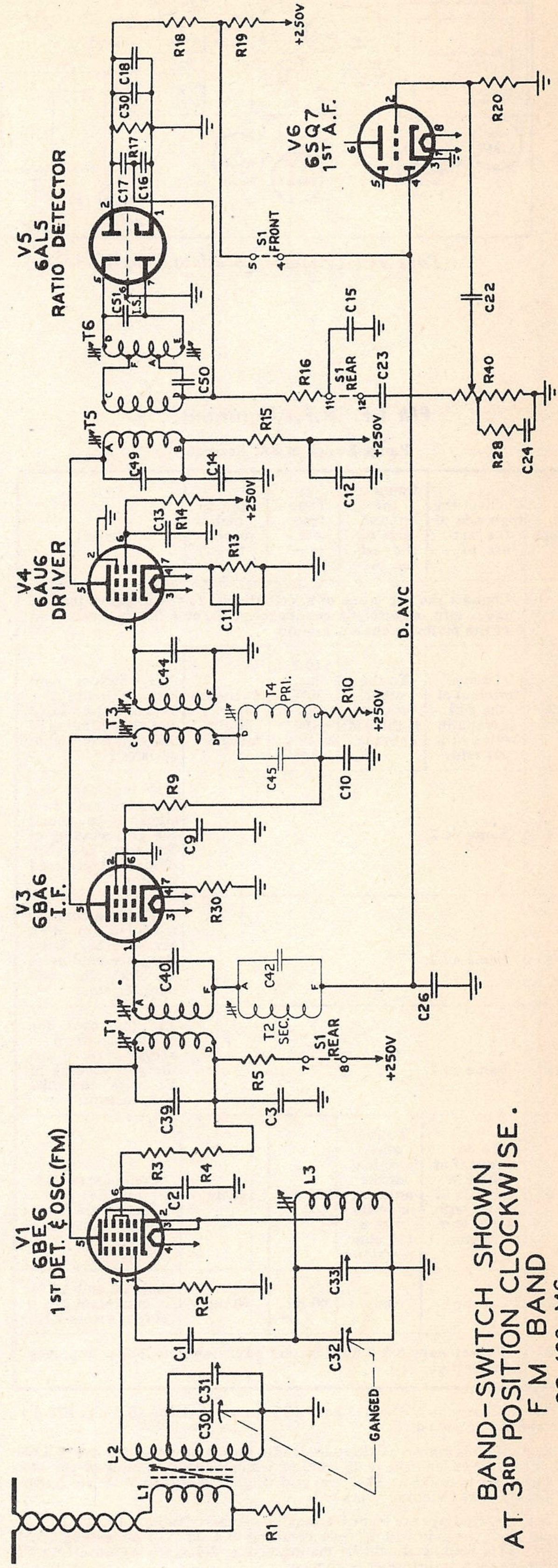
For parts list, see P.16-39

## RCA MFG. CO.

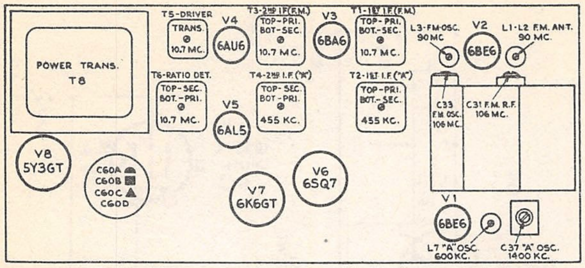

V6
6SQ7
2ND DET.-AVC-A.F.
R20
C22
S1 REAR
C23
R40
R29
R28
C24
C46
C47
R11
T4
T3 PRI.
C45
R10
+250V
R9
C10
R12
V3
6BA6
I.F.
C9
R30
S1 FRONT
AVC.
T1 SEC.
C40
C42
C26
T2
C41
+250V
V2
6BE6
1ST DET. & OSC. (AM)
R7
C5
L7
R6
C7
C8
C37
C36
R8
C6
GANGED
C35
C34
L4
L6
L5
R34
LINK CLOSED FOR LOOP OPERATION

NOTE:
1ST POSITION (PHONO) NOT SHOWN.

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
BROADCAST BAND
540-1600 KC


R18
R19
+250V
C18
C30
R17
C17
C16
V5
6AL5
RATIO DETECTOR
S1 FRONT
V6
6SQ7
1ST A.F.
R20
C22
T6
C51
I.S.
C50
R16
S1 REAR
C15
C23
R40
R28
C24
T5
R15
+250V
C49
C14
C12
R14
C13
V4
6AU6
DRIVER
R13
C11
C44
D. AVC
T3
T4 PRI.
R10
+250V
C45
C10
R9
C9
V3
6BA6
I.F.
R30
C40
C42
T2 SEC.
C26
T1
R5
S1 REAR
+250V
C3
C39
R3
R4
C2
V1
6BE6
1ST DET. & OSC. (FM)
L3
R2
C33
C1
C31
C30
C32
GANGED
L2
L1
R1

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
F M BAND
88-108 MC.


T5-DRIVER TRANS. 10.7 MC.
V4
6AU6
T3-2ND I.F.(F.M.) TOP-PRI. BOT-SEC. 10.7 MC.
V3
6BA6
T1-1ST I.F.(F.M.) TOP-PRI. BOT.-SEC. 10.7 MC.
L3-FM-OSC. 90 MC
V2
6BE6
L1-L2 F.M. ANT. 90 MC.
POWER TRANS. T8
T6-RATIO DET. TOP-SEC. BOT.-PRI. 10.7 MC.
V5
6AL5
T4-2ND I.F.("A") TOP-SEC. BOT-PRI. 455 KC.
T2-1ST I.F.("A") TOP-PRI. BOT.-SEC. 455 KC.
C33 F.M. OSC. 106 MC.
C31 F.M. R.F. 106 MC.
V8
5Y3GT
C60A ◓
C60B ■
C60C ▲
C60D
V7
6K6GT
V6
6SQ7
V1
6BE6
L7 "A" OSC. 600 KC.
C37 "A" OSC. 1400 KC.

*Tube and Trimmer Locations (Top View)*

## FM I.F. R.F. Alignment*

Range Switch in FM Position

| Steps | Connect the high side of the test-osc. to— | Connect the ground side of the test-osc. to— | Tune test-osc. to— | Radio dial turned to— | Adjust |
|---|---|---|---|---|---|
| 1 | Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. electrolytic condenser, C18, and the common lead of the meter to chassis ground. | | | | |
| 2 | To one terminal of the FM antenna in series with .01 mfd. | To the other terminal of the FM antenna. | 10.7 mc. 30% mod. at 400 cycles. (AM) | Maximum capacity. (Fully meshed) | †T3, bottom core for maximum d-c across C 18. Load the plate winding of T3 with a 680 ohm resistor.‡ |
| 3 | Same as 2. | | | | T3, top core for maximum d-c across C 18. Load the grid winding of T3 with the 680 ohm resistor used in Step 2. |
| 4 | Same as 2. | | | | T1, bottom core for maximum d-c across C 18. Load the plate winding of T1 with the 680 ohm resistor. |
| 5 | Same as 2. | | | | T1, top core for maximum d-c across C 18. Load the grid winding of T1 with the 680 ohm resistor. |
| 6 | To one terminal of the FM antenna in series with a 120 ohm resistor. | To the other terminal of the antenna in series with a 120 ohm resistor. | 106 mc. | 106 mc.§ | Condensers C33 and C31 for maximum d-c output across C18. |
| 7 | Same | Same | 90 mc. | 90 mc. | Coils L2 and L3 for maximum d-c output across C18. |
| 8 | Repeat steps 6 & 7 until further adjustment no longer improves calibration. | | | | |

*Correct alignment of the 455 kc. I.F. requires that the 10.7 mc. FM I.F. be aligned previously.

†This method is known as alternate loading which involves the use of a 680 ohm resistor to load the plate winding while the grid winding of the *same* transformer is peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked.

‡When the windings are loaded it may be necessary to increase the 10.7 mc input since the gain will decrease resulting in a small or no reading across C18. This reading should be maintained at 2-4 volts, by adjusting the input, as each transformer is aligned.

§Completely mesh the gang and see that the pointer goes to mechanical maximum calibration point at low end of band. (Reference mark on dial back plate).

## Alignment Procedure

**Test Oscillator—**

For all alignment operations, unless specified, keep the output as low as possible to avoid A.V.C. action. Ground lead of test-osc. to chassis ground, unless specified.

**Output Meter—**

To correctly observe the point of minimum a-f output, it is necessary to connect an output meter across the voice coil, and turn the receiver volume control to maximum.

## "A" Band Alignment*

Range Switch in BC Position

| Steps | Connect the high side of the test osc. to— | Tune test osc. to— | Turn the radio dial to— | Adjust for max. peak output. |
|---|---|---|---|---|
| 1 | AM converter grid, pin 1, 6BE6 in series with .01 mfd. | 455 kc. | "A" Band Quiet point at high freq. end. | †T4—Top core<br>T4—Bottom core |
| 2 | | | | T2—Bottom core<br>T2—Top core |
| 3 | Antenna lead in series with 200 mmf. | 1400 kc. | "A" Band 1400 kc calibration pt. | C37—Osc.<br>C34—Ant. (Loop) |
| 4 | | 600 kc. | "A" Band 600 kc calibration pt. | L7—Osc. Rock in. |
| 5 | Repeat steps 3 and 4 until aligned | | | |
| 6 | When chassis is installed, readjust C34 on the loop for max. output at 1400 kc. | | | |

*Correct alignment of the 455 kc. I.F. requires that the 10.7 mc. FM I.F. be aligned previously.

†Align T4 and T2 by means of alternate loading. Use a 47,000 ohm resistor instead of a 680 ohm resistor. Alternate loading is explained in "FM I.F.-R.F. Alignment."

## FM Ratio Detector Alignment

Range Switch in FM Position

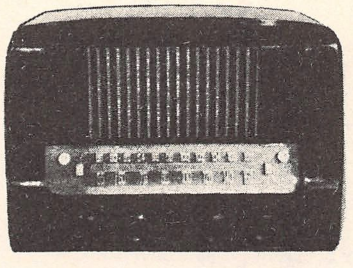
| Steps | Connect the high side of the test osc. to— | Tune test-osc. to— | Turn volume control to— | Adjust |
|---|---|---|---|---|
| 1 | Connect a 680 ohm resistor between pins 5 & 7 of the ratio detector tube 6AL5. Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. electrolytic condenser, C18. The common lead of the meter to ground. | | | |
| 2 | Driver grid, pin 1, of the 6AU6 in series with .01 mfd. | 10.7 mc. 30% mod. 400 cycles (AM) Approx. .25 Volt output | Maximum Volume | *Driver transformer, T5 for maximum d-c across C18. |
| 3 | Remove the meter leads and disconnect the 680 ohm resistor from the 6AL5. Connect two 68,000 ohms (±1%) resistors in series, across the 22,000 ohm ratio detector load resistor, R17. Connect the common lead of the VoltOhmyst to the center point of the 68,000 ohm resistors, and the d-c probe to terminal "A" of the ratio detector transformer, T6. Set the meter to the 0-30 VDC scale. | | | |
| 4 | Same as in Step 2. | Same as in Step 2. Approx. .25 Volt output. | Maximum volume. | †T6 bottom core for zero d-c balance.<br>T6 top core for min. audio output.‡ |
| 5 | Reconnect VoltOhmyst as in Step 1, omitting 680 ohm resistor. | | | |
| 6 | Repeat Step 2. | | | |
| 7 | Remove ALL connections. | | | |

*Approximately 14.5 volts.

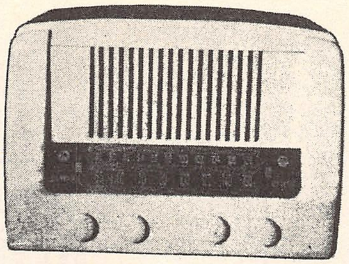
†Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

‡The zero d-c balance and the minimum a-f output should occur at the same point. If such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the VoltOhmyst, and the output meter, hooked across the voice coil, for the point at which both zero d-c and minimum a-f output occur.

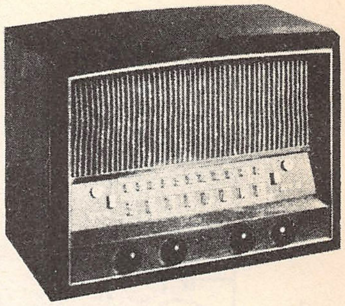
**Note:**—Two or more points may be found which will satisfy the condition required in Step 4. T6 top core should be correctly adjusted when approximately ⅛ inch of threads extend above the can, therefore, it is desirable to start adjustment with the top core in its furthest "in" position and turn out, while adjusting the bottom core, until the first point of minimum a-f and zero d-c is reached.



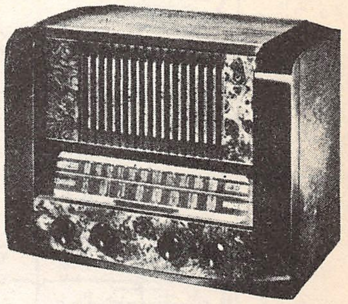
*68R1*



*68R2*



*68R3*



*68R4*

**Circuit Description**

These receivers are eight tube, table model, superhetrodyne radios, incorporating two separate converters, one for the FM band and the other for the broadcast band. The range switch has a position in which these models can be operated as a phonograph sound channel.

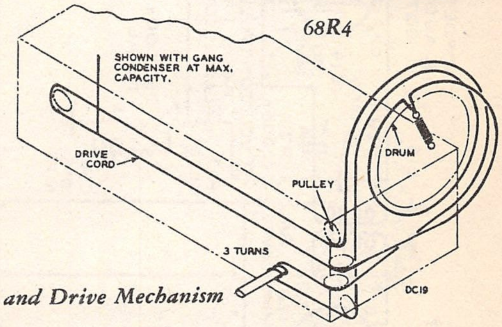
**Ratio Detector—**

These sets utilize a FM detector known as the "Ratio Detector." This type of circuit eliminates the necessity for a limiting stage preceding the detector, and has an inherent insensitivity to amplitude modulated signals. It is desirable, that before attempting to service these receivers, that this type of circuit be completely understood. Special care should be taken in alignment, and all precautions should be carefully observed.

**Note:**—Two antennas, a loop for broadcast reception and a folded dipole for FM, are contained in the cabinet. Because of the directional characteristic of these antennas, it may be necessary, when interference is encountered, to rotate the cabinet until a point of minimum interference is found. In some locations, a phenomenon known as "Multi-Path Reception" exists which produces distortion on FM. This is not a fault of the receiver. If this condition is suspected, remove the set to another location, and check it there. An external FM antenna, such as the RCA Dipole and Reflector, Stock #225, will eliminate, or appreciably reduce this effect.

**Standard Broadcasts—**

To install an external antenna for Standard Broadcasts, the link on the terminal board on the chassis in the back of the cabinet must be opened. Then connect the antenna, which should be a wire 40 to 60 feet long, to the terminal marked "A". A connection from "G" to ground should not be necessary but may be advantageous.



*Dial-Indicator and Drive Mechanism*

## Electrical and Mechanical Specifications

**Frequency Range**

| | |
|---|---|
| Broadcast ("A" Band) | 540-1600 kc. |
| Frequency Modulation (FM Band) | 88-108 mc. |

**Intermediate Frequency**

| | |
|---|---|
| Broadcast | 455 kc. |
| Frequency Modulation | 10.7 mc. |

**Tube Complement**

| | |
|---|---|
| (1) RCA 6BE6 | 1st Det. & Osc. FM |
| (2) RCA 6BE6 | 1st Det. & Osc. AM |
| (3) RCA 6BA6 | I-F Amplifier |
| (4) RCA 6AU6 | Driver |
| (5) RCA 6AL5 | Ratio Detector |
| (6) RCA 6SQ7 | 2nd Det., A.V.C., and A-F Amplifier |
| (7) RCA 6K6 GT | Power Output |
| (8) RCA 5Y3 GT | Rectifier |

**Power Supply Rating**

| | |
|---|---|
| 105-125 volts, 60 cycles | 64 watts |

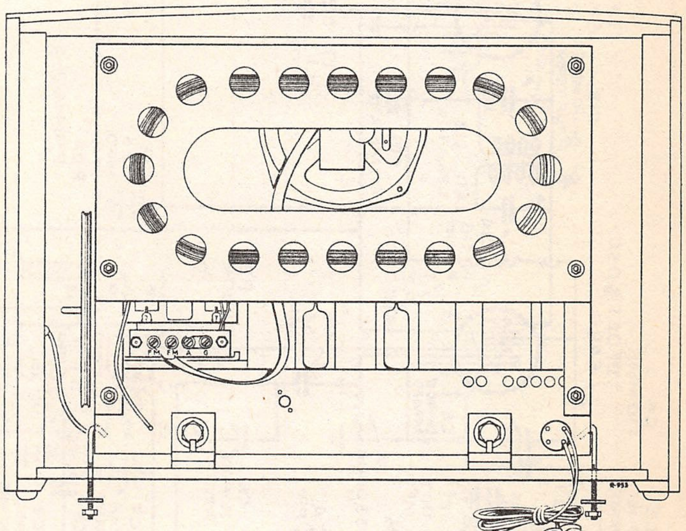
| | |
|---|---|
| **Pilot Lamps** | (2) Mazda No. 51, 6-8 volts, 0.2 amp. |

**Loudspeaker 940923-7**

| | |
|---|---|
| Size | 5" x 7" elliptical PM |
| V.C. Impedance | 3.4 ohms at 400 cycles |

**Power Output**

| | |
|---|---|
| Undistorted | 2.0 watts |
| Maximum | 4.0 watts |

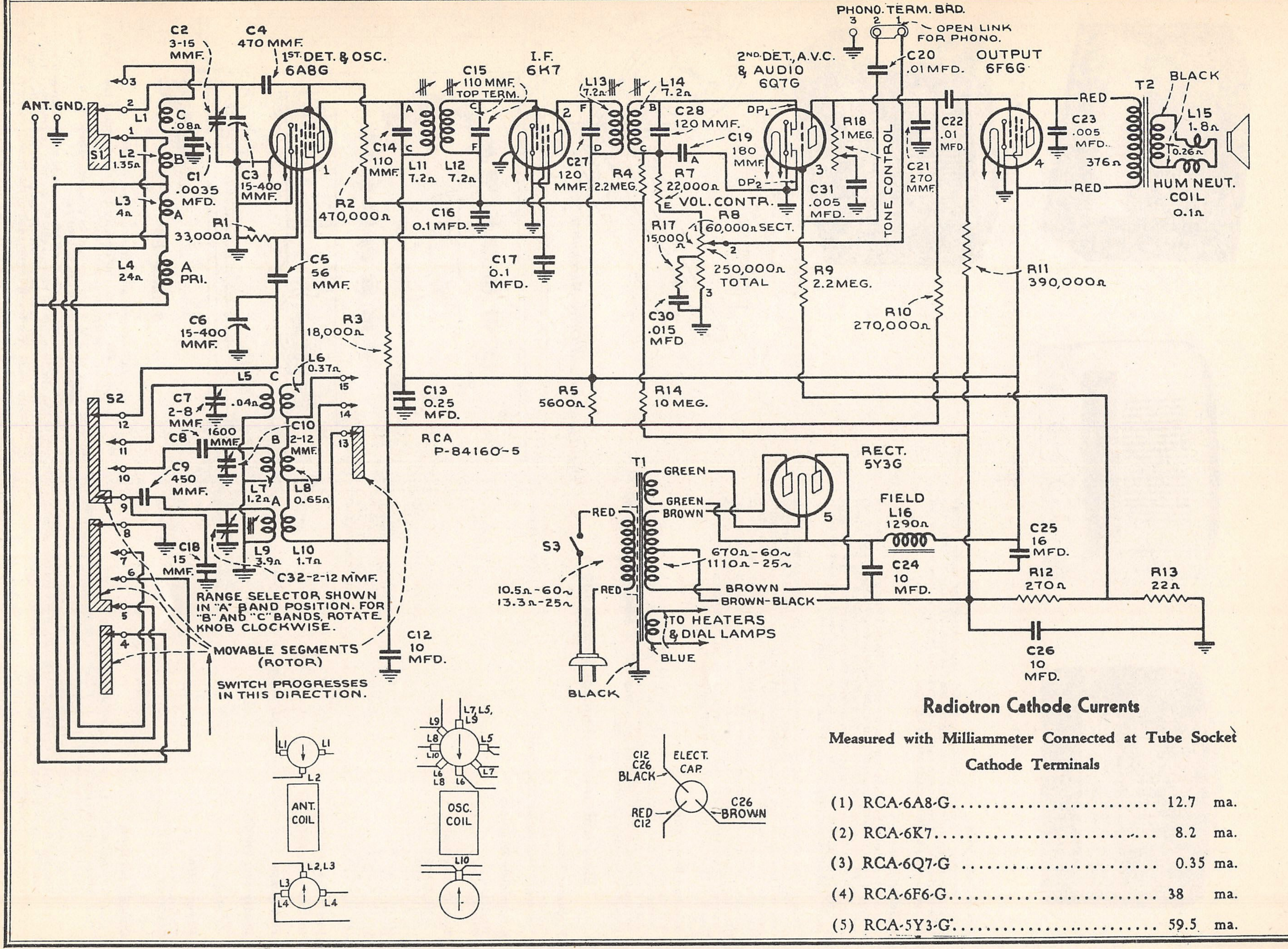


*BACK VIEW*

**Critical Lead Dress**

1. Dress capacitor C-1 near chassis base.
2. Dress lead from pin No. 5, No. 1 6BE6 to terminal C, of transformer T1, as near the bottom of the FM shelf as possible.
3. Dress capacitor C-23 next to chassis.
4. The lead from capacitor C-23 to the high side of the volume control must be dressed next to chassis along front apron.
5. Dress resistor R-20 near chassis base.
6. Dress all a-c leads away from volume control.
7. Solder FM antenna coil primary leads to terminal board with as short a lead length as practical.
8. Make all FM leads as short as possible. Dress of all other leads should be similar to original wiring.
9. The lead from pin No. 2, 6BA6, to ground must be dressed as close to the base and as near to the back apron as possible. This lead provides degeneration for the IF stage and neither its length, nor the point at which it is grounded to the chassis should be changed.

# RCA MFG. CO.

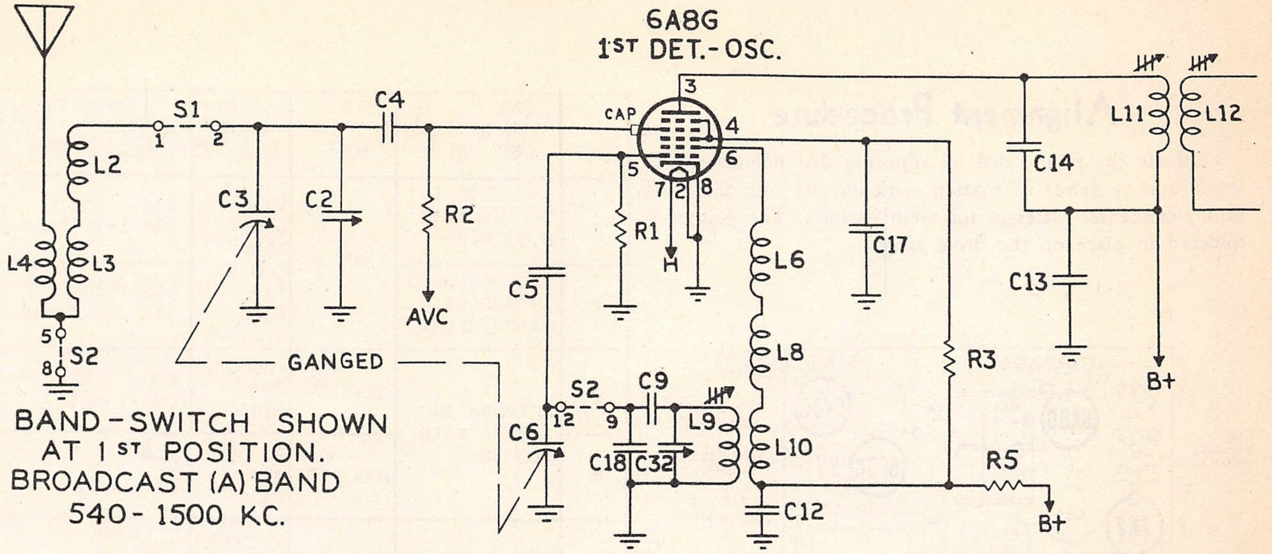

ANT. GND.
S1
L1
L2 1.35Ω
L3 4Ω
L4 24Ω
A PRI.
C2 3-15 MMF.
C4 470 MMF.
1ST. DET. & OSC. 6A8G
C3 15-400 MMF.
C1 .0035 MFD.
R1 33,000Ω
C5 56 MMF.
C6 15-400 MMF.
R2 470,000Ω
C14 110 MMF.
L11 7.2Ω
L12 7.2Ω
C15 110 MMF. TOP TERM.
I.F. 6K7
C16 0.1 MFD.
C17 0.1 MFD.
C27 120 MMF.
L13 7.2Ω
L14 7.2Ω
R4 2.2MEG.
C28 120 MMF.
C19 180 MMF.
R7 22,000Ω
VOL. CONTR. R8 60,000Ω SECT. 250,000Ω TOTAL
R17 15,000Ω
C30 .015 MFD
2ND. DET., A.V.C. & AUDIO 6Q7G
DP1
DP2
R18 1 MEG.
C31 .005 MFD.
TONE CONTROL
R9 2.2MEG.
PHONO. TERM. BRD.
OPEN LINK FOR PHONO.
C20 .01 MFD.
C21 270 MMF.
C22 .01 MFD.
OUTPUT 6F6G
C23 .005 MFD.
376Ω
RED
T2
BLACK
L15 1.8Ω
0.26Ω
HUM NEUT. COIL 0.1Ω
R10 270,000Ω
R11 390,000Ω
R3 18,000Ω
C13 0.25 MFD.
R5 5600Ω
R14 10 MEG.
RCA P-84160-5
S2
L5
L6 0.37Ω
C7 2-8 MMF.
.04Ω
C8 1600 MMF.
C10 2-12 MMF.
C9 450 MMF.
L7 1.2Ω
L8 0.65Ω
C18 15 MMF.
L9 3.9Ω
L10 1.7Ω
C32-2-12 MMF.
RANGE SELECTOR SHOWN IN "A" BAND POSITION. FOR "B" AND "C" BANDS, ROTATE KNOB CLOCKWISE.
MOVABLE SEGMENTS (ROTOR)
SWITCH PROGRESSES IN THIS DIRECTION.
C12 10 MFD.
T1
GREEN
GREEN BROWN
RED
S3
10.5Ω-60~
13.3Ω-25~
670Ω-60~
1110Ω-25~
BROWN
BROWN-BLACK
TO HEATERS & DIAL LAMPS
BLUE
BLACK
RECT. 5Y3G
FIELD L16 1290Ω
C24 10 MFD.
C25 16 MFD.
R12 270Ω
R13 22Ω
C26 10 MFD.
ANT. COIL
OSC. COIL
L2, L3
ELECT. CAP.
C12 C26 BLACK
RED C12
C26 BROWN

## Radiotron Cathode Currents

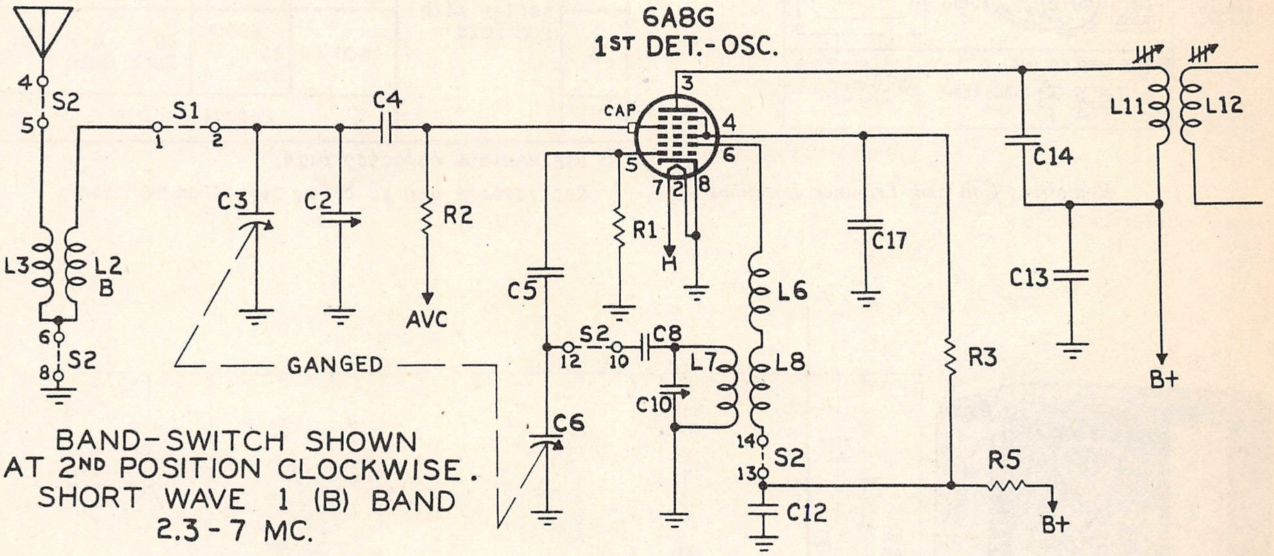
Measured with Milliammeter Connected at Tube Socket Cathode Terminals

| | | |
|---|---|---|
| (1) RCA-6A8-G | 12.7 | ma. |
| (2) RCA-6K7 | 8.2 | ma. |
| (3) RCA-6Q7-G | 0.35 | ma. |
| (4) RCA-6F6-G | 38 | ma. |
| (5) RCA-5Y3-G | 59.5 | ma. |

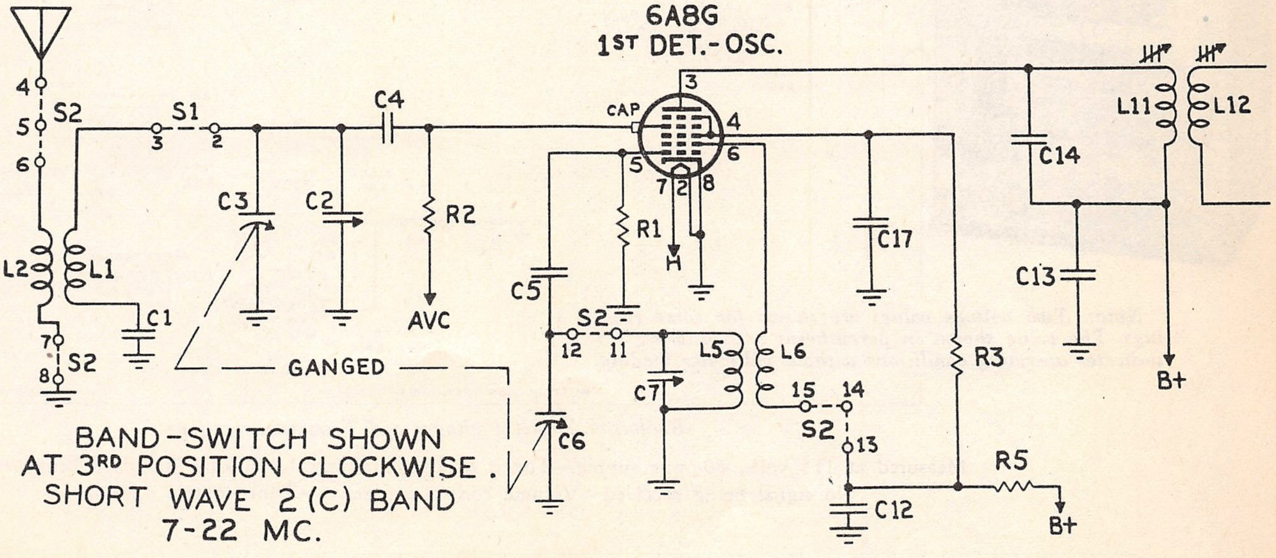
RCA MFG. CO.


6A8G
1ST DET.-OSC.
CAP
3
4
5
6
7
2
8
H
S1
1
2
C4
L2
L4
L3
5
S2
8
C3
C2
R2
AVC
GANGED
R1
C5
L6
L8
L10
C17
C14
C13
L11
L12
R3
B+
S2
12
9
C9
L9
C6
C18
C32
C12
R5
B+

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST (A) BAND
540-1500 KC.


6A8G
1ST DET.-OSC.
CAP
3
4
5
6
7
2
8
H
4
S2
5
S1
1
2
C4
L3
L2
B
6
S2
8
C3
C2
R2
AVC
GANGED
R1
C5
L6
L8
C17
C14
C13
L11
L12
R3
B+
S2
12
10
C8
L7
C10
C6
14
S2
13
C12
R5
B+

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE 1 (B) BAND
2.3-7 MC.

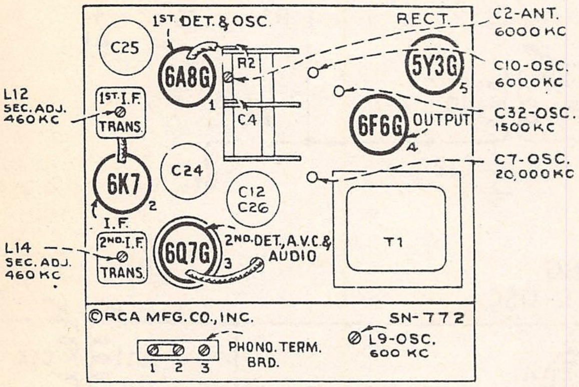

6A8G
1ST DET.-OSC.
CAP
3
4
5
6
7
2
8
H
4
S2
5
6
S1
3
2
C4
L2
L1
C1
7
S2
8
C3
C2
R2
AVC
GANGED
R1
C5
L6
C17
C14
C13
L11
L12
R3
B+
S2
12
11
L5
C7
C6
15
14
S2
13
C12
R5
B+

BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE 2 (C) BAND
7-22 MC.

RCA MFG. CO.

## Alignment Procedure

Calibrate the tuning dial by adjusting dial pointer to the low-frequency (end) calibration mark on dial with the gang tuning-condenser plates in full-mesh position. The pointer is soldered in place on the drive cable.

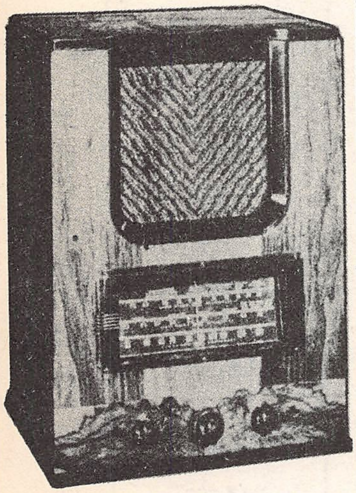

1ST DET. & OSC.
RECT.
C2-ANT. 6000KC
C25
6A8G
R2
5Y3G
C10-OSC. 6000KC
L12 SEC. ADJ. 460KC
1ST I.F. TRANS.
C4
6F6G
OUTPUT
C32-OSC. 1500KC
C7-OSC. 20,000KC
6K7
C24
C12 C26
I.F.
2ND I.F. TRANS.
6Q7G
2ND DET., A.V.C.& AUDIO
T1
L14 SEC. ADJ. 460 KC
1
2
3
4
5
©RCA MFG. CO., INC.
SN-772
PHONO. TERM. BRD.
1 2 3
L9-OSC. 600 KC

-Radiotron, Coil and Trimmer Locations

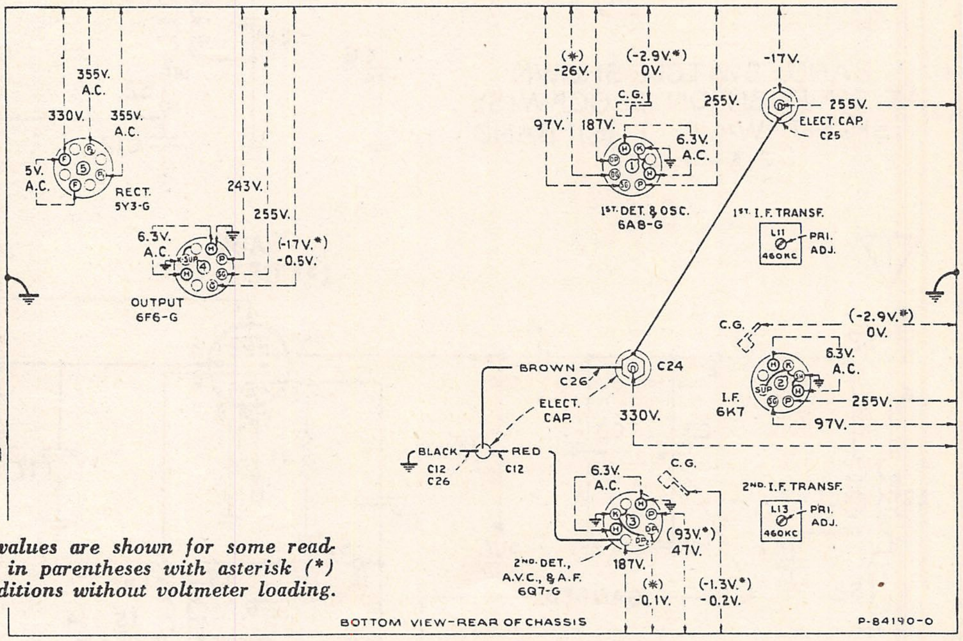
| STEP | CONNECT HIGH SIDE OF TEST OSC. TO - | TUNE TEST OSC TO - | TURN RADIO DIAL TO | ADJUST THE FOLLOWING FOR MAX. OUTPUT |
|---|---|---|---|---|
| 1 | I-F Grid in series with 0.01 mfd | 460 Kc | Quiet point near 600 Kc "A" Band | L14 L13<br>2nd I-F Trans. |
| 2 | 1st Det. Grid in series with 0.01mfd | | | L12 L11<br>1st I-F Trans. |
| 3 | Antenna in series with 300 ohms | 6000 Kc | 6000 Kc "B" Band | C10 C2<br>Osc. Ant. |
| 4 | | 20000 Kc | 20000 Kc "C" Band | C7▲<br>Osc. |
| 5 | Antenna in series with 200 mmfd | 1500 Kc | 1500 Kc "A" Band | C32<br>Osc. |
| 6 | | 600 Kc | 600 Kc "A" Band | L9 L-F Osc.<br>Rock Gang |
| 7 | | *Repeat Step 5* | | |

▲ *Use maximum capacity peak.*

*Osc. tracks 460 Kc below signal on "C" Band.*



*Note: Two voltage values are shown for some readings. The value shown in parentheses with asterisk (*) indicates operating conditions without voltmeter loading.*


355V. A.C.
330V.
355V. A.C.
5V. A.C.
RECT. 5Y3-G
243V.
255V.
6.3V. A.C.
(-17V.*) -0.5V.
OUTPUT 6F6-G
(*) -26V.
(-2.9V.*) 0V.
C.G.
255V.
97V.
187V.
6.3V. A.C.
1ST DET. & OSC. 6A8-G
-17V.
255V.
ELECT. CAP. C25
1ST I.F. TRANSF.
L11 460KC
PRI. ADJ.
C.G.
(-2.9V.*) 0V.
6.3V. A.C.
I.F. 6K7
255V.
97V.
BROWN
C26
C24
ELECT. CAP.
330V.
BLACK
RED
C12 C26
C12
6.3V. A.C.
C.G.
2ND I.F. TRANSF.
L13 460KC
PRI. ADJ.
(93V.*) 47V.
2ND DET., A.V.C., & A.F. 6Q7-G
187V.
(*) -0.1V.
(-1.3V.*) -0.2V.
BOTTOM VIEW-REAR OF CHASSIS
P-84190-O

-Radiotron Socket Voltages and Trimmer Locations

Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc ("Standard Broadcast")
No signal being received—Volume control minimum—Tone control optional

# Electrical Specifications

FREQUENCY RANGES
"Standard Broadcast" (A)................ 540-1,500 kc
"Short Wave—1" (B)................ 2,300-7,000 kc
"Short Wave—2" (C)................ 7,000-22,000 kc

R-F ALIGNMENT FREQUENCIES
"Short Wave—1" (B).............. 6,000 kc (osc., ant.)
"Short Wave—2" (C)................ 20,000 kc (osc.)
"Standard Broadcast" (A).. 600 kc (osc.), 1,500 kc (osc.)

INTERMEDIATE FREQUENCY.......................................... 460 kc

RADIOTRON COMPLEMENT
(1) RCA-6A8-G.............. First Detector—Oscillator
(2) RCA-6K7.................. Intermediate Amplifier
(3) RCA-6Q7-G.. Second Detector, A.V.C., and A-F Amp.
(4) RCA-6F6-G.......................... Power Output
(5) RCA-5Y3-G.................... Full-Wave Rectifier

POWER SUPPLY RATINGS
Rating A........... 105-125 volts, 50-60 cycles, 75 watts
Rating B........... 105-125 volts, 25-60 cycles, 75 watts
Rating C.... 105-125/200-250 volts, 50-60 cycles, 75 watts

PILOT LAMPS (2)............................................ 6.3 volts, 0.25 amp.

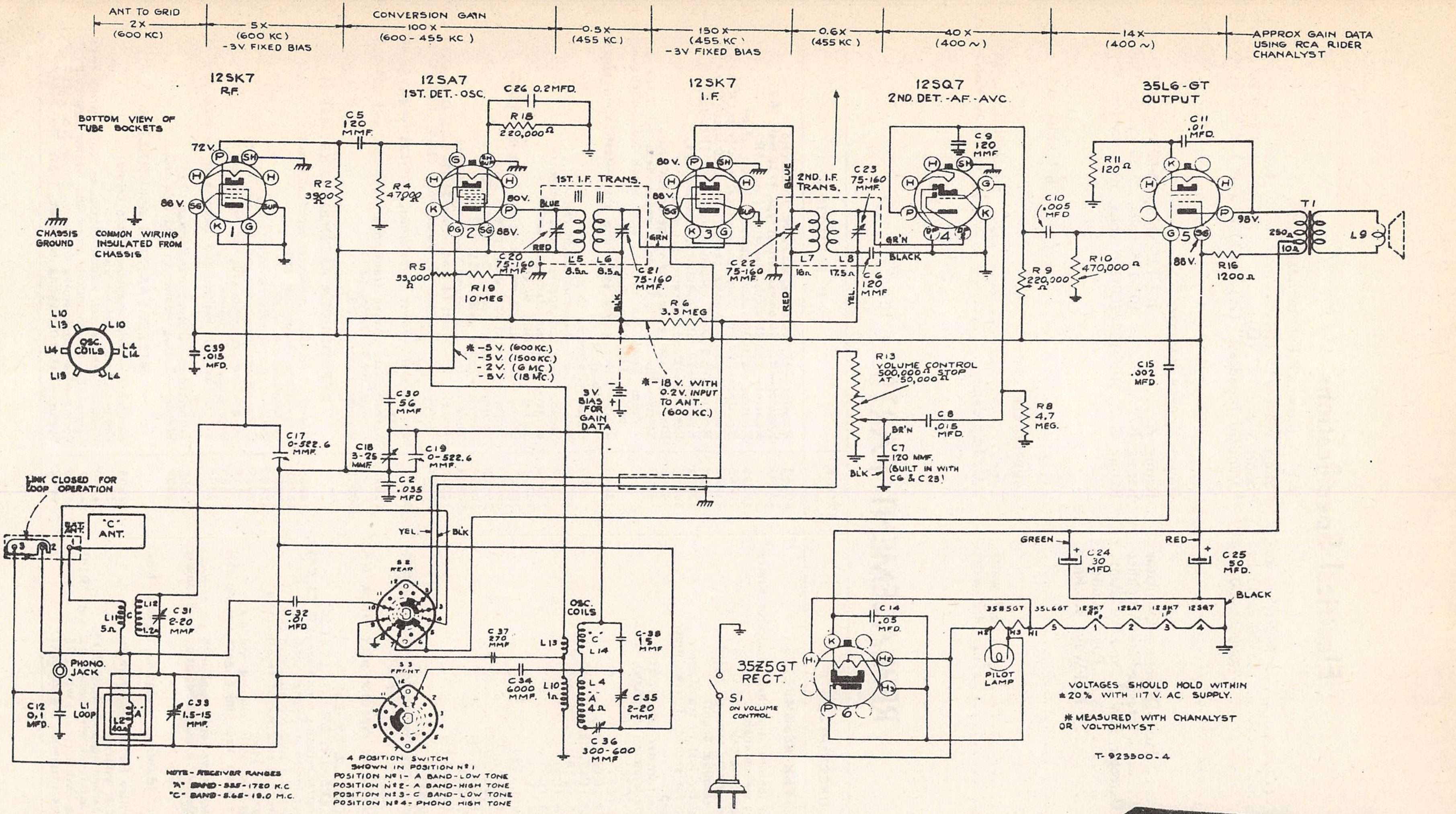
POWER OUTPUT RATING
Undistorted.................................. 2.5 watts
Maximum...................................... 4.5 watts

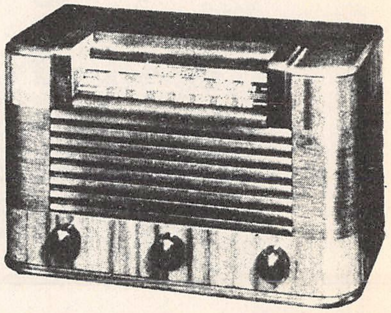
LOUDSPEAKER
Type.............................. 8-inch Electrodynamic
V.C. Impedance.............. 2.2 ohms at 400 cycles

# REPLACEMENT PARTS

| STOCK No. | DESCRIPTION |
|---|---|
| | RECEIVER ASSEMBLIES |
| 14380 | Arm—Hub and arm for operating band indicator shutter—fastens on range switch shaft |
| 14352 | Belt—Station selector drive belt |
| 13216 | Board—Antenna and ground terminal board |
| 12717 | Board—Phonograph terminal board |
| 12607 | Cap—Top shield cap for first i-f transformer |
| 12581 | Cap—Top shield cap for second i-f transformer |
| 11350 | Cap—Grid contact cap |
| 12807 | Capacitor—Adjustable trimmer (short) (C7) |
| 12714 | Capacitor—Adjustable trimmer (medium) (C32) |
| 12896 | Capacitor—15 mmfd. (C18) |
| 12723 | Capacitor—56 mmfd. (C5) |
| 14262 | Capacitor—110 mmfd. (C14, C15) |
| 12404 | Capacitor—120 mmfd. (C27, C28) |
| 12406 | Capacitor—180 mmfd. (C19) |
| 12488 | Capacitor—270 mmfd. (C21) |
| 12812 | Capacitor—450 mmfd. (C9) |
| 30433 | Capacitor—470 mmfd. (C4) |
| 30592 | Capacitor—1,600 mmfd. (C8) |
| 30303 | Capacitor—.0035 mfd. (C1) |
| 4838 | Capacitor—.005 mfd. (C23, C31) |
| 14393 | Capacitor—.01 mfd. (C20, C22) |
| 11315 | Capacitor—.015 mfd. (C30) |
| 4839 | Capacitor—0.1 mfd. (C16, C17) |
| 12484 | Capacitor—0.25 mfd. (C13) |
| 11203 | Capacitor—10 mfd. (C24) |
| 30577 | Capacitor Pack—Comprising two sections, each 10 mfd. (C12), C26) |
| 5212 | Capacitor—16 mfd. (C25) |
| 4358 | Clamp—Mounting clamp for capacitor pack, Stock No. 30577 |
| 30621 | Coil—Antenna coil (L1, L2, L3, L4) |
| 30579 | Coil—Oscillator coil (L5, L6, L7, L8, L9, L10) |
| 30573 | Condenser—2-gang variable tuning condenser (C2, C3, C6) |
| 30586 | Cord—Station selector indicator pointer cord |
| 12800 | Core—Adjustable core and stud for oscillator coil |
| 12006 | Core—Adjustable core and stud for i-f transformers |
| 30622 | Dial—Station selector dial scale |
| 30581 | Disc—Band indicator disc with celluloid window |
| 30572 | Drive—Vernier drive shaft and pinion gear for variable condenser |
| 30584 | Drum—Station-selector drive-cord drum with set screws |
| 30583 | Indicator—Station-selector indicator pointer and holder assembly |
| 5226 | Lamp—Dial lamp |
| 14028 | Nut—Jamb nut for adjustable capacitor, Stock Nos. 12807 and 12714 |
| 30587 | Pulley—Drive-belt pulley for condenser shaft |
| 14636 | Pulley—Drive-belt idler pulley |
| 14525 | Resistor—22 ohms, carbon type, ¼ watt (R13) |
| 13819 | Resistor—270 ohms, insulated, wire-wound, 1.1 watt (R12) |
| 11298 | Resistor—5,600 ohms, carbon type, 1 watt (R5) |
| 12695 | Resistor—15,000 ohms, insulated, ¼ watt (R17) |
| 30151 | Resistor—18,000 ohms, insulated, 1 watt (R3) |
| 14284 | Resistor—22,000 ohms, carbon type, 1/10 watt (R7) |
| 12454 | Resistor—33,000 ohms, insulated, ¼ watt (R1) |
| 12199 | Resistor—270,000 ohms, insulated, ¼ watt (R10) |
| 13005 | Resistor—390,000 ohms, carbon type, 1/10 watt (R11) |
| 11452 | Resistor—470,000 ohms, carbon type, 1/10 watt (R2) |
| 11626 | Resistor—2.2 meg., carbon type, ¼ watt (R4, R9) |
| 13601 | Resistor—10 meg., insulated, ¼ watt (R14) |
| 30582 | Retainer—Band indicator disc retainer |
| 14343 | Ring—Retaining ring for range switch shaft |
| 14350 | Screw—No. 8-32 x 3/16-inch square-head set screw for drum, Stock No. 30584; arm, Stock No. 14380, and pulley, Stock No. 30587 |
| 14340 | Shaft—Drive pulley and knob shaft—fastens on range-switch shaft |
| 3682 | Shield—Radiotron shield |
| 12008 | Shield—I-f transformer shield can |
| 5119 | Socket—3-contact speaker cable socket |
| 11196 | Socket—8-contact Radiotron socket |
| 14114 | Socket—Dial lamp socket |
| 12007 | Spring—Retaining spring for core, Stock No. 12006 |
| 30585 | Spring—Tension spring for pointer cord |
| 30588 | Spring—Tension spring for idler pulley |
| 30620 | Switch—Range switch (S1, S2) |
| 30574 | Tone control and power switch (R18, S3) |
| 14376 | Transformer—First i-f transformer (L11, L12, C14, C15) |
| 14308 | Transformer—Second i-f transformer (L13, L14, C19, C27, C28, R7) |
| 30571 | Transformer—Power transformer, 105-125 volts, 25-60 cycles (T1) |
| 30617 | Transformer—Power transformer, 105-125 and 200-250 volts, 50-60 cycles (T1) |
| 30575 | Volume Control (R8) |
| | REPRODUCER ASSEMBLIES (RL-63F-1) |
| 14356 | Board—3-contact reproducer terminal board |
| 13866 | Cap—Cone center dust cap |
| 12012 | Coil—Field coil (L16) |
| 11469 | Coil—Hum neutralizing coil (L17) |
| 12642 | Cone—Reproducer cone and dust cap (L15) |
| 5118 | Plug—3-contact male plug for reproducer |
| 14360 | Reproducer—Complete |
| 14358 | Screw—Screw, washer, and lockwasher to hold core in yoke |
| 14355 | Transformer—Output transformer (T2) |
| 14357 | Washer—Spring washer to hold field coil |
| | MISCELLANEOUS ASSEMBLIES |
| 30593 | Escutcheon—Dial escutcheon and crystal |
| 14359 | Knob—Station selector knob |
| 14269 | Knob—Tone control, volume control, or range-switch knob |
| 14267 | Screw—Chassis mounting screw and washer assembly |
| 14270 | Spring—Retaining spring for knob, Stock No. 14269 |
| 4982 | Spring—Retaining spring for knob, Stock No. 14359 |

RCA MFG. CO.


ANT TO GRID 2X (600 KC)
5X (600 KC) -3V FIXED BIAS
CONVERSION GAIN 100 X (600 - 455 KC)
0.5X (455 KC)
150 X (455 KC) -3V FIXED BIAS
0.6X (455 KC)
40 X (400 ~)
14 X (400 ~)
APPROX GAIN DATA USING RCA RIDER CHANALYST
12SK7 R.F.
12SA7 1ST. DET.-OSC.
12SK7 I.F.
12SQ7 2ND. DET.-AF.-AVC.
35L6-GT OUTPUT
BOTTOM VIEW OF TUBE SOCKETS
CHASSIS GROUND
COMMON WIRING INSULATED FROM CHASSIS
72V.
88V.
80V.
98V.
C5 120 MMF.
C26 0.2MFD.
R18 220,000 Ω
R2 3900 Ω
R4 47000 Ω
1ST. I.F. TRANS.
2ND. I.F. TRANS.
BLUE
RED
GRN
BLACK
BR'N
YEL.
BLK
C20 75-160 MMF
C21 75-160 MMF.
C22 75-160 MMF.
C23 75-160 MMF.
C6 120 MMF
C9 120 MMF
C10 .005 MFD
C11 .01 MFD.
R11 120 Ω
R9 220,000 Ω
R10 470,000 Ω
R16 1200 Ω
T1
L9
250 Ω
10 Ω
L5 8.5Ω
L6 8.5Ω
L7 16Ω
L8 17.5Ω
R5 33,000 Ω
R19 10 MEG
R6 3.3 MEG
C39 .015 MFD.
OSC. COILS
L10 L13 L4 L14
*-5 V. (600 KC.) -5 V. (1500 KC.) -2 V. (6 MC.) -8 V. (18 MC.)
*-18 V. WITH 0.2 V. INPUT TO ANT. (600 KC.)
3V BIAS FOR GAIN DATA
R13 VOLUME CONTROL 500,000 Ω STOP AT 50,000 Ω
C8 .015 MFD
R8 4.7 MEG.
C7 120 MMF. (BUILT IN WITH C6 & C23)
C15 .002 MFD
C17 0-522.6 MMF.
C18 3-25 MMF
C19 0-522.6 MMF.
C2 .035 MFD
C30 56 MMF
LINK CLOSED FOR LOOP OPERATION
BAT. ANT.
'C' ANT.
S2 REAR
S3 FRONT
L11 5Ω
L12 1.2Ω
C31 2-20 MMF
C32 .01 MFD
C37 270 MMF
C34 6000 MMF.
L13
L10 1Ω
L14
L4 4Ω
C38 15 MMF
C35 2-20 MMF.
C36 300-600 MMF
PHONO. JACK
C12 0.1 MFD.
L1 LOOP
L2 40Ω
C33 1.5-15 MMF.
NOTE - RECEIVER RANGES
'A' BAND - 535-1720 K.C.
'C' BAND - 5.65-19.0 M.C.
4 POSITION SWITCH SHOWN IN POSITION Nº 1
POSITION Nº 1 - A BAND - LOW TONE
POSITION Nº 2 - A BAND - HIGH TONE
POSITION Nº 3 - C BAND - LOW TONE
POSITION Nº 4 - PHONO HIGH TONE
35Z5GT RECT.
S1 ON VOLUME CONTROL
C14 .05 MFD.
PILOT LAMP
GREEN
RED
BLACK
C24 30 MFD.
C25 50 MFD.
35Z5GT 35L6GT 12SK7 12SA7 12SK7 12SQ7
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. AC. SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST
T-923300-4



## Specifications

| | |
|---|---|
| FREQUENCY RANGE | 535-1,720 kc<br>5.74-19 mc |
| Intermediate Frequency | 455 kc |

POWER SUPPLY RATINGS
AC Rating.. 105-125 volts, direct current, or 50-60 cycles, 30 watts

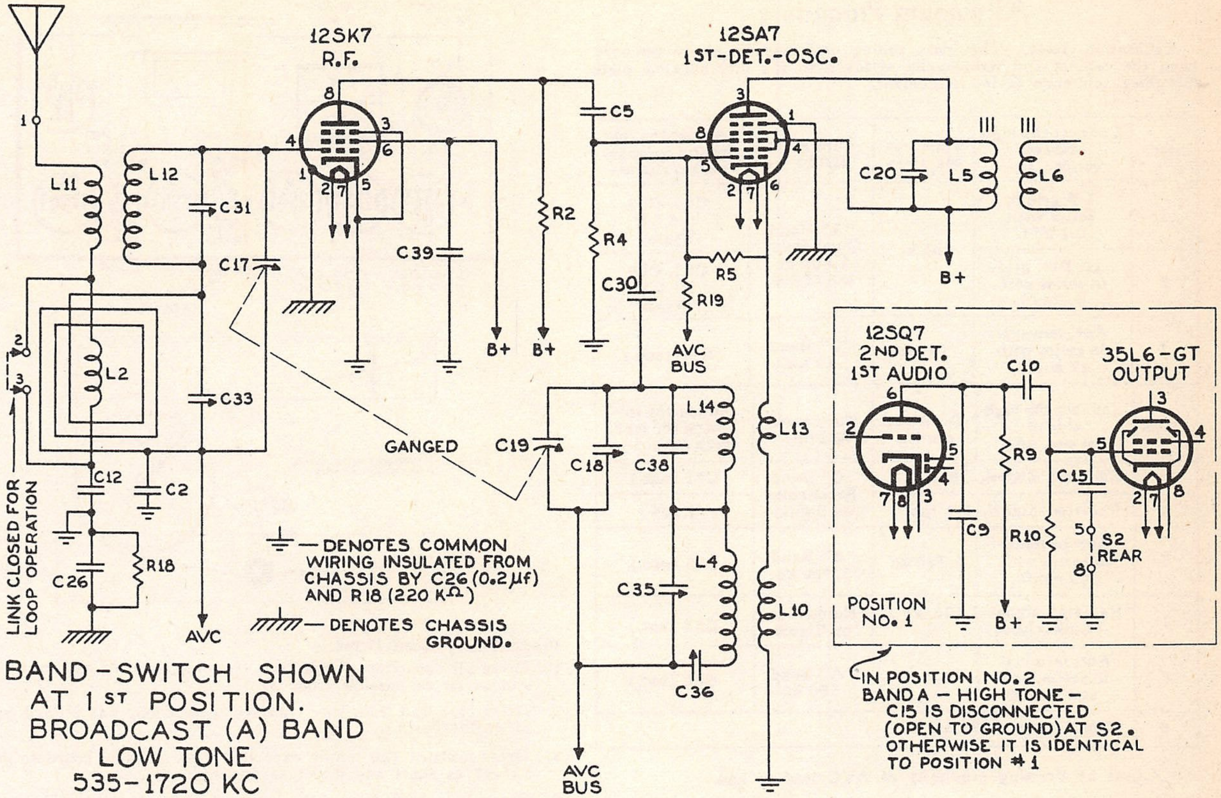
POWER OUTPUT (125 volt, 60 cycle supply)
Undistorted...... 0.9 watts Maximum...... 1.4 watts

LOUDSPEAKER (RL-81-B2)......5-inch permanent-magnet dynamic
Voice Coil Impedance at 400 cycles.................... 4 ohms

**Power-Supply Polarity.**—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

©John F. Rider

## RCA MFG. CO.

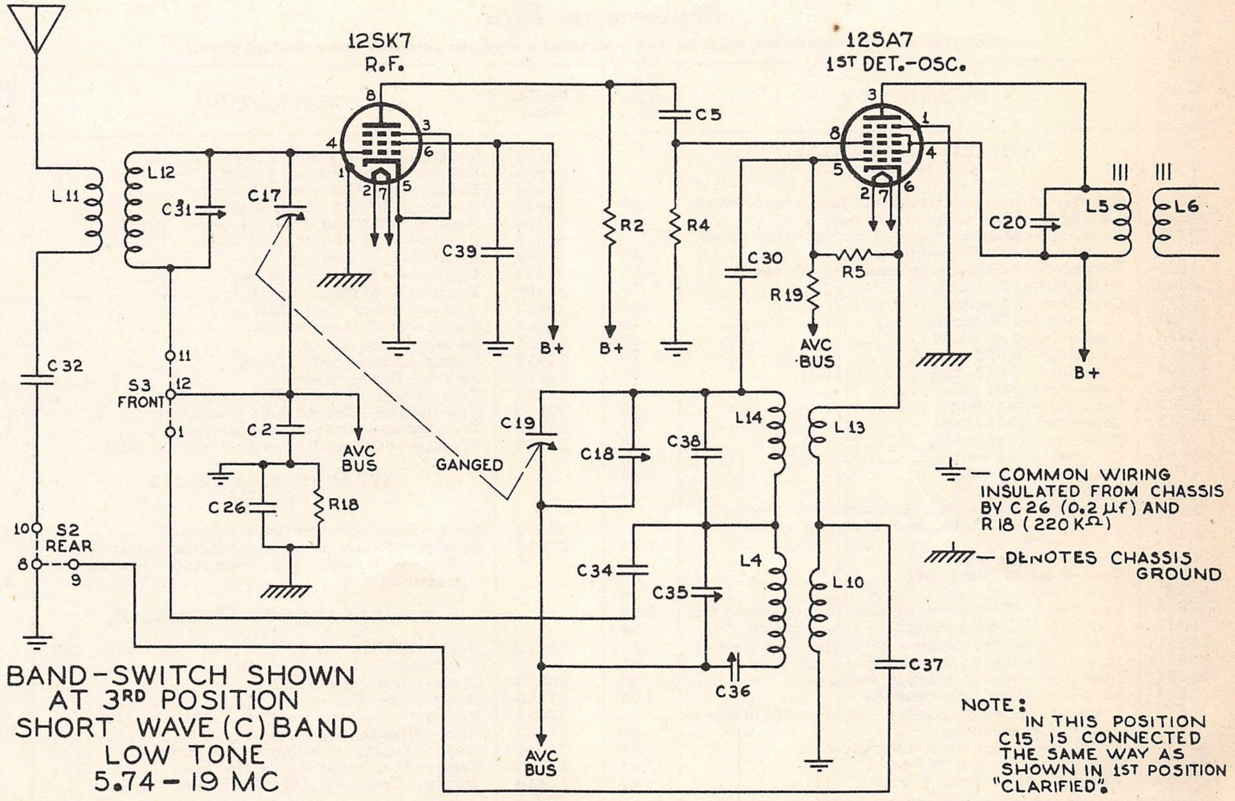

12SK7
R.F.
12SA7
1ST-DET.-OSC.
1
L11
L12
C31
C17
C33
C12
C2
C26
R18
L2
2
3
LINK CLOSED FOR LOOP OPERATION
AVC
8
4
3
6
1
2
7
5
C39
R2
R4
C5
B+
B+
C30
R5
R19
AVC BUS
GANGED
C19
C18
C38
L14
L4
C35
C36
L13
L10
AVC BUS
C20
L5
L6
B+
12SQ7
2ND DET.
1ST AUDIO
35L6-GT
OUTPUT
C10
R9
C9
R10
C15
S2
REAR
5
8
B+
POSITION NO. 1

⏚ — DENOTES COMMON WIRING INSULATED FROM CHASSIS BY C26 (0.2 μf) AND R18 (220 KΩ)

⫨ — DENOTES CHASSIS GROUND.

IN POSITION NO. 2
BAND A — HIGH TONE —
C15 IS DISCONNECTED
(OPEN TO GROUND) AT S2.
OTHERWISE IT IS IDENTICAL
TO POSITION #1

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST (A) BAND
LOW TONE
535-1720 KC


12SK7
R.F.
12SA7
1ST DET.-OSC.
L11
L12
C31
C17
C32
S3
FRONT
11
12
1
C2
AVC BUS
C26
R18
10
S2
REAR
8
9
8
4
3
6
1
2
7
5
C39
R2
R4
C5
B+
B+
C30
R5
R19
AVC BUS
GANGED
C19
C18
C38
L14
C34
C35
L4
C36
L13
L10
C37
AVC BUS
C20
L5
L6
B+

⏚ — COMMON WIRING INSULATED FROM CHASSIS BY C26 (0.2 μf) AND R18 (220 KΩ)

⫨ — DENOTES CHASSIS GROUND

NOTE:
IN THIS POSITION
C15 IS CONNECTED
THE SAME WAY AS
SHOWN IN 1ST POSITION
"CLARIFIED".

BAND-SWITCH SHOWN
AT 3RD POSITION
SHORT WAVE (C) BAND
LOW TONE
5.74 - 19 MC

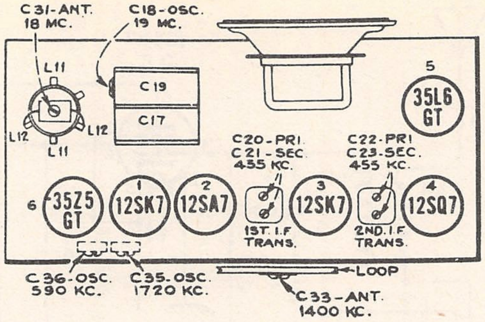
## Alignment Procedure

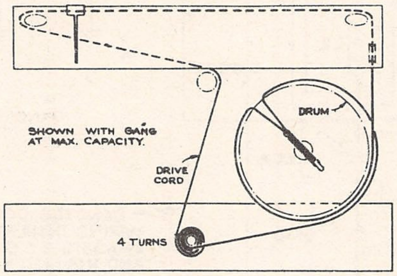
**Calibration Scale.**—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate for quick reference during alignment.

| Steps | Connect the high side of test-osc. to— | Tune test osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | I-F grid in series with 0.1 mfd. | 455 kc | "A" Band Quiet Point 1,600 kc end of dial | C23, C22 2nd I-F Trans. |
| 2 | 1st Det. grid in series with 0.1 mfd. | | | C21, C20 1st I-F Trans. |
| 3 | Ant. terminal in series with 47 mmfd. | 19 mc | "C" Band 19 mc | C18 (osc.) |

| Steps | Connect the high side of test-osc. to— | Tune test osc. to | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 4 | Radiated Signal, 18 mc | | "C" Band Resonance on Signal | C31 (ant.) |
| 5 | Radiated Signal, 6.1 mc | | | L12* |
| 6 | Ant. terminal in series with 200 mmfd. | 1,720 kc | "A" Band 1,720 kc | C35 (osc.) |
| 7 | Radiated signal 1,400 kc (Link closed) | | Resonance on Signal | C33 (ant.) |
| 8 | Ant. terminal in series with 200 mmfd. | 590 kc | "A" Band 590 kc | C36 (osc.) |
| 9 | Repeat steps 6, 7 and 8 | | | |

* Adjust by dressing proximity of AVC lead to coil.





Precautionary Lead Dress.—

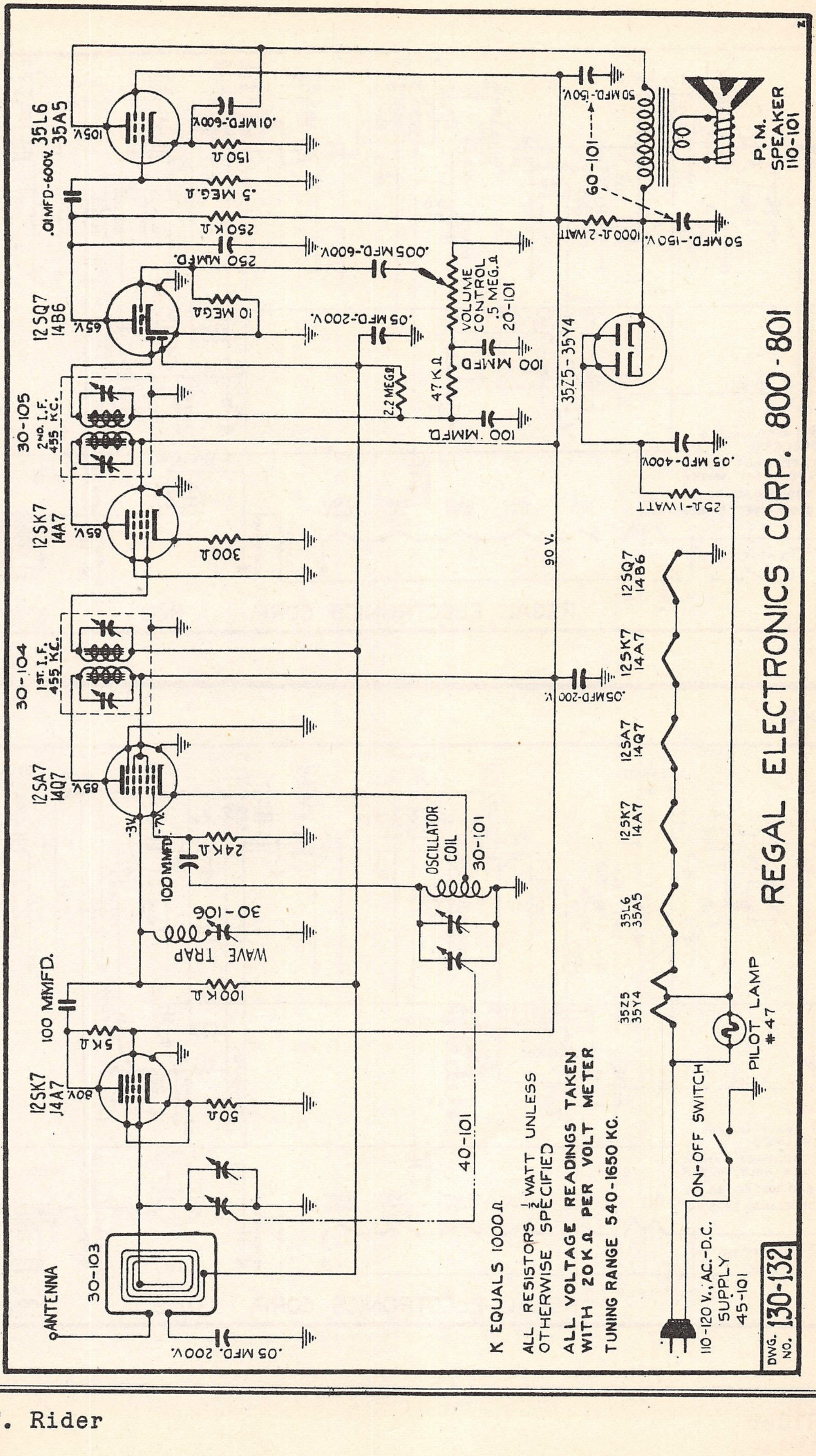
1. Dress all capacitors, leads, etc., coming close to osc. coil rigidly and as far as possible from it.
2. Dress blue lead from loop trimmer against loop and around outside of 35Z5GT tube.
3. Dress leads of 120 mmfd. capacitor from terminal board to grid of 12SA7 as short and direct as possible.
4. Dress blue lead from SW ant. coil through same hole in base through which green lead from stator of rear section of the variable condenser passes.

## Replacement Parts

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | CHASSIS ASSEMBLIES (RC-1000C) | |
| 36947 | Board—"Antenna-Ground" and phono input board | .25 |
| 35998 | Capacitor—Mica trimmer for loop | .25 |
| 36880 | Capacitor—Mica trimmer—1 section 2-20 mmfd. and 1 section 300-800 mmfd. | .60 |
| 11859 | Capacitor—Adjustable trimmer—3-30 mmfd. | .25 |
| 12896 | Capacitor—15 mmfd. | .35 |
| 12723 | Capacitor—56 mmfd. | .35 |
| 12724 | Capacitor—120 mmfd. | .35 |
| 12488 | Capacitor—270 mmfd. | .35 |
| 31405 | Capacitor—6,000 mmfd. | .75 |
| 34506 | Capacitor—.0018 mfd. | .25 |
| 33584 | Capacitor—.005 mfd. | .25 |
| 4937 | Capacitor—.01 mfd. | .25 |
| 11315 | Capacitor—.015 mfd. | .20 |
| 5196 | Capacitor—.035 mfd. | .20 |
| 32787 | Capacitor—.05 mfd. | .20 |
| 4839 | Capacitor—0.1 mfd. | .30 |
| 34505 | Capacitor—0.2 mfd. | .30 |
| 36301 | Capacitor—Electrolytic comprising 1 section of 30 mfd. 150 volts, and 1 section of 50 mfd. 150 volts | 1.25 |
| 35713 | Coil—Antenna coil | .75 |
| 35096 | Coil—Loop primary coil | .50 |
| 36937 | Coil—Oscillator coil | .85 |
| 36876 | Condenser—Two gang variable tuning condenser | 3.00 |
| 36242 | Control—Volume control and power switch | 1.50 |
| 32634 | Cord—Drive cord (approx. 50 inches long overall) | .10 |
| 36237 | Drum—Tuning condenser drive cord drum | .25 |
| 37068 | Indicator—Station selector indicator | .20 |
| 36882 | Loop—Antenna loop complete | 2.00 |
| 36877 | Loop—Loop winding only—less support, primary coil, and trimmer | .55 |
| 37928 | Plate—Dial back plate complete | 1.00 |
| 36230 | Pulley—Drive cord pulley | .04 |
| 30189 | Resistor—120 ohms, ¼ watt | .20 |
| 6134 | Resistor—1,200 ohms, 1 watt | .22 |
| 12955 | Resistor—3,900 ohms, ¼ watt | .20 |
| 12454 | Resistor—33,000 ohms, ¼ watt | .20 |
| 12412 | Resistor—47,000 ohms, ¼ watt | .20 |
| 12264 | Resistor—220,000 ohms, ¼ watt | .20 |
| 30648 | Resistor—470,000 ohms, ¼ watt | .20 |
| 12928 | Resistor—3.3 meg., ¼ watt | .20 |
| 30271 | Resistor—4.7 meg., ¼ watt | .20 |
| 30992 | Resistor—10 meg., ¼ watt | .20 |
| 36897 | Shaft—Tuning knob shaft | .10 |
| 34449 | Socket—Dial lamp socket | .30 |
| 31251 | Socket—Tube socket | .25 |
| 31418 | Spring—Drive cord spring | .05 |
| 36881 | Switch—Range switch | 1.25 |
| 36232 | Transformer—First I.F. transformer | 1.50 |
| 36233 | Transformer—Second I.F. transformer | 1.50 |
| 36800 | Transformer—Output transformer | 1.30 |
| 33726 | Washer—"C" washer to hold tuning shaft | .02 |
| | SPEAKER ASSEMBLIES (RL-81B2) | |
| 35570 | Cone—Cone complete with voice coil | 1.20 |
| 37612 | Speaker—5-inch permanent magnet speaker complete with cone and voice coil—less output transformer | 3.50 |
| | MISCELLANEOUS ASSEMBLIES | |
| 36302 | Back—Cabinet back—less red lead wire and terminal | .15 |
| 36873 | Clamp—Dial clamp | .10 |
| 37929 | Dial—Glass dial scale | |
| 37831 | Fastener—Push-on fastener | .10 |
| 37386 | Knob—Range switch knob | .25 |
| 36541 | Knob—Tuning or volume control knob | .20 |
| 11765 | Lamp—Dial lamp, Mazda No. 51 | .15 |
| 11349 | Spring—Retaining rings for knobs | .05 |

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.


ANTENNA
30-103
.05 MFD. 200 V.
12SK7
J4A7
80V
5K Ω
50 Ω
100 MMFD.
100 K Ω
40-101
WAVE TRAP
30-106
12SA7
14Q7
85V
-3V
7V
100 MMFD.
24 K Ω
OSCILLATOR COIL
30-101
30-104
1ST. I.F.
455 KC.
.05 MFD-200 V.
12SK7
14A7
85V
300 Ω
90 V.
30-105
2ND. I.F.
455 KC.
2.2 MEG Ω
47 K Ω
100 MMFD.
100 MMFD
.05 MFD-200 V.
12SQ7
14B6
65V
10 MEG Ω
250 MMFD.
.005 MFD.-600 V.
VOLUME CONTROL
.5 MEG Ω
20-101
250 K Ω
.01 MFD-600 V.
.5 MEG. Ω
35L6
35A5
105V
150 Ω
.01 MFD.-600 V.
50 MFD.-150 V.
60-101
1000 Ω-2 WATT
50 MFD.-150 V.
P.M. SPEAKER
110-101
35Z5-35Y4
.05 MFD-400 V.
25 Ω-1 WATT
12SQ7
14B6
12SK7
14A7
12SA7
14Q7
12SK7
14A7
35L6
35A5
35Z5
35Y4
PILOT LAMP
#47
ON-OFF SWITCH
110-120 V., AC.-D.C. SUPPLY
45-101
Z

K EQUALS 1000Ω

ALL RESISTORS ½ WATT UNLESS OTHERWISE SPECIFIED

**ALL VOLTAGE READINGS TAKEN WITH 20K Ω PER VOLT METER**

TUNING RANGE 540-1650 KC.

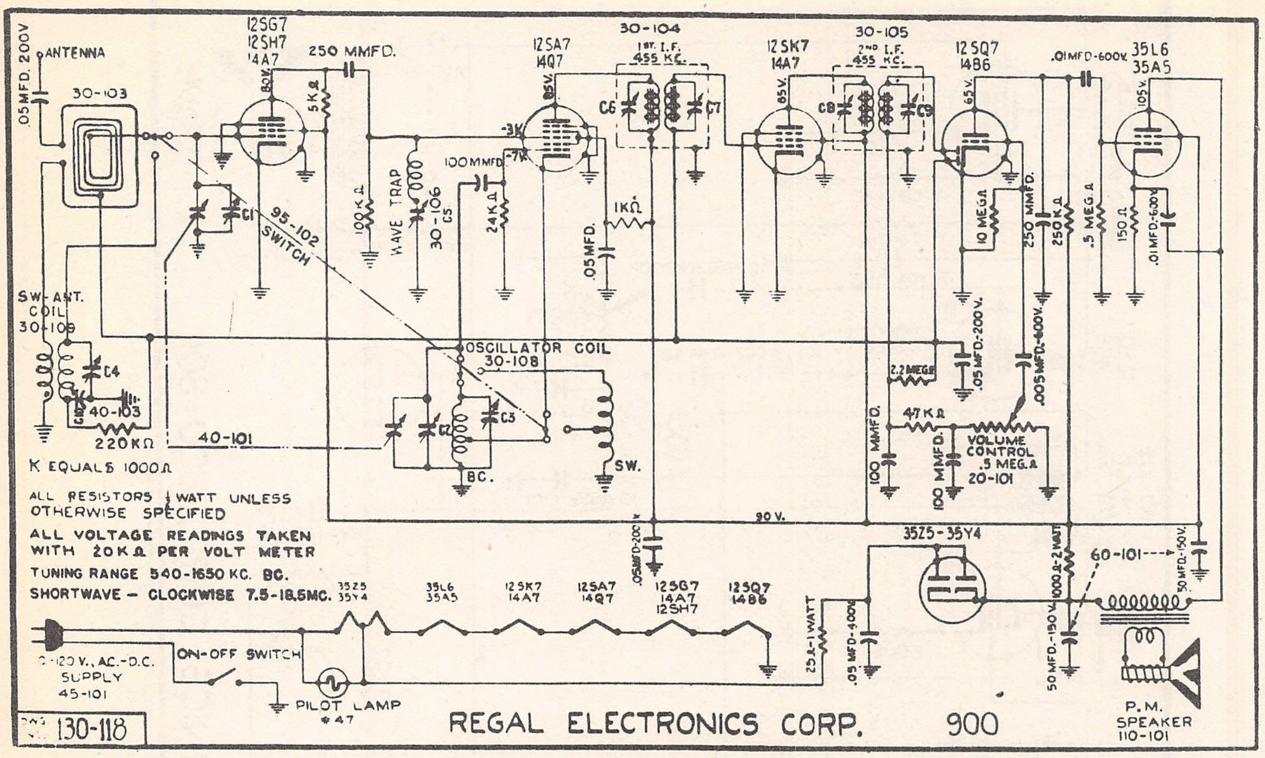
## REGAL ELECTRONICS CORP. 800-801

DWG. NO. 130-132

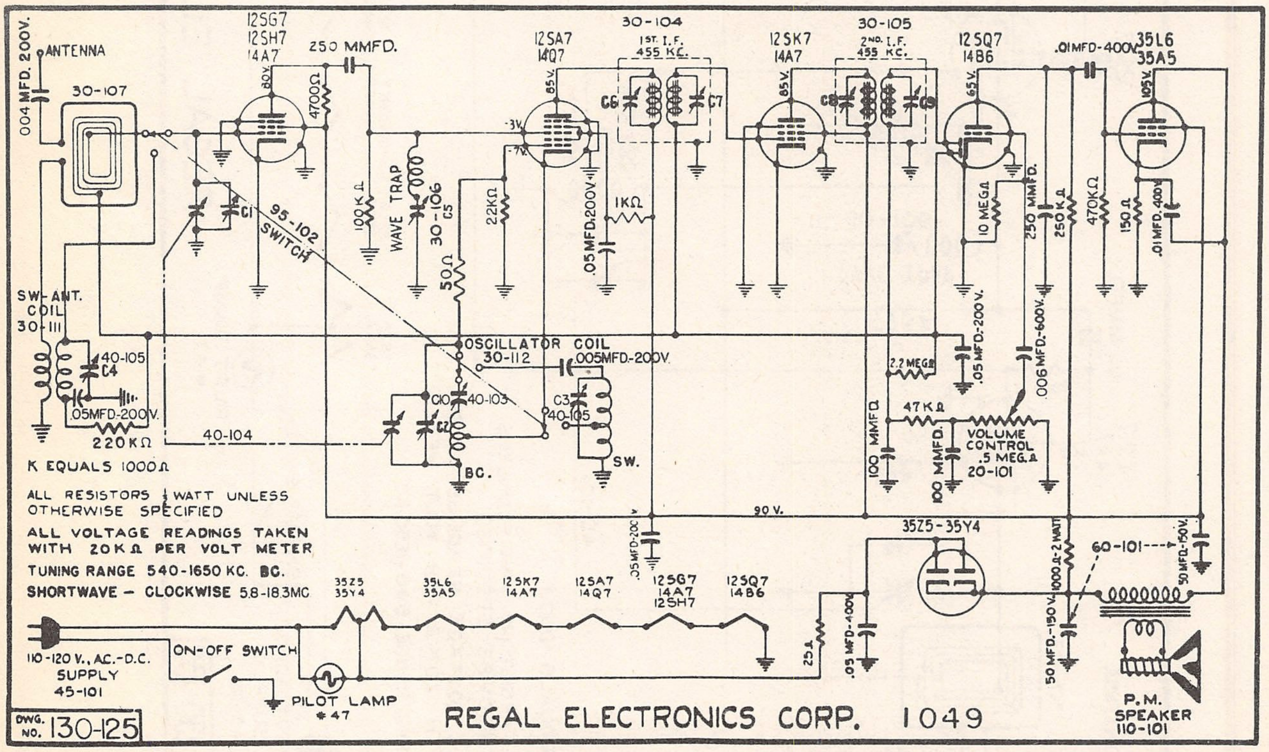
MODEL 900
MODEL 1049

# REGAL ELECTRONICS CORP.

## MODEL 900

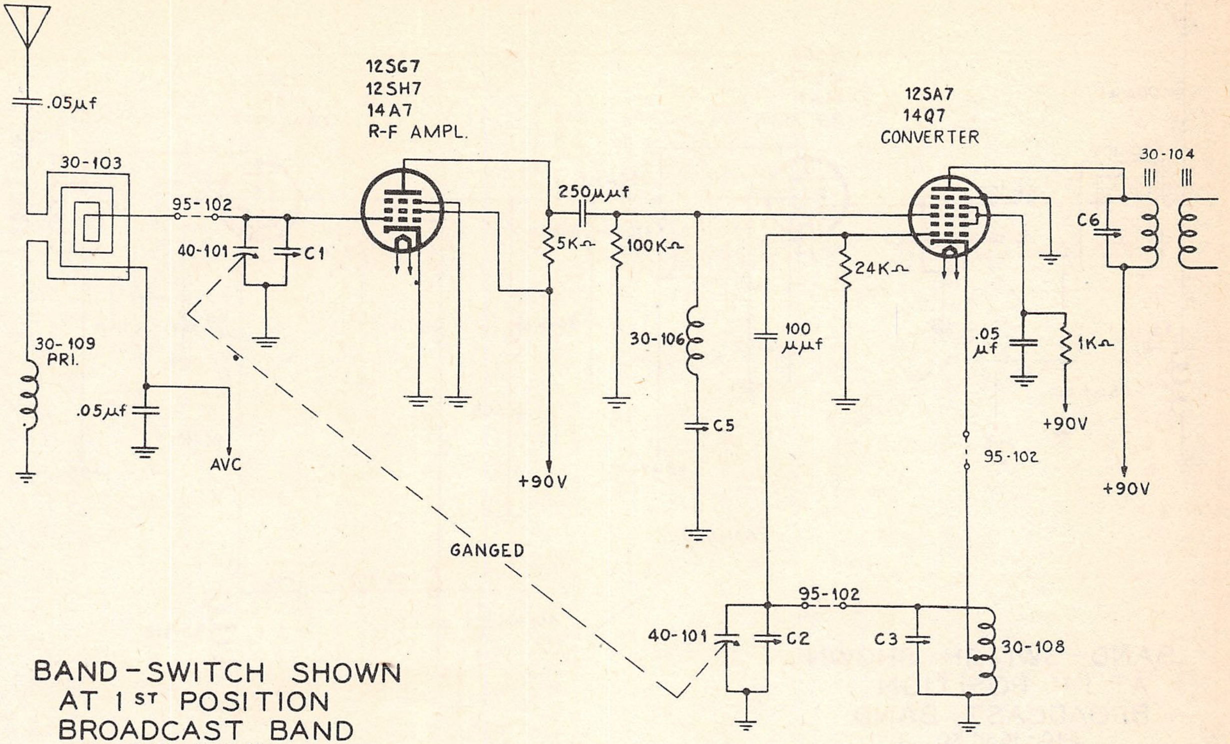

ANTENNA
.05 MFD. 200V
30-103
12SG7
12SH7
14A7
80V.
5KΩ
250 MMFD.
C1
95-102 SWITCH
100KΩ
WAVE TRAP
30-106
C5
100 MMFD.
-7V.
-3V.
24KΩ
12SA7
14Q7
85V.
30-104
1ST. I.F. 455 KC.
C6
C7
1KΩ
.05 MFD.
12SK7
14A7
85V.
30-105
2ND. I.F. 455 KC.
C8
C9
12SQ7
14B6
65V.
10 MEGΩ
250 MMFD.
250KΩ
.01MFD-600V.
35L6
35A5
105V.
.5 MEGΩ
150Ω
.01 MFD-600V.
SW-ANT. COIL 30-109
C4
C2
40-103
220KΩ
40-101
OSCILLATOR COIL 30-108
C3
BC.
SW.
2.2 MEGΩ
.05 MFD-200V.
.005 MFD-400V.
47KΩ
100 MMFD.
100 MMFD.
VOLUME CONTROL .5 MEGΩ 20-101
90 V.
.05 MFD-200V.
35Z5-35Y4
1000Ω-2 WATT
60-101
50 MFD-150V.
50 MFD-150V.
K EQUALS 1000Ω
ALL RESISTORS ½ WATT UNLESS OTHERWISE SPECIFIED
ALL VOLTAGE READINGS TAKEN WITH 20KΩ PER VOLT METER
TUNING RANGE 540-1650 KC. BC.
SHORTWAVE - CLOCKWISE 7.5-18.5MC.
35Z5 35Y4
35L6 35A5
12SK7 14A7
12SA7 14Q7
12SG7 14A7 12SH7
12SQ7 14B6
25Ω-1 WATT
.05 MFD-400V.
ON-OFF SWITCH
110-120 V., AC.-D.C. SUPPLY 45-101
PILOT LAMP #47
DWG. NO. 130-118
REGAL ELECTRONICS CORP. 900
P.M. SPEAKER 110-101

## MODEL 1049

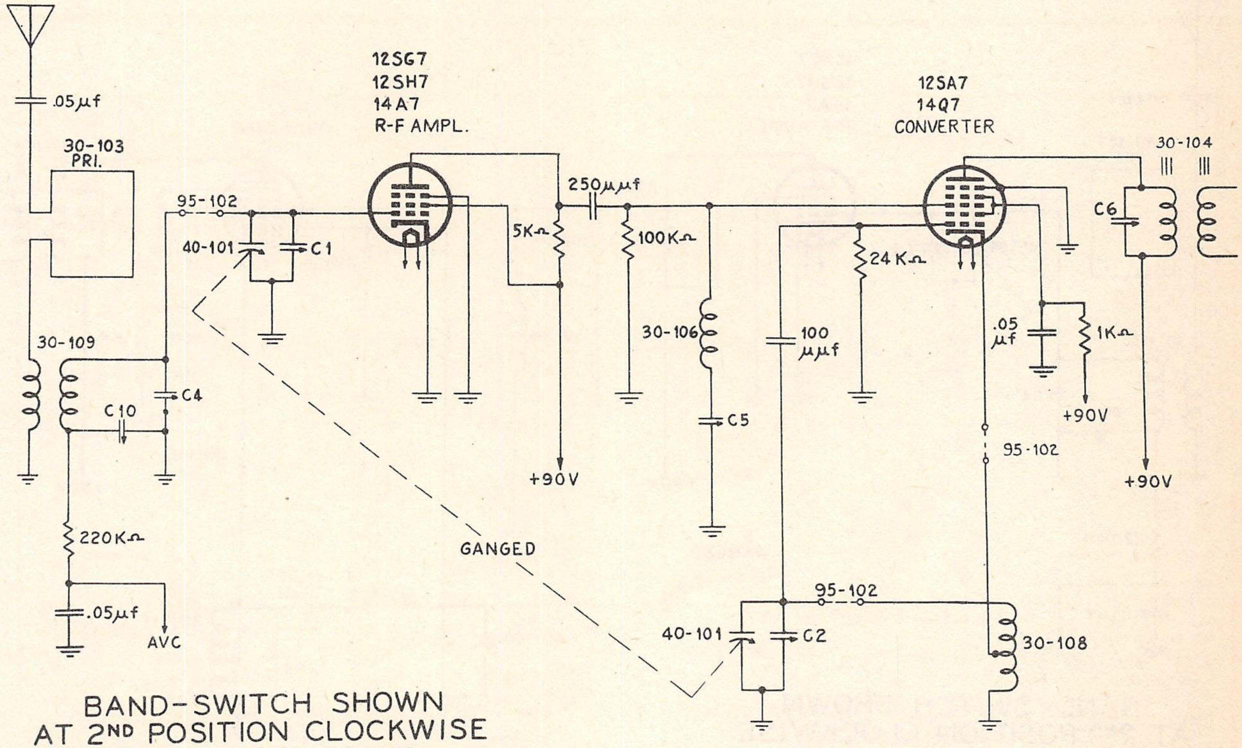

ANTENNA
.004 MFD. 200V.
30-107
12SG7
12SH7
14A7
80V.
4700Ω
250 MMFD.
C1
95-102 SWITCH
100KΩ
WAVE TRAP
30-106
C5
50Ω
22KΩ
-3V.
-7V.
12SA7
14Q7
85V.
30-104
1ST. I.F. 455 KC.
C6
C7
.05 MFD.200V.
1KΩ
12SK7
14A7
85V.
30-105
2ND. I.F. 455 KC.
C8
C9
12SQ7
14B6
65V.
10 MEGΩ
250 MMFD.
250KΩ
470KΩ
.01MFD-400V.
35L6
35A5
105V.
150Ω
.01 MFD. 400V.
SW-ANT. COIL 30-111
40-105
C4
.05MFD-200V.
220KΩ
40-104
OSCILLATOR COIL 30-112
.005MFD-200V.
C10
40-103
C2
C3
40-105
BC.
SW.
2.2 MEGΩ
.05 MFD-200V.
.006 MFD-600V.
47KΩ
100 MMFD.
100 MMFD.
VOLUME CONTROL .5 MEGΩ 20-101
90 V.
.05 MFD-200V.
35Z5-35Y4
1000Ω-2 WATT
60-101
50 MFD-150V.
50 MFD-150V.
K EQUALS 1000Ω
ALL RESISTORS ½ WATT UNLESS OTHERWISE SPECIFIED
ALL VOLTAGE READINGS TAKEN WITH 20KΩ PER VOLT METER
TUNING RANGE 540-1650 KC. BC.
SHORTWAVE - CLOCKWISE 5.8-18.3MC
35Z5 35Y4
35L6 35A5
12SK7 14A7
12SA7 14Q7
12SG7 14A7 12SH7
12SQ7 14B6
25Ω
.05 MFD-400V.
ON-OFF SWITCH
110-120 V., AC.-D.C. SUPPLY 45-101
PILOT LAMP #47
DWG. NO. 130-125
REGAL ELECTRONICS CORP. 1049
P.M. SPEAKER 110-101

## REGAL ELECTRONICS CORP.

**MODEL 900**


.05µf
30-103
30-109
PRI.
.05µf
AVC
95-102
40-101
C1
12SG7
12SH7
14A7
R-F AMPL.
250µµf
5KΩ
100KΩ
+90V
30-106
C5
100
µµf
24KΩ
12SA7
14Q7
CONVERTER
30-104
C6
.05
µf
1KΩ
+90V
95-102
+90V
GANGED
95-102
40-101
C2
C3
30-108

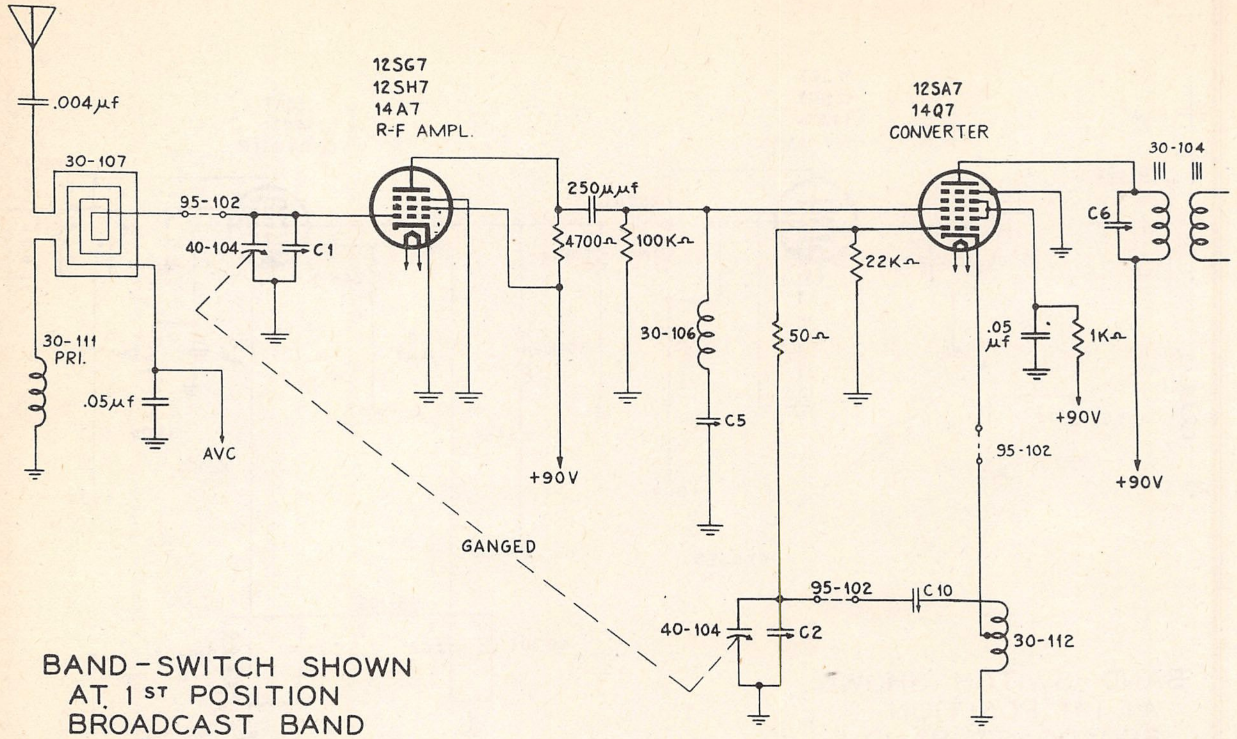
BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND
540-1650 KC.


.05µf
30-103
PRI.
30-109
C10
C4
220KΩ
.05µf
AVC
95-102
40-101
C1
12SG7
12SH7
14A7
R-F AMPL.
250µµf
5KΩ
100KΩ
+90V
30-106
C5
100
µµf
24KΩ
12SA7
14Q7
CONVERTER
30-104
C6
.05
µf
1KΩ
+90V
95-102
+90V
GANGED
95-102
40-101
C2
30-108

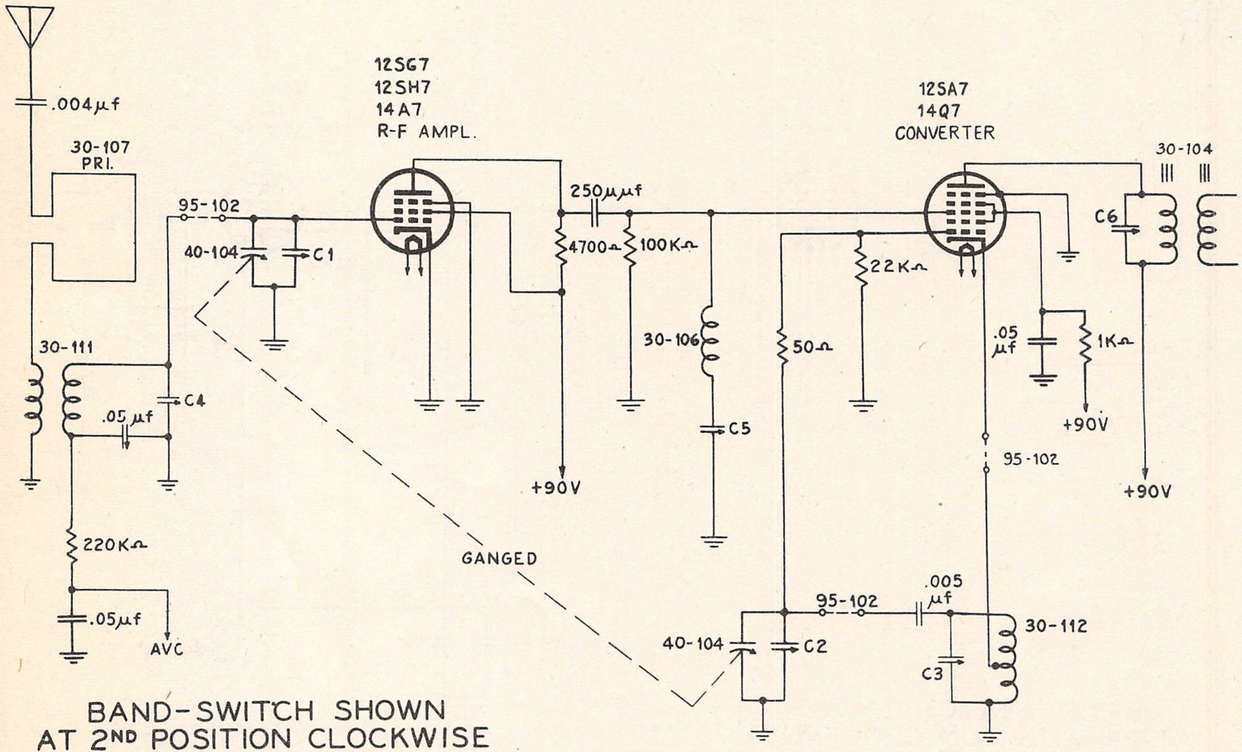
BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
7.5-18.5 MC.

**MODEL 1049**

# REGAL ELECTRONICS CORP.

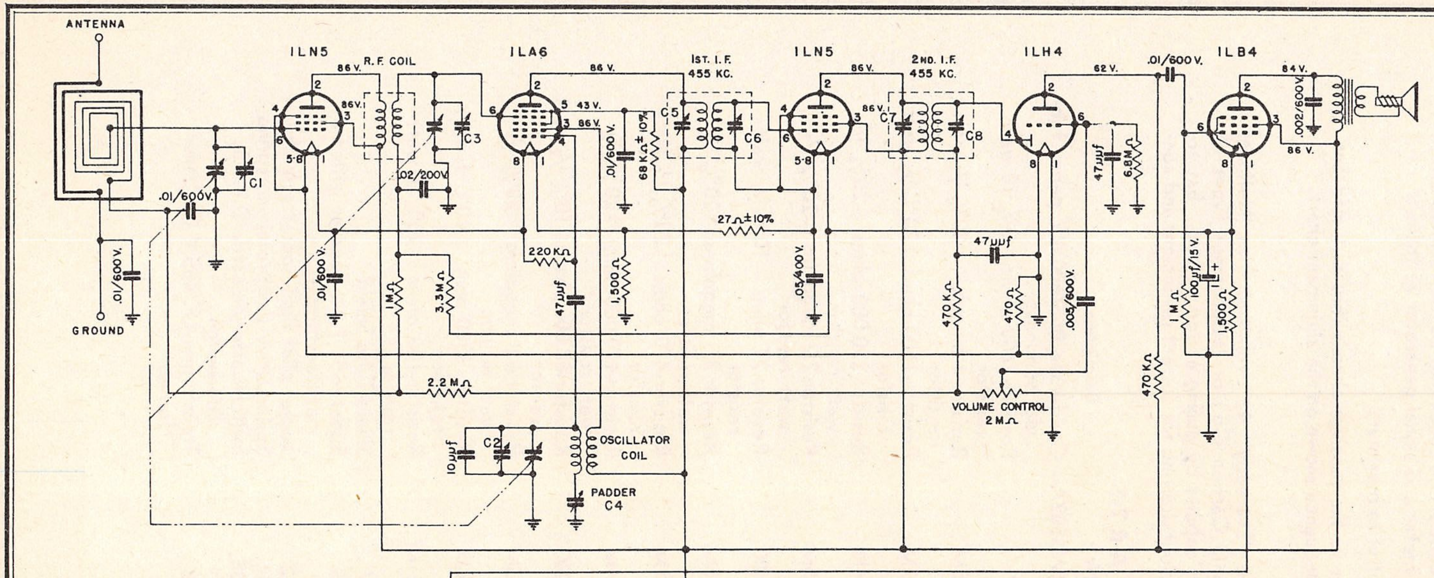

.004µf
30-107
30-111
PRI.
.05µf
AVC
95-102
40-104
C1
12SG7
12SH7
14A7
R-F AMPL.
250µµf
4700Ω
100KΩ
+90V
30-106
C5
12SA7
14Q7
CONVERTER
22KΩ
50Ω
.05
µf
1KΩ
+90V
30-104
C6
+90V
95-102
GANGED
95-102
C10
40-104
C2
30-112

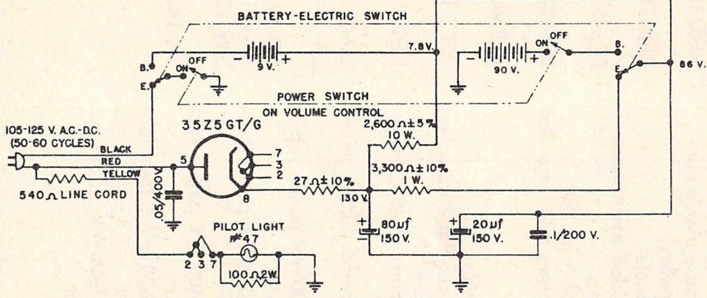
BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND
540-1650 KC.


.004µf
30-107
PRI.
95-102
40-104
C1
30-111
C4
.05µf
220KΩ
.05µf
AVC
12SG7
12SH7
14A7
R-F AMPL.
250µµf
4700Ω
100KΩ
+90V
30-106
C5
12SA7
14Q7
CONVERTER
22KΩ
50Ω
.05
µf
1KΩ
+90V
30-104
C6
+90V
95-102
GANGED
95-102
.005
µf
40-104
C2
C3
30-112

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
5.8-18.3 MC.

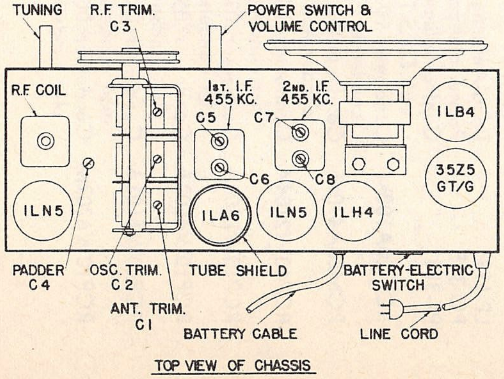
# REXEL MERCHANDISE CO.


ANTENNA
GROUND
ILN5
R.F. COIL
ILA6
1st. I.F. 455 KC.
ILN5
2nd. I.F. 455 KC.
ILH4
ILB4
86 V.
43 V.
62 V.
84 V.
C1
C2
C3
C5
C6
C7
C8
.01/600 V.
.02/200 V.
.05/400 V.
.005/600 V.
.002/600 V.
68 KΩ ± 10%
27Ω ± 10%
220 KΩ
47μμf
1 MΩ
3.3 MΩ
1,500 Ω
470 KΩ
470 KΩ
6.8 MΩ
100μf/15 V.
2.2 MΩ
10μμf
OSCILLATOR COIL
PADDER C4
VOLUME CONTROL 2 MΩ

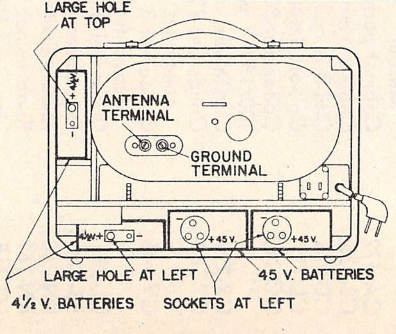

BATTERY-ELECTRIC SWITCH
9 V.
90 V.
7.8 V.
86 V.
OFF
ON
B.
E.
POWER SWITCH ON VOLUME CONTROL
105-125 V. A.C.-D.C. (50-60 CYCLES)
BLACK
RED
YELLOW
540Ω LINE CORD
35Z5GT/G
2,600Ω ± 5% 10 W.
3,300Ω ± 10% 1 W.
27Ω ± 10%
130 V.
.05/400 V.
80μf 150 V.
20μf 150 V.
.1/200 V.
PILOT LIGHT #47
100Ω 2W

ALIGNMENT PROCEDURE CHART

| STEP | CONNECT HIGH SIDE OF SIGNAL GENERATOR TO- | SET SIGNAL GENERATOR TO- | SET POINTER TO- | ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.) |
|---|---|---|---|---|
| 1 | R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD. COND. | 455 KC. | EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN.) | C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1st. AND 2nd. I.F. TRANSFORMERS.) |
| 2 | ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND. | 1500 KC. | 1500 KC. (150 ON DIAL) | C2, C3, C1 OSCILLATOR, R.F. AND ANTENNA TRIMMERS |
| 3 | | 600 KC. | 600 KC. (APPROX. 60 ON DIAL) | C4 PADDER ROCK DIAL FOR MAXIMUM SIGNAL |
| 4 | | REPEAT STEPS 2 AND 3 | | |


TUNING
R.F. TRIM. C3
POWER SWITCH & VOLUME CONTROL
R.F. COIL
1st. I.F. 455 KC.
2nd. I.F. 455 KC.
C5
C6
C7
C8
ILB4
35Z5 GT/G
ILN5
ILA6
ILN5
ILH4
PADDER C4
OSC. TRIM. C2
ANT. TRIM. C1
TUBE SHIELD
BATTERY CABLE
BATTERY-ELECTRIC SWITCH
LINE CORD

TOP VIEW OF CHASSIS


LARGE HOLE AT TOP
ANTENNA TERMINAL
GROUND TERMINAL
+45 V.
+45 V.
LARGE HOLE AT LEFT
45 V. BATTERIES
4½ V. BATTERIES
SOCKETS AT LEFT

REAR VIEW OF CABINET
SHOWING PLACEMENT OF BATTERIES

NOTES:
1. ALL RESISTORS ± 20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%.
ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.
4. ILA6 TUBE IS ENCLOSED IN METAL SHIELD.

NOTE: ILA6 TUBE IS ENCLOSED IN METAL SHIELD.

**Frequency Range** 530 - 1700 kc.

# 'REXEL MERCHANDISE CO.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

## ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

## BATTERIES

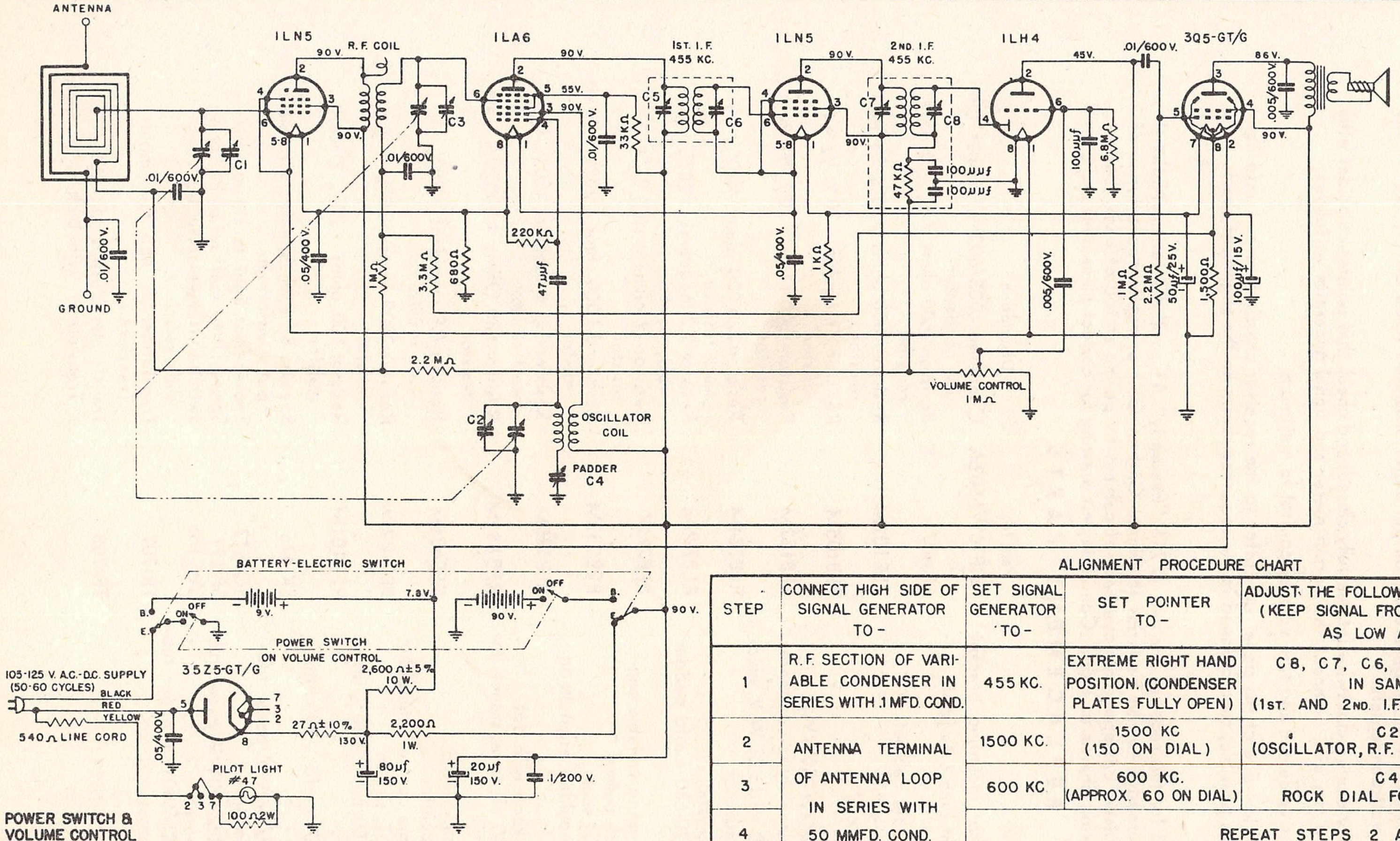
The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

## REPLACEMENT PARTS

| Part No. | Description |
|---|---|
| BK-405 | Bracket-Resistor mounting bracket |
| BT-232 | Battery-4½ volt battery (A) |
| BT-233 | Battery-45 volt battery (B) |
| BU-187 | Bulb-pilot light bulb 6.3v (#47 Mazda) |
| CA-472 | Cabinet-portable cabinet |
| CB-335 | Cable-battery cable |
| CL-176 | Coil-R.F. coil, shielded |
| CL-177 | Coil-oscillator coil |
| CO-182 | Condenser-80/20/150WV & 100/15WV electrolytic condenser |
| CR-299 | Crystal-dial crystal |
| CT-388 | Condenser-220-680 mmfd padder condenser |
| CV-146 | Condenser-3 gang variable condenser (with pulley) |
| DL-391 | Dial-metal dial scale |
| ES-274-3 | Escutcheon-moulded escutcheon |
| KN-260 | Knob-walnut knob |
| KN-261 | Knob-walnut knob with dot |
| LC-315 | Line Cord-540 ohms resistance line cord |
| LP-178 | Loop-Antenna |
| PO-395 | Pointer-dial pointer |
| PT-383 | Control-volume control 2 megohms with D.P.S.T. switch |
| RCM20A100M | Condenser-10 mmfd ±20% mica condenser |
| RCM20A470M | Condenser-47 mmfd ±20% mica condenser |
| RCP10W2104A | Condenser-.1-200WV paper tubular condenser |
| RCP10W2203A | Condenser-.02/200WV paper tubular condenser |
| RCP10W4503A | Condenser-.05/400WV paper tubular condenser |
| RCP10W6103A | Condenser-.01/600WV paper tubular condenser |
| RCP10W6202M | Condenser-.002/600WV paper tubular condenser |

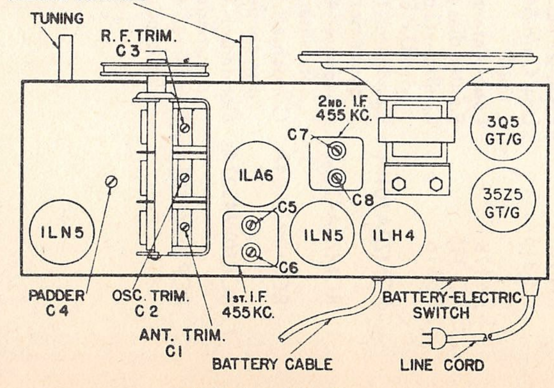
| Part No. | Description |
|---|---|
| RCP10W6502A | Condenser-.005/600WV paper tubular condenser |
| RE-407 | Resistor-2600 ohms ±5% 10 watt resistor |
| REB105M | Resistor-1 megohm ±20% ½ watt resistor |
| REB152M | Resistor-1500 ohms ±20% ½ watt resistor |
| REB224M | Resistor-220,000 ohms ±20% ½ watt resistor |
| REB225M | Resistor-2.2 megohms ±20% ½ watt resistor |
| REB270K | Resistor-27 ohms ±10% ½ watt resistor |
| REB335M | Resistor-3.3 megohms ±20% ½ watt resistor |
| REB471M | Resistor-470 ohms ±20% ½ watt resistor |
| REB474M | Resistor-470,000 ohms ±20% ½ watt resistor |
| REB683K | Resistor-68,000 ohms ±10% ½ watt resistor |
| REB685M | Resistor-6.8 megohms ±20% ½ watt resistor |
| REC332K | Resistor- 3300 ohms ±10% 1 watt resistor |
| RED101M | Resistor-100 ohms ±20% 2 watt resistor |
| SD-607 | Shield-Tube Shield |
| SK-156 | Speaker-5" P.M. Speaker with output transformer |
| SO-572 | Socket-pilot light socket assembly |
| SP-191 | Spring-Drive shaft retaining spring |
| SW-185 | Switch-battery-electric D.P.D.T. slide switch |
| TR-186 | Transformer-I.F. 455 K.C. Transformer |

# REXEL MERCHANDISE CO.

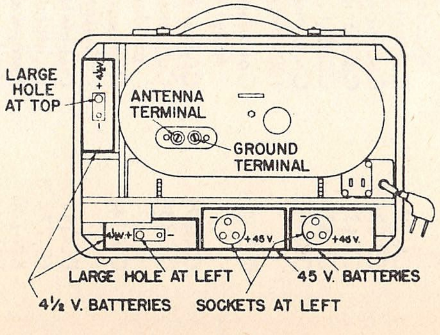

ANTENNA
GROUND
.01/600V.
ILN5
90 V.
R.F. COIL
ILA6
90 V.
55V.
.01/600V.
C3
C1
.01/600 V.
33KΩ
IST. I.F. 455 KC.
C5
C6
2ND. I.F. 455 KC.
C7
C8
47KΩ
100μμf
100μμf
ILH4
45V.
.01/600 V.
3Q5-GT/G
86 V.
.005/600V.
90 V.
100μμf
6.8MΩ
.05/400 V.
1MΩ
3.3MΩ
680Ω
220KΩ
47μμf
.05/400V.
1KΩ
.005/600V.
1MΩ
2.2MΩ
50μf/25V.
1,500Ω
100μf/15V.
2.2 MΩ
VOLUME CONTROL 1MΩ
C2
OSCILLATOR COIL
PADDER C4
BATTERY-ELECTRIC SWITCH
7.8V.
9 V.
90 V.
ON
OFF
B.
E.
90 V.
POWER SWITCH ON VOLUME CONTROL
105-125 V. A.C.-D.C. SUPPLY (50-60 CYCLES)
BLACK
RED
YELLOW
540Ω LINE CORD
35Z5-GT/G
2,600Ω±5% 10 W.
27Ω±10%
130 V.
2,200Ω 1W.
.05/400V.
PILOT LIGHT #47
100Ω 2W
80μf 150 V.
20μf 150 V.
.1/200 V.

ALIGNMENT PROCEDURE CHART

| STEP | CONNECT HIGH SIDE OF SIGNAL GENERATOR TO - | SET SIGNAL GENERATOR TO - | SET POINTER TO - | ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.) |
|---|---|---|---|---|
| 1 | R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD COND. | 455 KC. | EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN) | C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS) |
| 2 | ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND. | 1500 KC. | 1500 KC (150 ON DIAL) | C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS) |
| 3 | | 600 KC | 600 KC. (APPROX. 60 ON DIAL) | C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL |
| 4 | | REPEAT STEPS 2 AND 3 | | |


POWER SWITCH & VOLUME CONTROL
TUNING
R.F. TRIM. C3
2ND. I.F. 455 KC.
C7
C8
3Q5 GT/G
35Z5 GT/G
ILA6
ILN5
C5
C6
ILN5
ILH4
PADDER C4
OSC. TRIM. C2
ANT. TRIM. C1
1ST. I.F. 455 KC.
BATTERY-ELECTRIC SWITCH
BATTERY CABLE
LINE CORD

TOP VIEW OF CHASSIS


LARGE HOLE AT TOP
ANTENNA TERMINAL
GROUND TERMINAL
+45 V.
+45 V.
LARGE HOLE AT LEFT
45 V. BATTERIES
4½ V. BATTERIES
SOCKETS AT LEFT

REAR VIEW OF CABINET
SHOWING PLACEMENT OF BATTERIES

NOTES:

1. ALL RESISTORS ± 20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ± 20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND GROUND, WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ± 10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ± 5%. ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.

**Frequency Range** 530 - 1700 kc.

# REXEL MERCHANDISE CO.

WHEN SERVICING THIS RECEIVER DO NOT PLACE CHASSIS ON A GROUNDED METALLIC BENCH

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

## ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

## BATTERIES

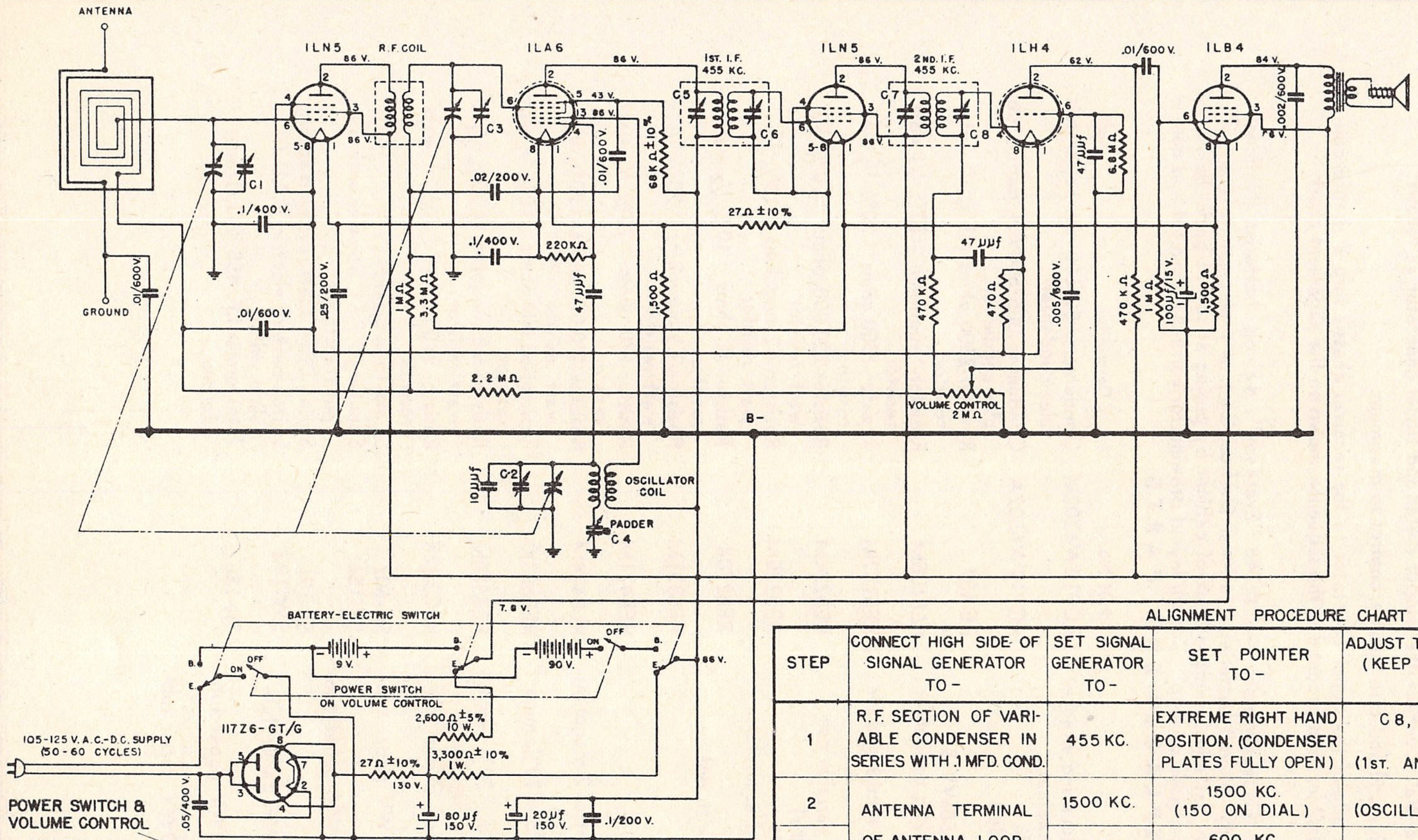
The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

## REPLACEMENT PARTS

| Part No. | Description |
|---|---|
| BK-405 | Bracket-Resistor mounting bracket |
| BU-187 | Bulb-pilot light bulb 6.3v (#47 Mazda) |
| CA-472 | Cabinet-portable cabinet |
| CB-335 | Cable-battery cable |
| CL-177 | Coil-oscillator coil |
| CL-630 | Coil-R.F. coil |
| CO-182 | Condenser-80/20/150WV & 100/15WV electrolytic condenser |
| CO 808 | Condenser-50 mfd /25 W.V. electrolytic condenser |
| CR-299 | Crystal-dial crystal |
| CT-388 | Condenser-220-680 mmfd padder condenser |
| CV-146 | Condenser-3 gang variable condenser (with pulley) |
| DL-391 | Dial-metal dial scale |
| ES-274-3 | Escutcheon-moulded escutcheon |
| KN-260 | Knob-walnut knob |
| KN-261 | Knob-walnut knob with dot |
| LC-315 | Line Cord-540 ohms resistance line cord |
| LP-178 | Loop-Antenna |
| PO-395 | Pointer-dial pointer |
| PT-576 | Control-volume control 1 megohm with D.P.S.T. switch |
| RCM20A101M | Condenser-100 mmf ±20% mica condenser |
| RCM20A470M | Condenser-47 mmfd ±20% mica condenser |
| RCP10W2104A | Condenser-.1/200WV paper tubular condenser |
| RCP10W4503A | Condenser-.05/400WV paper tubular condenser |
| RCP10W6103A | Condenser-.01/600WV paper tubular condenser |
| RCP10W6502A | Condenser-.005/600WV paper tubular condenser |
| RE-407 | Resistor-2600 ohms ±5% 10 watt resistor |
| REB 102M | Resistor-1000 ohms ±20% ½ watt resistor |
| REB105M | Resistor-1 megohm ±20% ½ watt resistor |
| REB152M | Resistor-1500 ohms ±20% ½ watt resistor |
| REB224M | Resistor-220,000 ohms ±20% ½ watt resistor |
| REB225M | Resistor-2.2 megohms ±20% ½ watt resistor |
| REB270K | Resistor-27 ohms ±10% ½ watt resistor |
| REB333M | Resistor-33,000 ohms ±20% ½ watt resistor |
| REB335M | Resistor-3.3 megohms ±20% ½ watt resistor |
| REB 681M | Resistor-680 Ohms ±20% ½ watt resistor |
| REB685M | Resistor-6.8 megohms ±20% ½ watt resistor |
| REC 222M | Resistor-2200 ohms ±20% 1 watt resistor |
| RED101M | Resistor-100 ohms ±20% 2 watt resistor |
| SK-476 | Speaker-5" P.M. Speaker with output transformer |
| SO-572 | Socket-pilot light socket assembly |
| SP-191 | Spring-Drive shaft retaining spring |
| SW-185 | Switch-battery-electric D.P.D.T. slide switch |
| TR-707 | Transformer-I.F. 455 K.C. input-Transformer |
| TR-708 | Transformer-Output I.F. 455 K.C. Transformer with built-in I.F. filter |

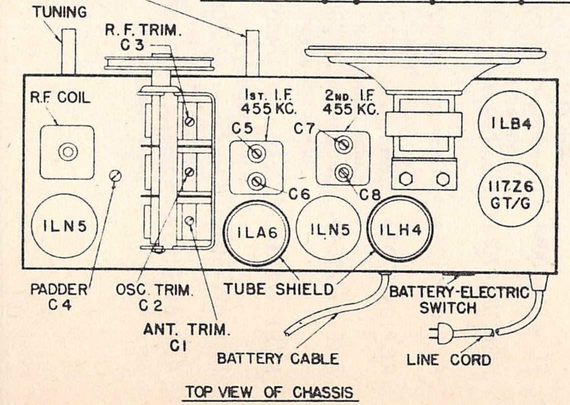
# REXEL MERCHANDISE CO.

## MODEL L-266-U

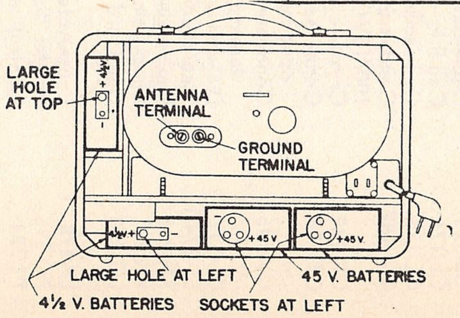

ANTENNA
GROUND
ILN5
R.F. COIL
ILA6
1ST. I.F. 455 KC.
ILN5
2ND. I.F. 455 KC.
ILH4
ILB4
86 V.
43 V.
62 V.
84 V.
78 V.
C1
C3
C5
C6
C7
C8
.01/600 V.
.1/400 V.
.25/200 V.
.02/200 V.
.1/400 V.
220 KΩ
47 μμf
68 KΩ ±10%
1,500 Ω
1 MΩ
3.3 MΩ
27 Ω ±10%
47 μμf
470 KΩ
470 Ω
.005/600 V.
6.8 MΩ
470 KΩ
1 MΩ
100 μf/15 V.
1,500 Ω
.01/600 V.
.002/600 V.
2.2 MΩ
VOLUME CONTROL 2 MΩ
B-
10 μμf
C2
OSCILLATOR COIL
PADDER C4
BATTERY-ELECTRIC SWITCH
7.8 V.
9 V.
90 V.
ON
OFF
B.
E.
POWER SWITCH ON VOLUME CONTROL
105-125 V. A.C.-D.C. SUPPLY (50-60 CYCLES)
117Z6-GT/G
2,600 Ω ±5% 10 W.
3,300 Ω ±10% 1 W.
27 Ω ±10%
130 V.
80 μf 150 V.
20 μf 150 V.
.1/200 V.
.05/400 V.
POWER SWITCH & VOLUME CONTROL

### ALIGNMENT PROCEDURE CHART

| STEP | CONNECT HIGH SIDE OF SIGNAL GENERATOR TO - | SET SIGNAL GENERATOR TO - | SET POINTER TO - | ADJUST THE FOLLOWING FOR MAXIMUM OUTPUT. (KEEP SIGNAL FROM SIGNAL GENERATOR AS LOW AS POSSIBLE.) |
|---|---|---|---|---|
| 1 | R.F. SECTION OF VARIABLE CONDENSER IN SERIES WITH .1 MFD. COND. | 455 KC. | EXTREME RIGHT HAND POSITION. (CONDENSER PLATES FULLY OPEN) | C8, C7, C6, C5 AND REPEAT IN SAME ORDER (1ST. AND 2ND. I.F. TRANSFORMERS) |
| 2 | ANTENNA TERMINAL OF ANTENNA LOOP IN SERIES WITH 50 MMFD. COND. | 1500 KC. | 1500 KC. (150 ON DIAL) | C2, C3, C1 (OSCILLATOR, R.F. AND ANTENNA TRIMMERS) |
| 3 | | 600 KC | 600 KC. (APPROX. 60 ON DIAL) | C4 (PADDER) ROCK DIAL FOR MAXIMUM SIGNAL |
| 4 | | REPEAT STEPS 2 AND 3 | | |


TUNING
R.F. TRIM. C3
R.F. COIL
1ST. I.F. 455 KC.
2ND. I.F. 455 KC.
C5
C7
C6
C8
ILB4
117Z6 GT/G
ILN5
ILA6
ILN5
ILH4
PADDER C4
OSC. TRIM. C2
ANT. TRIM. C1
TUBE SHIELD
BATTERY CABLE
BATTERY-ELECTRIC SWITCH
LINE CORD

TOP VIEW OF CHASSIS


LARGE HOLE AT TOP
ANTENNA TERMINAL
GROUND TERMINAL
+45 V
+45 V
LARGE HOLE AT LEFT
45 V. BATTERIES
4½ V. BATTERIES
SOCKETS AT LEFT

REAR VIEW OF CABINET
SHOWING PLACEMENT OF BATTERIES.

**NOTE:**
ILA6 AND ILH4 TUBES ARE
ENCLOSED IN METAL SHIELDS.

LEGEND:
⏚ CHASSIS GROUND

NOTES:
1. ALL RESISTORS ±20% TOLERANCE, ½ WATT, UNLESS OTHERWISE SPECIFIED.
2. ALL MICA CONDENSERS ±20% TOLERANCE.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND B- WITH VOLUME CONTROL FULL ON, USING 20,000 OHMS-PER-VOLT METER. ALL VOLTAGE READINGS ±10%, EXCEPT FILAMENT VOLTAGE WHICH SHOULD BE KEPT WITHIN ±5%. ALL READINGS MEASURED ON ELECTRIC POWER OPERATION WITH AN INPUT VOLTAGE OF 117 V., 60 CYCLES, A.C.
4. ILA6 AND ILH4 TUBES ARE ENCLOSED IN METAL SHIELDS.

**Frequency Range 530 - 1700 kc.**

# REXEL MERCHANDISE CO.

For tube replacement it is not necessary to remove the chassis from the cabinet. Access to the tubes may be made by removing the center screw on the loop holding same to the bracket, and then lifting loop carefully off the bracket so as to avoid breaking of wires connecting same.

For ALIGNMENT the chassis must be removed from case. Remove first batteries and then the three screws holding chassis to the bottom of the shelf.

## ALIGNMENT

Equipment Required: Modulated r-f signal generator; output meter; insulated screw driver; two .1 mfd 400 volt and one 50 mmfd 400 volt condensers.

Turn variable condenser fully counterclockwise (plates fully closed) and check that pointer coincides with the first thin calibration mark on the dial. Connect the output meter and signal generator as follows:

Output meter: Connect across voice coil and turn volume control to maximum.

Signal generator: Connect the low side of the signal generator to the receiver chassis thru a .1 mfd condenser and keep output as low as possible, then proceed in the sequence shown on the alignment chart.

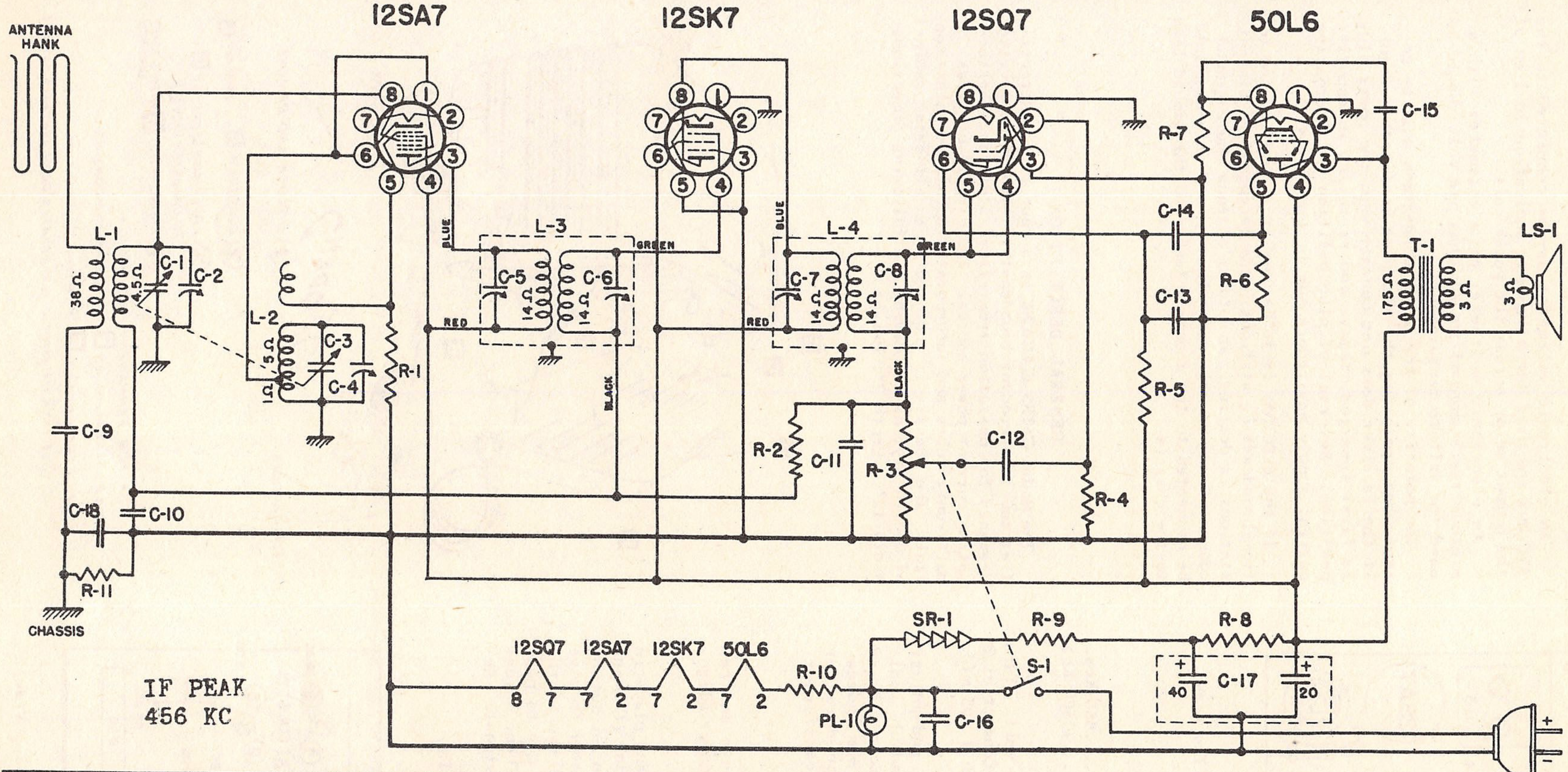
## BATTERIES

The batteries recommended for this receiver are two #746 "Eveready" 4½ volt batteries (National Carbon Co.) and two #482 "Eveready" 45 volt batteries (National Carbon Co.) or replacement types of equal size and voltage. To replace batteries, remove back of cabinet by pulling at top of back. Batteries are accessible without removing chassis or loop. Consult layout drawing for correct placement and connections of batteries.

## REPLACEMENT PARTS

| Part No. | Description |
|---|---|
| BK-405 | Bracket-Resistor mounting bracket |
| CA-472 | Cabinet-portable cabinet |
| CB-335 | Cable-battery cable |
| CL-176 | Coil-R.F. coil, shielded |
| CL-177 | Coil-oscillator coil |
| CO-182 | Condenser-80/20/150W.V. & 100/15W.V. electrolytic condenser |
| CR-299 | Crystal-dial crystal |
| CT-388 | Condenser-220-680 mmfd padder condenser |
| CV-146 | Condenser-3 gang variable condenser (with pulley) |
| DL-391 | Dial-metal dial scale |
| ES-274-1 | Escutcheon-moulded escutcheon |
| KN-260 | Knob-walnut knob |
| KN-261 | Knob-walnut knob with dot |
| LC-223 | Line Cord |
| LP-178 | Loop-Antenna |
| PO-395 | Pointer-dial pointer |
| PT-383 | Control-volume control 2 megohms with D.P.S.T. switch |
| RCM20A100M | Condenser-10 mmfd ±20% mica condenser |
| RCM20A470M | Condenser-47 mmfd ±20% mica condenser |
| RCP10W2104A | Condenser-.1/200W.V. paper tubular condenser |
| RCP10W2203A | Condenser-.02/200W.V. paper tubular condenser |
| RCP10W2254A | Condenser-.25/200W.V. paper tubular condenser |
| RCP10W4104L | Condenser-.1/400W.V. paper tubular condenser |
| RCP10W4503A | Condenser-.05/400W.V. paper tubular condenser |
| RCP10W6103A | Condenser-.01/600W.V. paper tubular condenser |
| RCP10W6202M | Condenser-.002/600W.V. paper tubular condenser |
| RCP10W6502A | Condenser-.005/600W.V. paper tubular condenser |
| RE-407 | Resistor-2600 ohms ±5% 10 watt resistor |
| REB105M | Resistor-1 megohm ±20% ½ watt resistor |
| REB152M | Resistor-1500 ohms ±20% ½ watt resistor |
| REB224M | Resistor-220,000 ohms ±20% ½ watt resistor |
| REB225M | Resistor-2.2 megohms ±20% ½ watt resistor |
| REB270K | Resistor-27 ohms ±10% ½ watt resistor |
| REB335M | Resistor-3.3 megohms ±20% ½ watt resistor |
| REB471M | Resistor-470 ohms ±20% ½ watt resistor |
| REB474M | Resistor-470,000 ohms ±20% ½ watt resistor |
| REB683K | Resistor-68,000 ohms ±10% ½ watt resistor |
| REB685M | Resistor-6.8 megohms ±20% ½ watt resistor |
| REC332K | Resistor-3300 ohms ±10% 1 watt resistor |
| SD-607 | Shield-Tube Shield |
| SK-156 | Speaker-5" P.M. Speaker with output transformer |
| SP-191 | Spring-Drive shaft retaining spring |
| SW-193 | Switch-battery-electric T.P.D.T. slide switch |
| TR-186 | Transformer-I.F. 455 K.C. Transformer |

# RYAN SALES CO.


ANTENNA HANK
12SA7
12SK7
12SQ7
50L6
L-1
38 Ω
4.5 Ω
C-1
C-2
L-2
5 Ω
1 Ω
C-3
C-4
R-1
C-9
C-18
C-10
R-11
CHASSIS
BLUE
RED
GREEN
BLACK
L-3
C-5
C-6
14 Ω
L-4
C-7
C-8
R-2
C-11
R-3
C-12
R-4
R-5
C-13
C-14
R-6
R-7
C-15
T-1
175 Ω
3 Ω
LS-1
12SQ7 12SA7 12SK7 50L6
8 7 7 2 7 2 7 2
R-10
PL-1
C-16
SR-1
R-9
S-1
R-8
C-17
40
20
117 VOLTS A.C./D.C.

IF PEAK
456 KC

LIST OF SYMBOLS

| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
|---|---|---|---|
| C-1 | ANT. TUNING CAPACITOR including trimmer C-2 | LS-1 | LOUDSPEAKER - 5" PM |
| C-3 | OSC. TUNING CAPACITOR including trimmer C-4 | PL-1 | PILOT LAMP - 115 volts - 6 watts |
| C-5,6 | 1st I. F. TRIMMER CAPACITORS | R-1 | RESISTOR - 20,000 ohms - 1/2 watt |
| C-7,8 | 2nd I. F. TRIMMER CAPACITORS | R-2 | RESISTOR - 3.0 Megohms - 1/2 watt |
| C-9 | CAPACITOR - 0.001 mfd. - 500 volts - Mica | R-3 | POTENTIOMETER AND SPST SWITCH (S-1) - 500,000 ohms |
| C-10 | CAPACITOR - 0.05 mfd. - 200 volts - Paper | R-4 | RESISTOR - 15.0 Megohms - 1/2 watt. |
| C-11 | CAPACITOR - 0.00025 mfd. - 500 volts - Mica | R-5 | RESISTOR - 470,000 ohms - 1/2 watt |
| C-12 | CAPACITOR - 0.002 mfd. - 600 volts - Paper | R-6 | RESISTOR - 470,000 ohms - 1/2 watt |
| C-13 | CAPACITOR - 0.00025 mfd. - 500 volts - Mica | R-7 | RESISTOR - 100 ohms - 1/2 watt |
| C-14 | CAPACITOR - 0.02 mfd. - 400 volts - Paper | R-8 | RESISTOR - 1,000 ohms - 5 watts |
| C-15 | CAPACITOR - 0.02 mfd. - 400 volts - Paper | R-9 | RESISTOR - 15 ohms - Type CW |
| C-16 | CAPACITOR - 0.05 mfd. - 400 volts - Paper | R-10 | RESISTOR - 200 ohms - 10 watts |
| C-17 | CAPACITOR - 40/20 mfd. - 150 volts - Electrolytic | R-9 | RESISTOR - 15 ohms - IRC Type CW |
| C-18 | CAPACITOR - 0.05 mfd. - 400 volts - Paper | R-10 | RESISTOR - 200 ohms - 10 watts |
| L-1 | ANTENNA COIL | R-11 | RESISTOR - 250,000 ohms - 1/2 watt |
| L-2 | OSCILLATOR COIL | S-1 | POWER SWITCH - SPST (part of R-3) |
| L-3 | 1st I. F. TRANSFORMER | SR-1 | SELENIUM RECTIFIER - 100 milliampere - 5 plates |
| L-4 | 2nd I. F. TRANSFORMER | T-1 | OUTPUT TRANSFORMER |

## TUBE COMPLEMENT

| | |
|---|---|
| Converter and Oscillator | 12SA7 |
| I.F. Amplifier | 12SK7 |
| Detector-AVC-Audio | 12SQ7 |
| Power Output | 50L6GT |
| Rectifier | Selenium |
| Dial Lamp | Mazda #6S6 |

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Power Supply | 105-125 volts, 50-60 cycles, AC |
| Power Consumption | 30 watts |
| Frequency Range | 500-1700 Kcs. |
| Intermediate Frequency | 456 Kcs. |
| Audio Output | 1.5 watts |

## LOUDSPEAKER

| | |
|---|---|
| Permanent Magnet | 5" Diameter |

## INSTALLATION FACILITIES PROVIDED

| | |
|---|---|
| Power | 5' cord and plug |
| Antenna | 10' indoor type |
| Ground | None required |

# RYAN SALES CO.

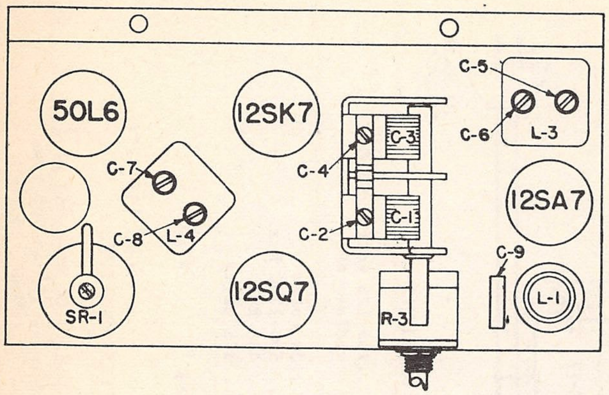

50L6
12SK7
12SA7
12SQ7
C-5
C-6
L-3
C-7
C-8
L-4
C-4
C-3
C-2
C-1
C-9
L-1
R-3
SR-1

*FIG. 1 - Tube and Trimmer Locations (Top View)*

## ALIGNMENT PROCEDURE

Alignment Frequencies:

| | |
|---|---|
| I.F. | 456 Kcs. |
| R.F. | 1500 Kcs. |

**I. F. Alignment:**

Connect output meter across the voice coil. Turn the receiver volume control to maximum. Connect high side of the alignment oscillator, through a .05 mfd. capacitor, to the converter grid.

Set alignment oscillator at 456 Kcs. and adjust output to give the lowest conveniently readable indication on the output meter. Adjust trimmers C-7 and C-8 in 2nd I.F. transformer to give maximum indication on output meter. Repeat this procedure for trimmers C-5 and C-6 in the 1st I.F. transformer. Repeat procedure to check accuracy.

**R. F. Alignment:**

Retain output meter connected as above and receiver volume control set at maximum. Connect alignment oscillator to antenna.

Set alignment oscillator at 1500 Kcs. and place in operation. Rotate receiver tuning capacitor (C-1 and C-3) to give maximum signal indication on output meter. Adjust output of alignment oscillator to give the lowest conveniently readable indication on the output meter. Adjust oscillator trimmer C-4 to peak the signal indication on output meter. Then, adjust antenna trimmer C-2 to further peak the signal. Repeat procedure to check accuracy.

Trimmer locations are shown in Figure 1.

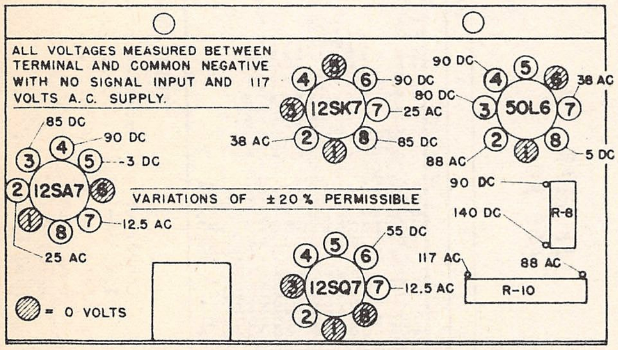

ALL VOLTAGES MEASURED BETWEEN TERMINAL AND COMMON NEGATIVE WITH NO SIGNAL INPUT AND 117 VOLTS A.C. SUPPLY.
12SA7
85 DC
90 DC
-3 DC
12.5 AC
25 AC
12SK7
90 DC
25 AC
85 DC
38 AC
50L6
90 DC
80 DC
38 AC
5 DC
88 AC
VARIATIONS OF ±20% PERMISSIBLE
90 DC
140 DC
R-8
12SQ7
55 DC
12.5 AC
117 AC
88 AC
R-10
= 0 VOLTS

*FIG. 2 - Socket Terminal Voltages (Bottom View)*

NOTES:

An electronic voltmeter may be connected to the AVC bus and used for alignment indication in lieu of the output meter across the voice coil.

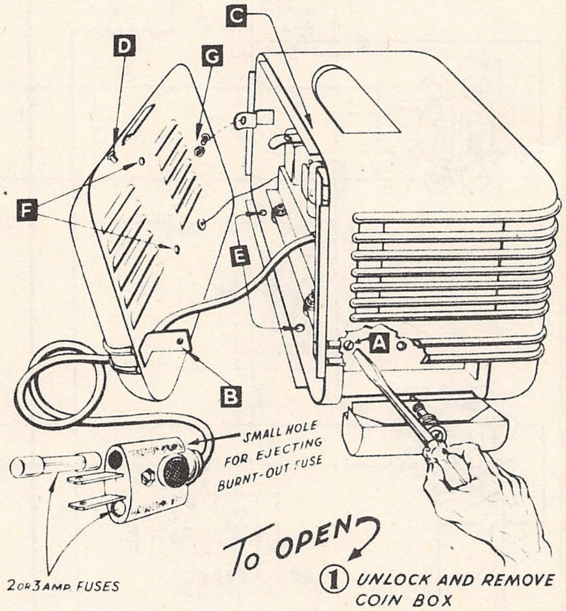
An electronic voltmeter or a voltmeter with a minimum resistance of 20,000 ohms per volt should be used for voltage measurements.

The polarity of the power connection must be correct when operating the receiver on direct current. If the receiver does not operate when the power plug is first inserted, remove and re-insert in opposite position. Reversal of plug position on alternating current supply may reduce hum in some cases.

If the ELECTONE is to be used in a location remote from broadcasting stations or the reception of distant stations is desired, an outdoor antenna and a ground connection may be utilized. The outdoor antenna should be connected to the indoor antenna and the ground lead to the chassis.

## GENERAL DESCRIPTION

The Model C5TS3 ELECTONE is a four tube and rectifier super-heterodyne broadcast entertainment receiver designed for operation from either a direct or alternating current power source. The circuit utilizes multi-unit tubes and incorporates automatic volume control. The chassis is enclosed in an all-metal cabinet of modern styling and having the following dimensions: Width 12"; Depth 7"; Height 7".


C
D
G
F
E
B
A
SMALL HOLE FOR EJECTING BURNT-OUT FUSE
2 OR 3 AMP FUSES
TO OPEN

① UNLOCK AND REMOVE COIN BOX

② UNSCREW A TO RELEASE BRACKET B

③ APPLY PRESSURE AT C TO UNFASTEN PIN D

④ UNSCREW NUT G WITH SOCKET WRENCH

— FOR PERMANENT MOUNTING —

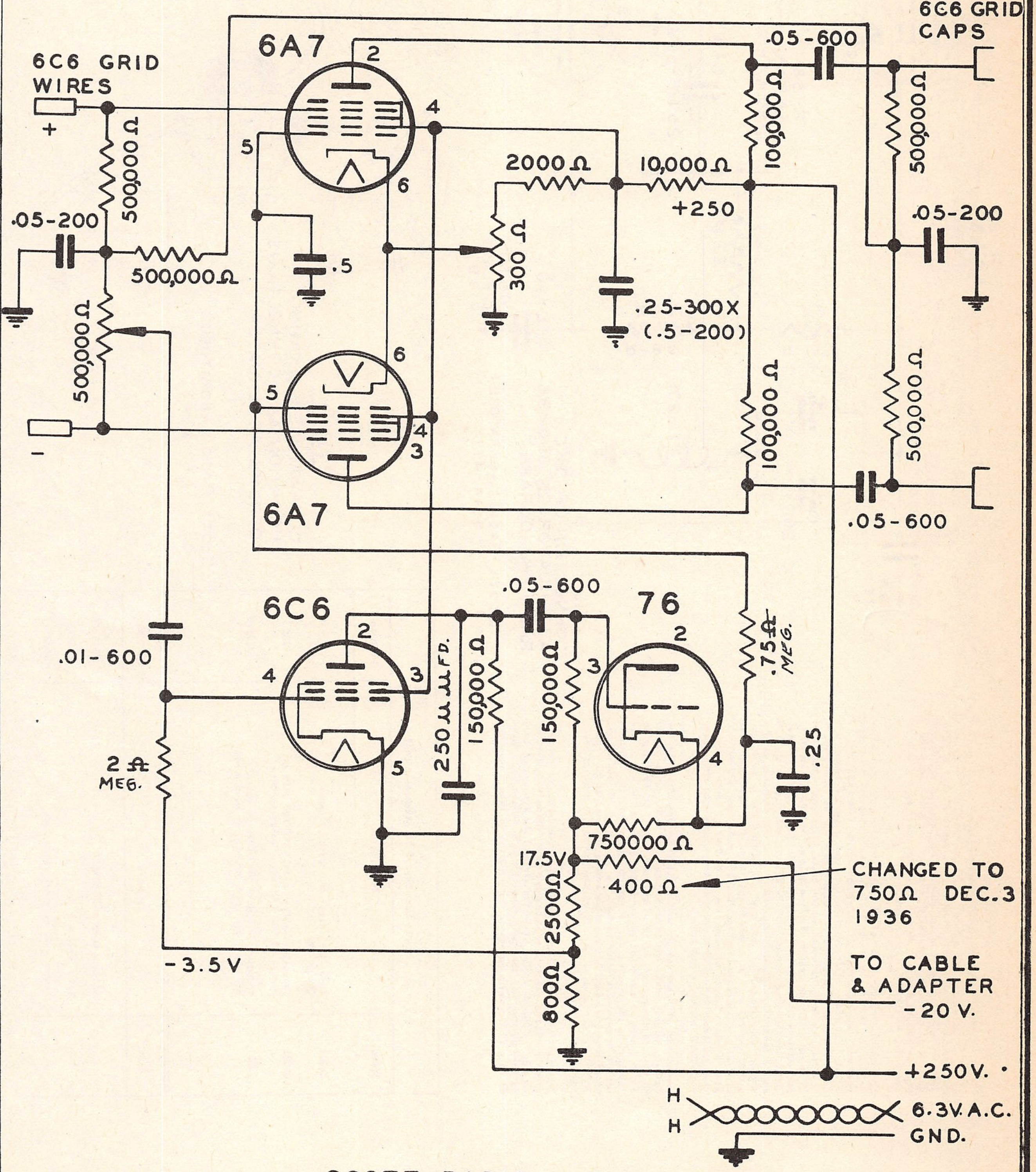
USE SCREW HOLES E FOR TABLE MOUNTING

USE SCREW HOLES F FOR WALL MOUNTING

(USE THICK WASHERS (HALF INCH) BETWEEN RADIO AND TABLE OR WALL)

NOV. 30, 1936

# REVISED
# VOL. RANGE EXPANDER


6A7
6C6 GRID WIRES
+
500,000 Ω
.05-200
500,000 Ω
500,000 Ω
-
5
2
4
6
.5
2000 Ω
10,000 Ω
+250
300 Ω
.25-300X
(.5-200)
100,000 Ω
.05-600
6C6 GRID CAPS
500,000 Ω
.05-200
6
5
4
3
6A7
100,000 Ω
500,000 Ω
.05-600
6C6
2
4
3
5
.01-600
2 Ω MEG.
250 μμFD.
150,000 Ω
.05-600
150,000 Ω
76
2
3
4
.75 Ω MEG.
.25
750000 Ω
17.5V
400 Ω
2500 Ω
800 Ω
-3.5V
TO CABLE & ADAPTER
-20 V.
+250V.
H
H
6.3V. A.C.
GND.

CHANGED TO 750Ω DEC.3 1936

SCOTT RADIO LABORATORIES INC.
CHICAGO 40 ILLINOIS

### 10 KC Attenuator for
### Model 800-B6 Radio-Phonograph

For use in locations where trouble is encountered from a 10 KC whistle caused by two adjacent channel stations, an attenuator unit is provided which is easily installed and wired into the grid circuit of the 6L6G tube V-20 in the power supply unit of the Model 800-B6 Radio-Phonograph.

The attenuator unit is installed in the power supply unit adjacent to the terminal strip which holds the compensation network resistors and capacitors for the input grid of the 6SL7GT tube V-19A. The choke is fastened to the base using the screw, nut and lockwasher furnished as shown in Figure 2. It is necessary to drill one hole for mounting the choke. The most convenient location being the center mounting hole of the output transformer which is not used for mounting the transformer. The trimmer capacitor C-101 is mounted on the top of the choke with this same screw and nut. Capacitor C-202 is connected directly across trimmer capacitor C-201, one lead of choke L-201 is then connected to one side of trimmer capacitor C-201, the other side of C-201 is connected to contact No. 5 of 6L6G tube socket V-20 with a short length of wire, the other lead of choke L-201 is then grounded preferably to a lug fastened under one of the output transformer mounting nuts.

The filter is tuned to resonance either by operating the receiver and adjusting the trimmer capacitor C-201 until the 10 KC whistle disappears, or is at a minimum level, or by using an audio generator connected to the PHONO-GND terminal strip, adjusting the receiver as for record changer operation, then by use of a meter connected across the secondary of the output transformer and with the audio generator adjusted to provide a 10,000 cycle signal. The filter is adjusted for minimum reading on the meter.

Although the adjustment of trimmer capacitor C-201 is not extremely critical, caution must be taken to set the audio generator to exactly 10,000 cycles since the width of the attenuated band is very narrow, and maximum attenuation at 10 KC can be obtained only if the audio generator is adjusted to this frequency.

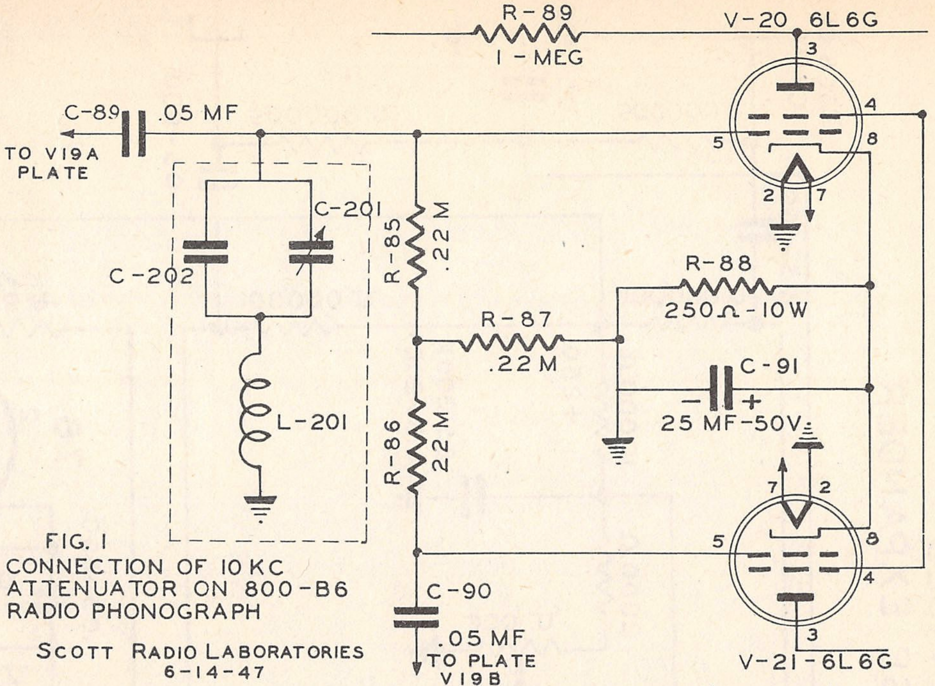


FIG. I
CONNECTION OF 10 KC ATTENUATOR ON 800-B6 RADIO PHONOGRAPH

SCOTT RADIO LABORATORIES
6-14-47

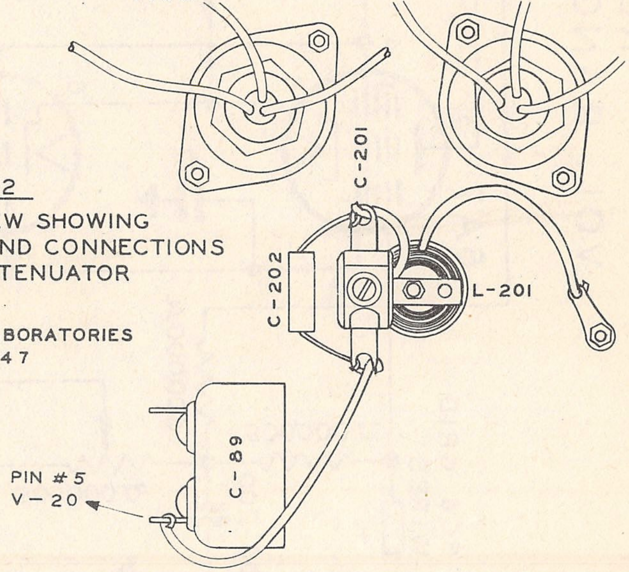


FIG. 2
CUTAWAY VIEW SHOWING LOCATION AND CONNECTIONS OF 10 KC ATTENUATOR

SCOTT RADIO LABORATORIES
6-12-47

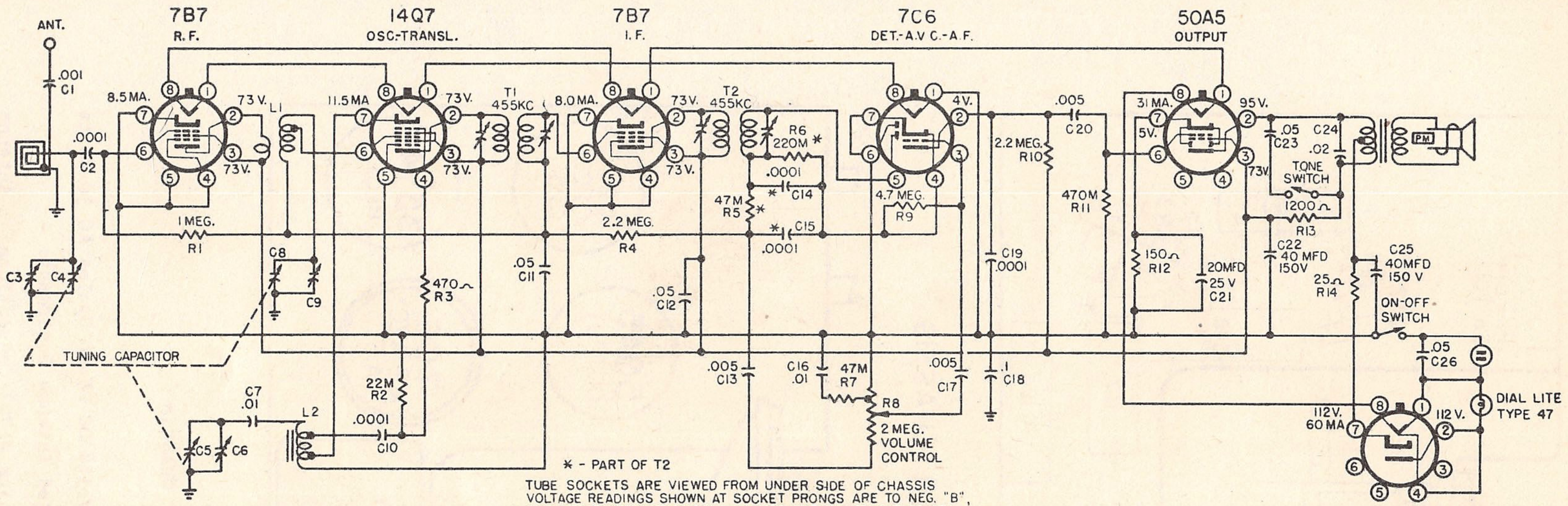
Parts List for 10 KC Attenuator Unit

| Symbol | Description | Part No. |
|---|---|---|
| C-201 | Capacitor, mica compression trimmer 30-200 MMF | 15E2675 |
| C-202 | Capacitor, silver mica, 1000 MMF plus or minus 10% 500 V DC wkg., bakelite case | 15A36 |
| L-201 | Inductor, 200 MH @ 1000 CPS, DC resis. 525 ohms, air core, mounted on wood dowel | 17E2676 |

| Quan. | Hardware | Part No. |
|---|---|---|
| 1 | Screw - 6-32 x 2" RHNPB | 77E2177 |
| 1 | Nut - 6-32 x ¼" hex | 59A177 |
| 1 | Washer - #6 external tooth lock | 95A255 |

# SEARS ROEBUCK & CO.

MODELS 7020,Ch.101.807;
7021,Ch.101.807A;
7054;Ch.101.808
MODELS 7080,Ch.101.809;
7100,Ch.101.811


ANT.
.001 C1
.0001 C2
7B7 R.F.
8.5 MA.
73 V.
73V.
L1
1 MEG. R1
C3
C4
C8
C9
TUNING CAPACITOR
C7 .01
L2
C5
C6
14Q7 OSC-TRANSL.
11.5 MA
73V.
73V.
470~ R3
22M R2
.0001 C10
T1 455KC
.05 C11
7B7 I.F.
8.0 MA.
73V.
73V.
2.2 MEG. R4
.05 C12
T2 455KC
R6 220M *
.0001 * C14
47M R5 *
* C15 .0001
.005 C13
C16 .01
47M R7
R8
2 MEG. VOLUME CONTROL
7C6 DET.-A.V C.-A.F.
4V.
4.7 MEG. R9
.005 C17
.1 C18
C19 .0001
2.2 MEG. R10
.005 C20
470M R11
50A5 OUTPUT
31 MA.
5V.
95V.
73V
150~ R12
20MFD 25 V C21
.05 C23
.02 C24
TONE SWITCH
1200~ R13
C22 40 MFD 150V
25~ R14
C25 40MFD 150 V
ON-OFF SWITCH
.05 C26
PM
DIAL LITE TYPE 47
112V. 60 MA
112 V.
35Y4 RECTIFIER

* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEG. "B", AND ARE TAKEN WITH NO SIGNAL, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.
SYMBOLS ARE IN ACCORDANCE WITH A.S.A. STANDARDS Z32.5 AND Z32.10 UNLESS OTHERWISE STATED.

## MODELS 7020,7021,7054; 7080,7100

### ALIGNMENT PROCEDURE

Output Meter Connection..............................Across Loud Speaker Voice Coil
Output Meter Reading to Indicate .05 Watts (Standard Output)................0.4 Volts
Generator Ground Lead Connection....................I. F. Alignment - Negative B Lead
Dummy Antenna Value to be in Series with Generator Output............See Chart Below
Connection of Generator Output Lead..................................See Chart Below
Generator Modulation.................................................30%, 400 Cycles
Position of Volume Control...............................................Fully on
Position of Tone Control...................................................Treble
Position of Pointer with Tuner Fully Closed......Last Line Below 540 Calibration Mark

| POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | ADJUSTMENTS IN ORDER SHOWN | TRIMMER FUNCTION |
|---|---|---|---|---|---|
| Closed | 455 KC | 0.1 Mfd. | Translator Grid | T2-T1 | I. F. |
| 1500 KC | 1500 KC | .0002 Mfd. | Antenna | C6 | Oscillator |
| 1500 KC | 1500 KC | .0002 Mfd. | Antenna | C9 | R. F. |
| 1500 KC | 1500 KC | .0002 Mfd. | Antenna | C3 | Antenna |

### IMPORTANT ALIGNMENT NOTES

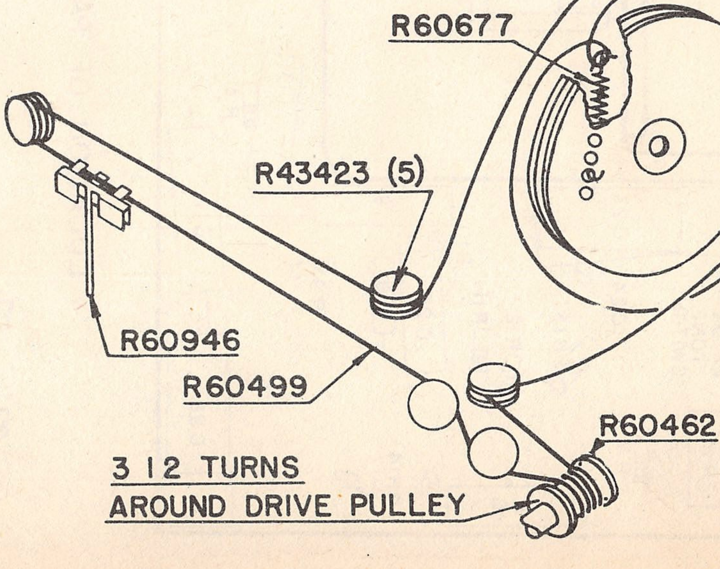
The alignment must be done in the order given.

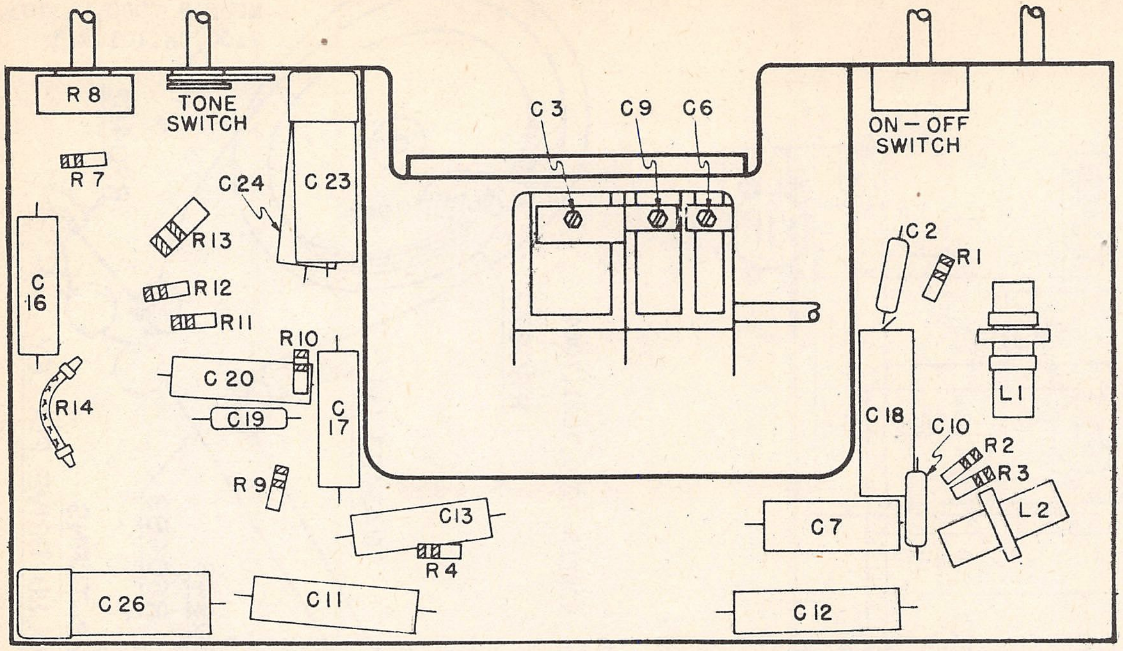
The Alignment Procedure should be repeated step by step in the original order for greatest accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

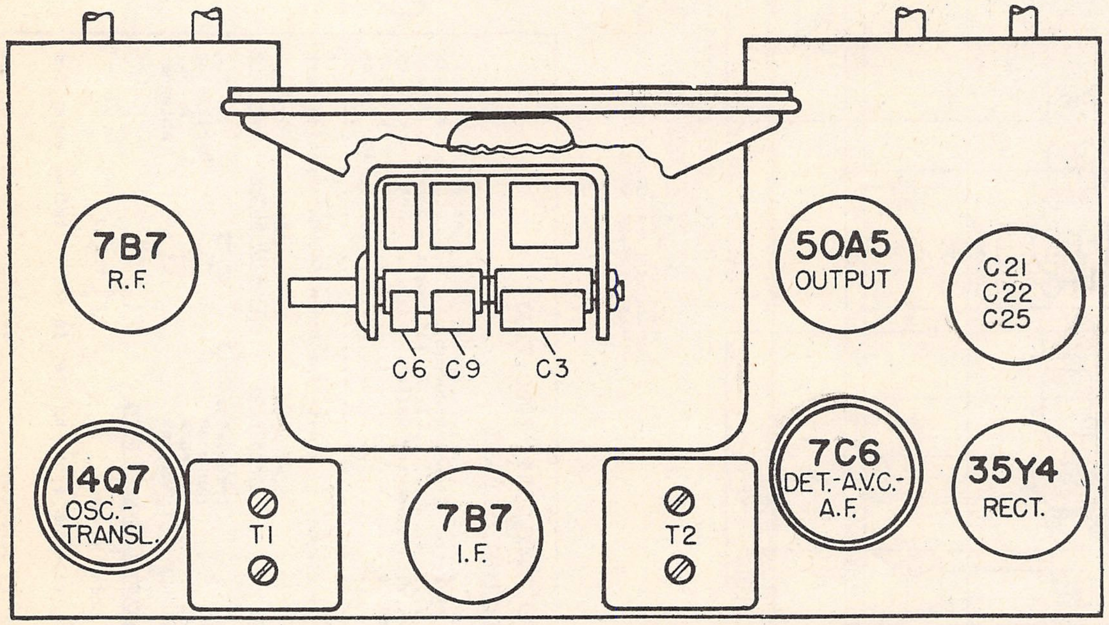
| Power Output | Undistorted 1.1 Watts | Maximum 1.9 Watts |
|---|---|---|

MODELS 7020,7021,7054


R60677
R43423 (5)
R60946
R60499
R60462
3 1 2 TURNS
AROUND DRIVE PULLEY


R 8
TONE SWITCH
C 23
C 24
R 7
R 13
R 12
R 11
C 16
R 10
C 20
C 17
R 14
C19
R 9
C 3
C 9
C 6
ON – OFF SWITCH
C 2
R 1
L 1
C 18
C 10
R 2
R 3
L 2
C 7
C 13
R 4
C 26
C 11
C 12

LOCATION OF PARTS UNDER CHASSIS


7B7
R.F.
C6
C9
C3
50A5
OUTPUT
C21
C22
C25
14Q7
OSC.-TRANSL.
T1
7B7
I.F.
T2
7C6
DET.-A.V.C.-A.F.
35Y4
RECT.

LOCATION OF PARTS ON TOP OF CHASSIS

Power Supply:

All models available.......................117 Volts DC 25-60 Cycles AC 30 Watts

Frequency Range:

Broadcast...............540-1600 KC

Difference between 101.807 and 101.807-A

101.807-A same as 101.807 except ivory cabinet instead of brown.

Recommended Antenna Equipment:

Catalog #6703 Conventional Antenna
Catalog #6704 Noise Reducing Antenna
Catalog #6705 Greatest Reception and Noise Reduction Antenna

## SEARS ROEBUCK & CO.

## MODEL 101.807, 101.807A

### HOW TO ORDER PARTS

1. Use Correct Order Form.
2. On the Purchase Order always give the following information:
   (1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
   (2) THE CHASSIS NUMBER, which is 101.807 or 101.807-A. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:
   Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of AA5, unless otherwise noted in the M. U. Code Column. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of mark-up code.

### REPAIR PARTS LIST

THE RETAIL SELLING PRICES SHOWN BELOW ARE VOID AFTER AUGUST 1, 1947. AFTER THIS DATE REFER TO DIV. 57 REPAIR PARTS STRAIGHT LIST. ALL PRICES PREPAID.

| SCHEMATIC LOCATION | PART NUMBER | DESCRIPTION | SEARS LIST PRICE EACH | MU CODE |
|---|---|---|---|---|
| | R60426 | Button - Push, Brown (101.807) | $ .11 | |
| | R60486 | Button - Push, Ivory (101.807-A) | .14 | |
| | R61846 | Button - Snap | .02 | |
| | R60415 | Cabinet - Brown (101.807) | 4.17 | A0 |
| | R60950 | Cabinet - Ivory (101.807-A) | 5.40 | A0 |
| C4,C5,C8 | R60413 | Capacitor - Variable Tuning | 5.35 | |
| C1 | | Capacitor - .001 Mfd. 600 V. | .15 | |
| C7 | | Capacitor - .01 Mfd. 600 V. | .18 | |
| C11,C12 | | Capacitor - .05 Mfd. 200 V. | .21 | |
| C13,C17,C20 | | Capacitor - .005 Mfd. 600 V. | .17 | |
| C16 | | Capacitor - .01 Mfd. 400 V. | .18 | |
| C18 | | Capacitor - .1 Mfd. 200 V. | .27 | |
| C23,C26 | | Capacitor - .05 Mfd. 600 V. | .26 | |
| C24 | | Capacitor - .02 Mfd. 600 V. | .27 | |
| C2,C10,C19 | | Capacitor - .0001 Mfd. Mica | .20 | |
| C21,C22,C25 | R60416 | Capacitor - Electrolytic, 40 Mfd. 150 V. 40 Mfd. 150 V., 20 Mfd. 25 V. | 1.91 | |
| | R61836 | Cloth - Grille, Gold (101.807) | .34 | |
| | R60952 | Cloth - Grille, Tan (101.807-A) | .43 | |
| L1 | R60465 | Coil - R. F. | 1.25 | |
| L2 | R60448 | Coil - Oscillator | 1.53 | |
| | R60430 | Control - Volume - 2 Megohm | .80 | |
| | R16706 | Cord - Power | .77 | |
| | R60540 | Covers - Tab | .01 | |
| | R60458 | Covers - Dial | .14 | |
| | R60446 | Dial | .23 | |
| | R60461 | Drum and Pinion Assembly | .68 | |
| | R60459 | Gear and Hub Assembly | .46 | |
| | R60444 | Grille - Cabinet | .83 | |
| | R60455 | Knob - Tone, Brown (101.807) | .14 | |
| | R60485 | Knob - Tone, Ivory (101.807-A) | .14 | |
| | R60456 | Knob - Tuning, Brown (101.807) | .14 | |
| | R60480 | Knob - Tuning, Ivory (101.807-A) | .14 | |
| | R60457 | Knob - Volume, Brown (101.807) | .14 | |
| | R60484 | Knob - Volume, Ivory (101.807-A) | $ .14 | |
| | R60454 | Knob - On-Off, Brown (101.807) | .14 | |
| | R60483 | Knob - On-Off, Ivory (101.807-A) | .14 | |
| | R20963 | Lamp - Dial #47 | .18 | |
| | R54529 | Leaflet - Instruction | .20 | |
| | R60541 | Loop Assembly with Back Cover | 2.08 | A0 |
| | R60464 | Plunger and Yoke Assembly | .43 | |
| | R60946 | Pointer - Dial | .09 | |
| | R43423 | Pulley - Wood | .01 | |
| R14 | R40232 | Resistor - Glasohm, 25 Ohm, 1 Watt | .14 | |
| R1 | | Resistor - 1 Megohm, 1/3 Watt | .15 | |
| R2 | | Resistor - 22,000 Ohm, 1/3 Watt | .15 | |
| R3 | | Resistor - 470 Ohm, 1/3 Watt | .15 | |
| R4,R10 | | Resistor - 2.2 Megohm, 1/3 Watt | .15 | |
| R7 | | Resistor - 47,000 Ohm, 1/3 Watt | .15 | |
| R9 | | Resistor - 4.7 Megohm, 1/3 Watt | .15 | |
| R11 | | Resistor - 470,000 Ohm, 1/3 Watt | .15 | |
| R12 | | Resistor - 150 Ohm, 1/3 Watt | .15 | |
| R13 | | Resistor - 1200 Ohm, 1 Watt | .21 | |
| | R60462 | Shaft - Tuning Assembly | .17 | |
| | R57049 | Socket - Tube | .13 | |
| | R60401 | Socket - Pilot Lamp | .29 | |
| | | WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER | | |
| | R60431 | Speaker - P. M. 5¼" | 6.76 | A0 |
| | R60674 | Cone and Voice Coil | 2.51 | |
| | R60675 | Output Transformer | 2.74 | |
| | R60427 | Spring - Extension | .06 | |
| | R60437 | Spring - Compression | .01 | |
| | R60499 | String - Dial Drive Assembly | .31 | |
| | R60447 | Switch - Tone | .68 | |
| | R60432 | Switch - On-Off | .63 | |
| | R60474 | Tabs - Station | .26 | |
| T1 | R60417 | Transformer - 1st I. F. | 2.24 | |
| T2 | R60418 | Transformer - 2nd I. F. | 2.71 | |

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## MODEL 101.808

### HOW TO ORDER PARTS

1. Use Correct Order Form.
2. On the Purchase Order always give the following information:
   (1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
   (2) THE CHASSIS NUMBER, which is 101.808. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:
   Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of AA5, unless otherwise noted in the M. U. Code Column. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of mark-up code.
5. In all correspondence relating to cabinets, always mention the source code letter stamped into the upper rear rail of consoles or the bottom of table models, and the CATALOG NUMBER shown on the sticker on the back, bottom or inside of cabinet.

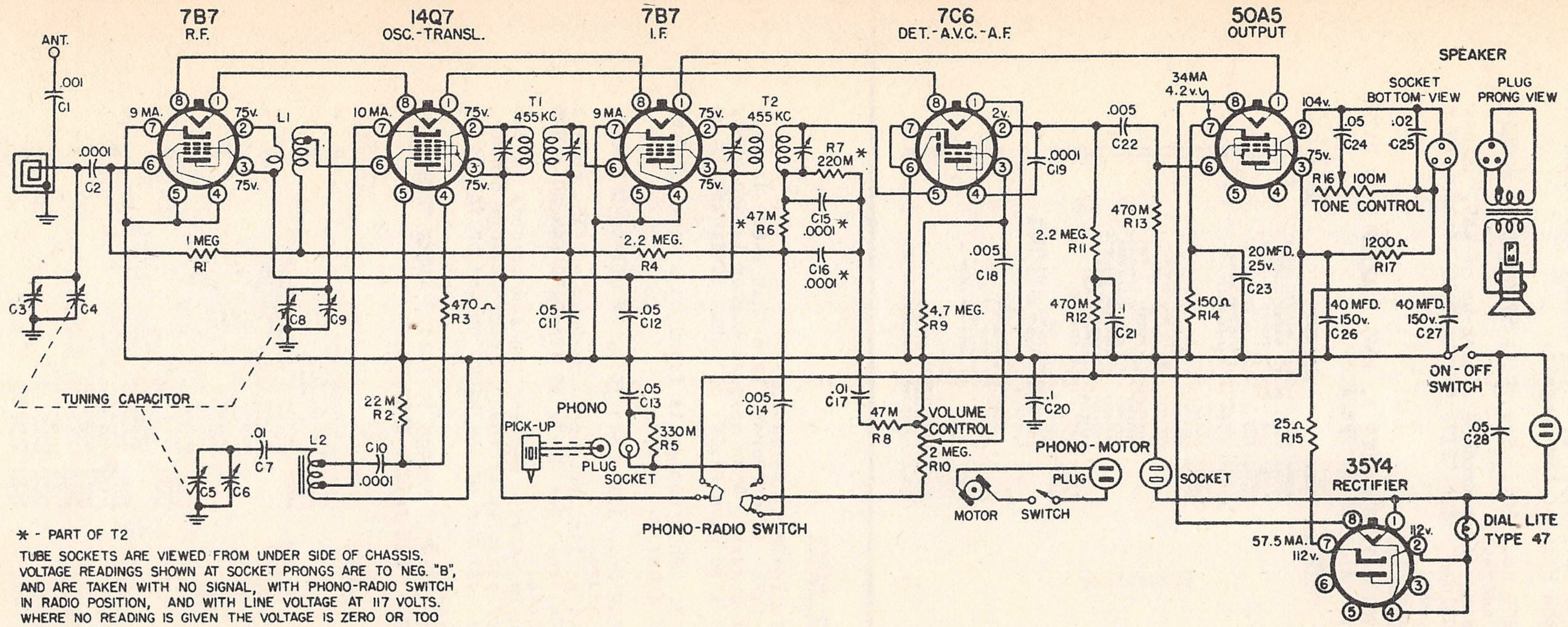
### REPAIR PARTS LIST

THE RETAIL SELLING PRICES SHOWN BELOW ARE VOID AFTER AUGUST 1, 1947. AFTER THIS DATE REFER TO DIV. 57 REPAIR PARTS STRAIGHT LIST. ALL PRICES PREPAID.

| SCHEMATIC LOCATION | PART NUMBER | DESCRIPTION | SEARS LIST PRICE EACH | MU CODE |
|---|---|---|---|---|
| | R60486 | Button - Push | $ .14 | |
| | R61846 | Button - Snap | .01 | |
| C4,C5,C8 | R60413 | Capacitor - Variable Tuning | 5.35 | |
| C1 | | Capacitor - .001 Mfd. 600 V. | .15 | |
| C7 | | Capacitor - .01 Mfd. 600 V. | .18 | |
| C11,C12 | | Capacitor - .05 Mfd. 200 V. | .21 | |
| C13,C17,C20 | | Capacitor - .005 Mfd. 600 V. | .17 | |
| C16 | | Capacitor - .01 Mfd. 400 V. | .18 | |
| C18 | | Capacitor - .1 Mfd. 200 V. | .27 | |
| C24 | | Capacitor - .02 Mfd. 600 V. | .27 | |
| C23,C26 | | Capacitor - .05 Mfd. 600 V. | .26 | |
| C2,C10,C25 | | Capacitor - .0001 Mfd. Mica | .20 | |
| C21,C22,C25 | R60416 | Capacitor - Electrolytic, 40 Mfd. 150 V. 40 Mfd. 150 V., 20 Mfd. 25 V. | 1.91 | |
| L1 | R60465 | Coil - R. F. | 1.25 | |
| L2 | R60448 | Coil - Oscillator | 1.53 | |
| | R60430 | Control - Volume - 2 Megohm | .80 | |
| | R16706 | Cord - Power | .77 | |
| | R60540 | Covers - Tab | .01 | |
| | R60458 | Covers - Dial | .14 | |
| | R60579 | Dial | .23 | |
| | R60461 | Drum and Pinion Assembly | .68 | |
| | R60487 | Escutcheon | 1.25 | |
| | R60459 | Gear and Hub Assembly | .46 | |
| | R60485 | Knob - Tone | .14 | |
| | R60480 | Knob - Tuning | .14 | |
| | R60484 | Knob - Volume | .14 | |
| | R60483 | Knob - On-Off | .14 | |
| | | Lamp - Dial Mazda Type #47 | .18 | |
| | R54534 | Leaflet - Instruction | .20 | |
| | R60549 | Loop Assembly with Back Cover | $ 2.12 | A0 |
| | R60464 | Plunger and Yoke Assembly | .43 | |
| | R60946 | Pointer - Dial | .09 | |
| | R43423 | Pulley - Wood | .01 | |
| R4 | R40232 | Resistor - Glasohm, 25 Ohm, 1 Watt | .14 | |
| R1 | | Resistor - 1 Megohm, 1/3 Watt | .15 | |
| R2 | | Resistor - 22,000 Ohm, 1/3 Watt | .15 | |
| R3 | | Resistor - 470 Ohm, 1/3 Watt | .15 | |
| R4,R10 | | Resistor - 2.2 Megohm, 1/3 Watt | .15 | |
| R7 | | Resistor - 47,000 Ohm, 1/3 Watt | .15 | |
| R9 | | Resistor - 4.7 Megohm, 1/3 Watt | .15 | |
| R11 | | Resistor - 470,000 Ohm, 1/3 Watt | .15 | |
| R12 | | Resistor - 150 Ohm, 1/3 Watt | .15 | |
| R13 | | Resistor - 1200 Ohm, 1 Watt | .21 | |
| | R60462 | Shaft - Tuning Assembly | .17 | |
| | R57049 | Socket - Tube | .13 | |
| | R60401 | Socket - Pilot Lamp | .29 | |
| | | WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER | | |
| | R61627 | Speaker - P. M. 5¼" | 6.76 | A0 |
| | R61634 | Cone and Voice Coil | 2.52 | |
| | R61635 | Output Transformer | 2.74 | |
| | R60427 | Spring - Extension | .06 | |
| | R60437 | Spring - Compression | .01 | |
| | R60499 | String - Dial Drive Assembly | .31 | |
| | R60447 | Switch - Tone | .68 | |
| | R60432 | Switch - On-Off | .63 | |
| | R60474 | Tabs - Station | .26 | |
| T1 | R60417 | Transformer - 1st I. F. | 2.24 | |
| T2 | R60418 | Transformer - 2nd I. F. | 2.71 | |

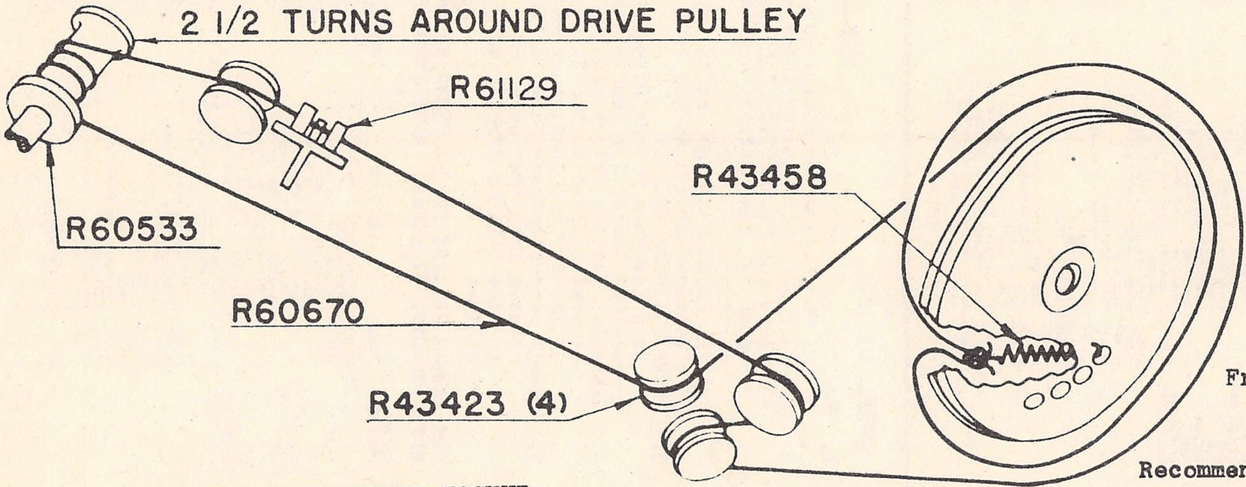
**MODELS 7080,Ch.101.809;**
**7100,Ch.101.811**

# SEARS ROEBUCK & CO.


7B7
R.F.
14Q7
OSC.-TRANSL.
7B7
I.F.
7C6
DET.-A.V.C.-A.F.
50A5
OUTPUT
SPEAKER
SOCKET BOTTOM VIEW
PLUG PRONG VIEW
ANT.
.001 C1
.0001 C2
9 MA.
10 MA.
75v.
L1
T1 455KC
T2 455KC
R7 220M *
*47M R6
C15 .0001 *
C16 .0001 *
1 MEG R1
2.2 MEG. R4
470 Ω R3
.05 C11
.05 C12
C3
C4
C8
C9
TUNING CAPACITOR
22 M R2
.01 C7
L2
C10 .0001
C5
C6
PHONO
PICK-UP
PLUG
SOCKET
.05 C13
330M R5
.005 C14
.01 C17
47M R8
VOLUME CONTROL
2 MEG. R10
4.7 MEG. R9
.005 C18
2v.
.0001 C19
.1 C20
PHONO-RADIO SWITCH
2.2 MEG. R11
470M R12
.1 C21
.005 C22
470M R13
PHONO-MOTOR
PLUG
MOTOR
SWITCH
SOCKET
34MA 4.2v.
104v.
150Ω R14
20MFD. 25v. C23
.05 C24
.02 C25
R16 100M
TONE CONTROL
1200Ω R17
40 MFD. 150v. C26
40 MFD. 150v. C27
ON-OFF SWITCH
.05 C28
25Ω R15
35Y4
RECTIFIER
57.5 MA.
112v.
DIAL LITE TYPE 47

* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEG. "B", AND ARE TAKEN WITH NO SIGNAL, WITH PHONO-RADIO SWITCH IN RADIO POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.
SYMBOLS ARE IN ACCORDANCE WITH A.S.A. STANDARDS Z32.5 AND Z32.10 UNLESS OTHERWISE STATED.


2 1/2 TURNS AROUND DRIVE PULLEY
R61129
R60533
R60670
R43458
R43423 (4)

STRING AND POINTER HOOKUP

Uses Record Changer 101.203-1

## SPECIFICATIONS

Power Supply:

All models available..

117 Volts 60 Cycles AC 60 Watts

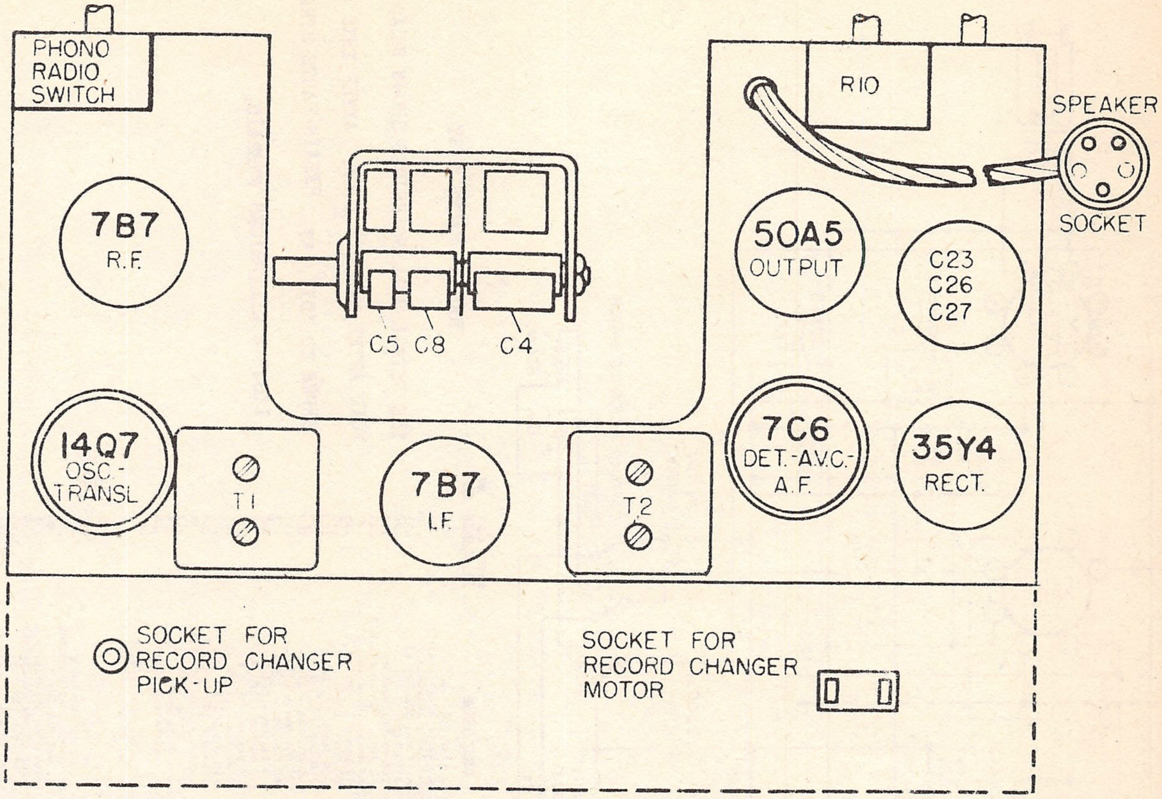
Frequency Range:

Broadcast....540-1600 KC

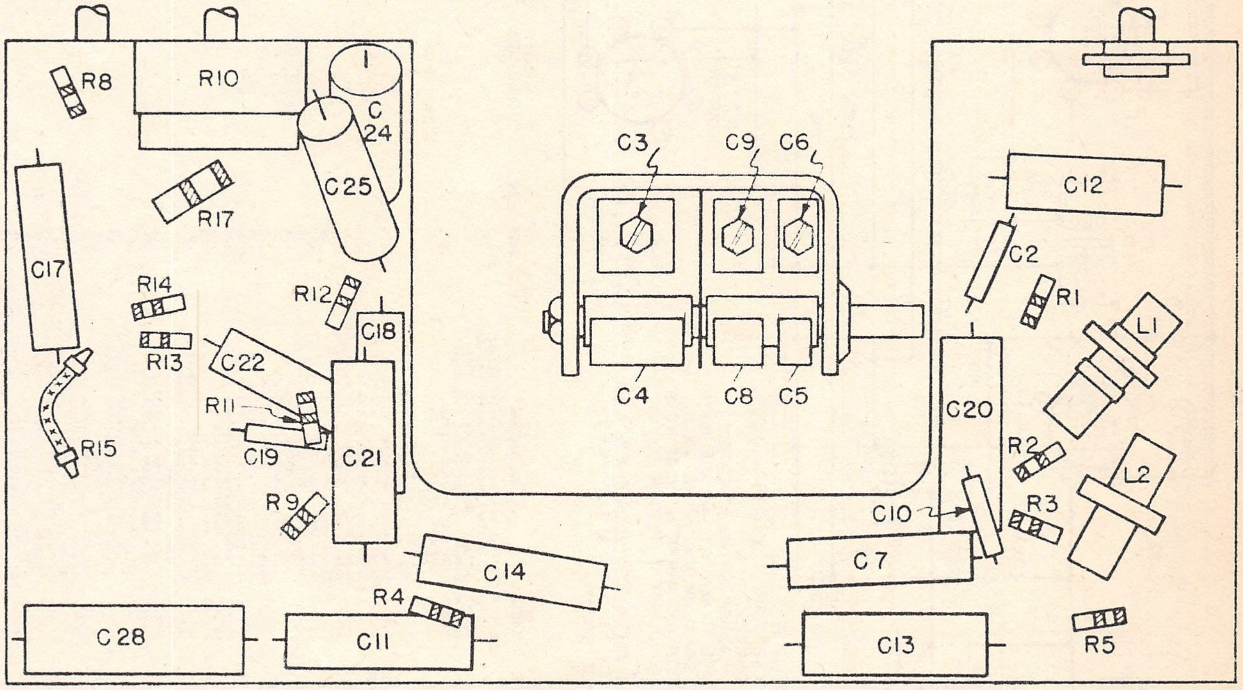
Recommended Antenna Equipment:
Catalog #6703 A Conventional Antenna
Catalog #6704 Noise Reducing Antenna
Catalog #6705 Greatest Reception and
Noise Reduction Antenna

RECORD CHANGER:
General instrument 205, RCD.CH.15-5

For alignment, see P.16-1
For parts list, see P.16-8


PHONO RADIO SWITCH
R10
SPEAKER
SOCKET
7B7
R.F.
C5
C8
C4
50A5
OUTPUT
C23
C26
C27
14Q7
OSC.-TRANSL.
T1
7B7
I.F.
T2
7C6
DET.-A.V.C.-A.F.
35Y4
RECT.
SOCKET FOR RECORD CHANGER PICK-UP
SOCKET FOR RECORD CHANGER MOTOR

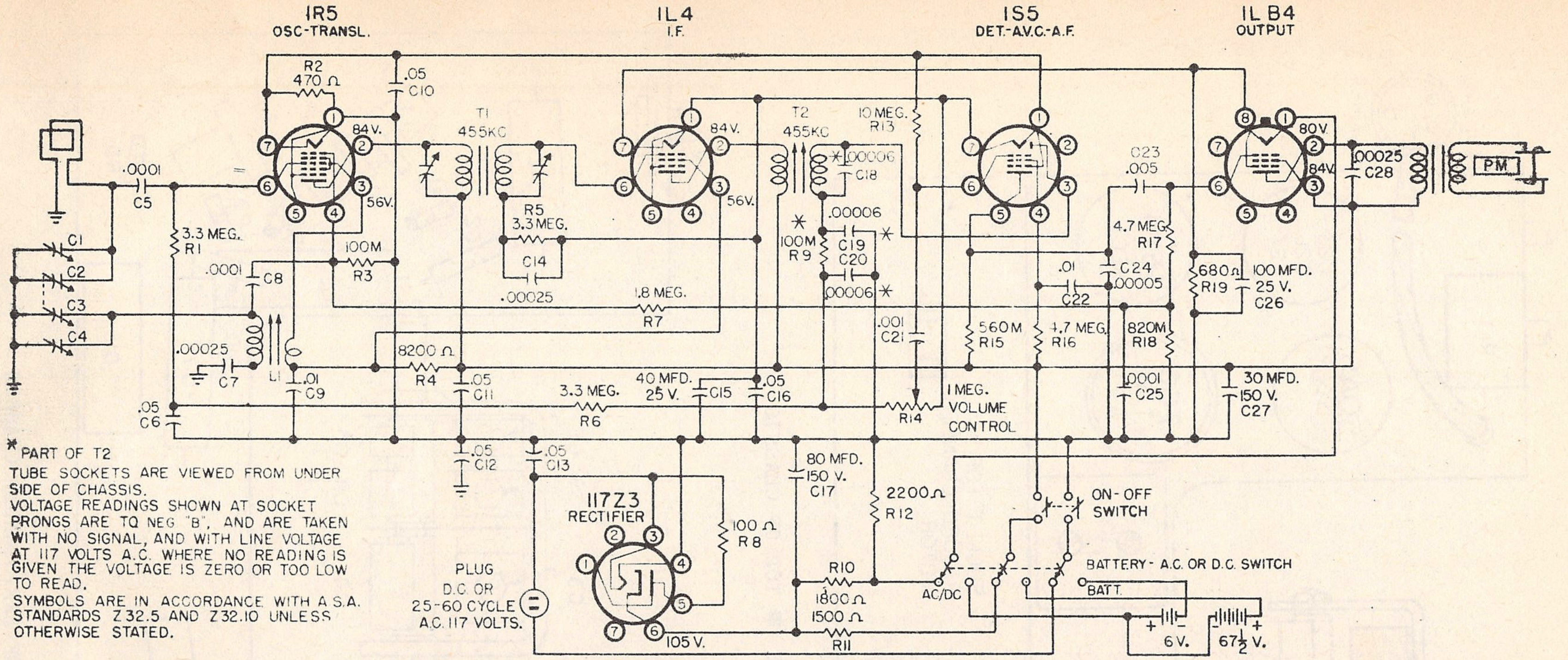
LOCATION OF PARTS ON TOP OF CHASSIS


R8
R10
C 24
C25
R17
C17
R14
R13
R12
C18
C22
R11
C19
C21
R15
R9
C14
R4
C28
C11
C3
C9
C6
C4
C8
C5
C12
C2
R1
L1
C20
R2
L2
R3
C10
C7
C13
R5

LOCATION OF PARTS UNDER CHASSIS

## MODELS 7165, Ch. 101.823, 101.823-1; 7166, Ch. 101.823A, 101.823-1A

## SEARS ROEBUCK & CO.



1R5
OSC-TRANSL.
1L4
I.F.
1S5
DET.-AV.C.-A.F.
1LB4
OUTPUT
R2 470 Ω
.05 C10
84 V.
56V.
T1 455KC
T2 455KC
10 MEG. R13
.00006 C18
.00006 C19 C20
.00006
100M R9
80V
84V
.00025 C28
PM
.0001 C5
3.3 MEG. R1
.0001 C8
100M R3
R5 3.3 MEG.
C14
.00025
1.8 MEG. R7
C23 .005
4.7 MEG R17
.01 C22
C24 .00005
680Ω R19
100 MFD. 25 V. C26
.00025 C7
L1
.01 C9
8200 Ω R4
.05 C11
40 MFD. 25 V. C15
.05 C16
3.3 MEG. R6
.001 C21
560M R15
4.7 MEG. R16
820M R18
.0001 C25
30 MFD. 150 V. C27
1 MEG. VOLUME CONTROL R14
.05 C6
C1 C2 C3 C4
.05 C12
.05 C13
80 MFD. 150 V. C17
2200 Ω R12
ON-OFF SWITCH
117Z3 RECTIFIER
100 Ω R8
PLUG D.C. OR 25-60 CYCLE A.C. 117 VOLTS.
R10 1800 Ω
1500 Ω R11
105 V.
AC/DC
BATTERY - A.C. OR D.C. SWITCH
BATT.
6 V.
67½ V.

* PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.

VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEG "B", AND ARE TAKEN WITH NO SIGNAL, AND WITH LINE VOLTAGE AT 117 VOLTS A.C. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

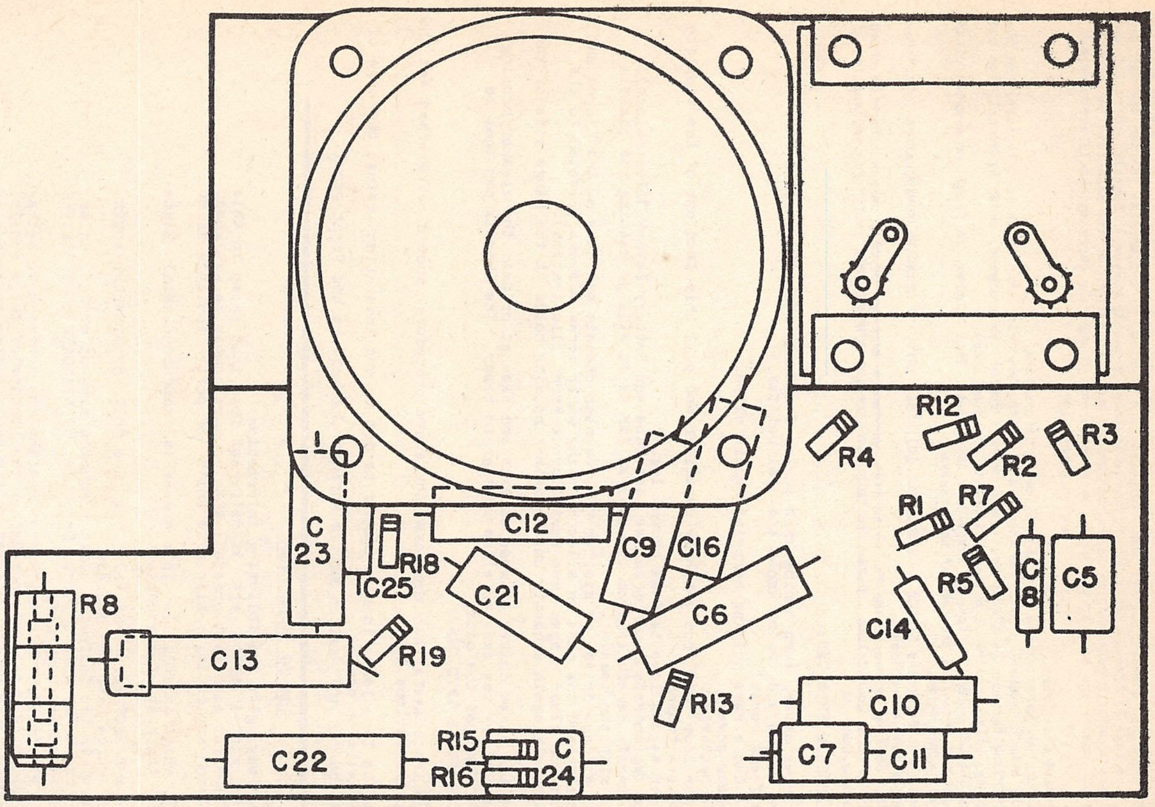
SYMBOLS ARE IN ACCORDANCE WITH A.S.A. STANDARDS Z32.5 AND Z32.10 UNLESS OTHERWISE STATED.

| SCHEMATIC LOCATION | PART NUMBER | DESCRIPTION | SEARS LIST PRICE EACH | MU CODE |
|---|---|---|---|---|
| | R60859 | "A" Battery Board Assembly (Fixed) | $ .31 | |
| | R60860 | "A" Battery Board Assembly (Removable) | .21 | |
| | R60965 | Button - On-Off Switch (101.823) | .41 | |
| | R60904 | Button - On-Off Switch (101.823-A) | .41 | |
| | R60803 | Capacitor - Electrolytic | 2.61 | |
| C15 | | 40 Mfd. 25 Volts | | |
| C26 | | 100 Mfd. 25 Volts | | |
| C27 | | 30 Mfd. 150 Volts | | |
| C17 | | 80 Mfd. 150 Volts | | |
| C1,C2,C3,C4 | R60804 | Capacitor - Variable | 4.19 | AO |
| C9 | R42877 | Capacitor - .01 Mfd. - 400 V. H.T. | .16 | |
| C22 | | Capacitor - .01 Mfd. - 400 V. | .18 | |
| C10,C11,C12 | | Capacitor - .05 Mfd. - 200 V. | .21 | |
| C6,C16 | R43661 | Capacitor - .05 Mfd. - 200 V. H.T. | .16 | |
| C13 | | Capacitor - .05 Mfd. - 400 V. | .20 | |
| C21 | R52846 | Capacitor - .001 Mfd. - 600 V. H.T. | .17 | |
| C23 | | Capacitor - .005 Mfd. - 400 V. | .17 | |
| C24 | | Capacitor - 50 Mmfd. - Mica | .24 | |
| C5,C8,C25 | | Capacitor - 100 Mmfd. - Mica | .20 | |
| C14,C28 | R20548 | Capacitor - 250 Mmfd. - Mica ±20% | .28 | |
| C7 | R44835 | Capacitor - 250 Mmfd. - Mica ±3% | .36 | |
| | R60872 | Case Assy.-Loop & Covers (Ivory 101.823) | 8.57 | BO |
| | R60916 | Case Assy.-Loop & Covers (Black 101.823-A) | 8.22 | BO |
| | R60867 | Clip - Carrying Handle | .07 | |
| L1 | R60805 | Coil - Oscillator | 2.02 | |
| | R44583 | Connector - "B" Battery - Female | .04 | |
| | R44584 | Connector - "B" Battery - Male | .03 | |
| R14 | R60807 | Control - Volume | .75 | |
| | R60826 | Cord - Line (Brown 101.823) | .59 | |
| | R60920 | Cord - Line (Black 101.823-A) | .59 | |
| | R60893 | Cover Assembly - Switch | .30 | |
| | R60869 | Grille Cloth Assy.-Speaker (101.823) | .50 | |
| | R60918 | Grille Cloth Assy.-Speaker (101.823-A) | .42 | |
| | R60971 | Insulator - "B" Battery | .01 | |
| | R60851 | Insulator - Chassis Bottom | .06 | |
| | R49557 | Kit-Front Cover with Rivets (Ivory 101.823) | 3.60 | A5 |
| | R49562 | Kit-Front Cover with Rivets (Black 101.823-A) | 3.38 | A5 |
| | R49569 | Kit-Back Cover with Rivets (Ivory 101.823) | 2.14 | |
| | R49574 | Kit-Back Cover with Rivets (Black 101.823-A) | 2.14 | |
| | R49576 | Kit-Hinge Back with Rivets (101.823 & 823-A) | .26 | |
| | R49583 | Kit-Hinge Front with Rivets (Ivory 101.823) | .51 | |
| | R49595 | Kit-Hinge Front with Rivets (Black 101.823-A) | .51 | |
| | R49596 | Kit-Latch with Rivets (Ivory 101.823) | .23 | |
| | R49597 | Kit-Latch with Rivets (Black 101.823-A) | .23 | |

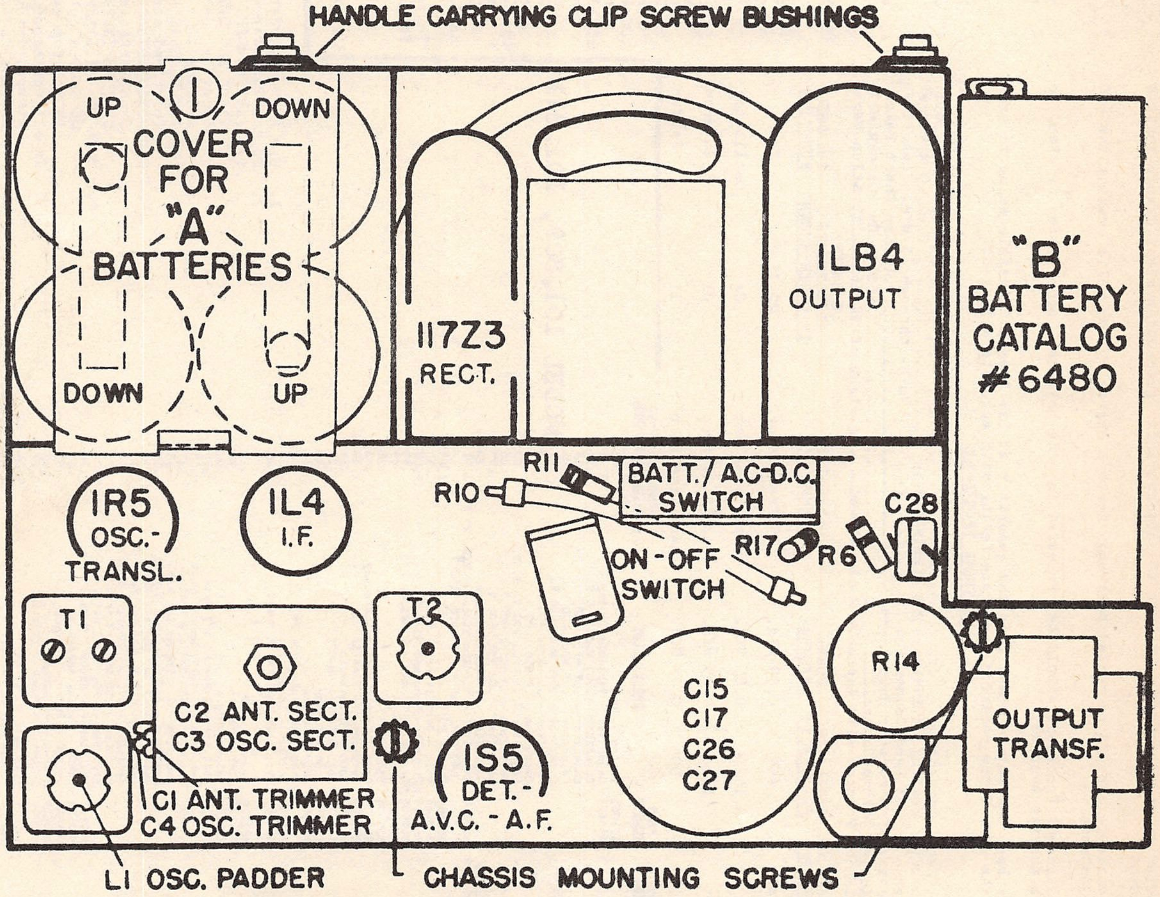
| SCHEMATIC LOCATION | PART NUMBER | DESCRIPTION | SEARS LIST PRICE EACH | MU CODE |
|---|---|---|---|---|
| | R60808 | Knob - Tuning (Ivory 101.823) | $ .11 | |
| | R60905 | Knob - Tuning (Black 101.823-A) | .12 | |
| | R60889 | Knob - Volume (Ivory 101.823) | .12 | |
| | R60906 | Knob - Volume (Black 101.823-A) | .13 | |
| | R54540 | Leaflet - Instruction | .20 | |
| | R60878 | Pin - Drive for On-Off Button | .02 | |
| | R60849 | Pointer - Dial Assy. (Green 101.823) | .29 | |
| | R60902 | Pointer - Dial Assy. (Gold 101.823-A) | .29 | |
| R2 | | Resistor - 470 Ohm - 1/3 W. | .15 | |
| R19 | | Resistor - 680 Ohm - 1/3 W. | .15 | |
| R12 | | Resistor - 2200 Ohm - 1/3 W. | .15 | |
| R4 | | Resistor - 8200 Ohm - 1/3 W. | .15 | |
| R3 | | Resistor - 100,000 Ohm - 1/3 W. | .15 | |
| R18 | | Resistor - 820,000 Ohm - 1/3 W. | .15 | |
| R15 | | Resistor - 560,000 Ohm - 1/3 W. | .15 | |
| R7 | | Resistor - 1.8 Megohm - 1/3 W. | .15 | |
| R1,R5,R6 | | Resistor - 3.3 Megohm - 1/3 W. | .15 | |
| R16,R17 | | Resistor - 4.7 Megohm - 1/3 W. | .15 | |
| R13 | | Resistor - 10 Megohm - 1/3 W. | .15 | |
| R11 | | Resistor - 1500 Ohm - 1 W. | .21 | |
| R8 | R61219 | Resistor - Glasohm - 100 Ohm 2 W. | .15 | |
| R10 | R60810 | Resistor - Glasohm - 1800 Ohm 5 W. | .34 | |
| | R57049 | Socket - Tube - 8 Prong Lock-in | .13 | |
| | R60055 | Socket - Tube - Miniature | .14 | |
| | R60811 | Socket - Tube - Miniature (1L4) | .16 | |
| | | WHEN ORDERING SPEAKER PARTS, ALWAYS GIVE THE PART NUMBER APPEARING ON THE SPEAKER | | |
| | R60812 | Speaker - 3-1/2" P. M. | 4.28 | AO |
| | R60890 | Cone and Voice Coil | 2.00 | AAO |
| | R60842 | Spring - "A" Battery Retaining | .05 | |
| | R60897 | Spring - Compression On-Off Switch | .01 | |
| | R60870 | Spring - Loop Lead Tension | .07 | |
| | R60821 | Strap - Carrying (Tan 101.823) | .75 | |
| | R60914 | Strap - Carrying (Black 101.823-A) | .75 | |
| | R60873 | Strap - Shoulder (Tan 101.823) | 1.63 | |
| | R60913 | Strap - Shoulder (Black 101.823-A) | 1.63 | |
| | R60813 | Switch - AC - Battery - T.P.D.T. | .60 | |
| | R60814 | Switch - On-Off | .62 | |
| | R60817 | Transformer - Output | 2.48 | |
| T1 | R60815 | Transformer - I. F. #1 | 3.05 | |
| T2,R9,C18<br>C19,C20 | R60816 | Transformer - I. F. #2 | 2.99 | |

### REPAIR PARTS LIST

THE RETAIL SELLING PRICES SHOWN BELOW ARE VOID AFTER MARCH 1 1947. AFTER THIS DATE REFER TO "DIV. 57 REPAIR PARTS STRAIGHT LIST" - ALL PRICES PREPAID.


R12
R4
R2
R3
R1
R7
C12
C
23
R18
C25
C21
C9
C16
C6
R5
C
8
C5
C14
R8
C13
R19
R13
C10
C22
R15
R16
C
24
C7
C11

PARTS LAYOUT - FRONT


HANDLE CARRYING CLIP SCREW BUSHINGS
UP
DOWN
COVER FOR "A" BATTERIES
DOWN
UP
117Z3
RECT.
1LB4
OUTPUT
"B"
BATTERY
CATALOG
#6480
R11
R10
BATT./A.C-D.C.
SWITCH
C28
1R5
OSC.-
TRANSL.
1L4
I.F.
R17
R6
ON-OFF
SWITCH
T1
T2
C2 ANT. SECT.
C3 OSC. SECT.
R14
C15
C17
C26
C27
OUTPUT
TRANSF.
1S5
DET.-
A.V.C. - A.F.
C1 ANT. TRIMMER
C4 OSC. TRIMMER
L1 OSC. PADDER
CHASSIS MOUNTING SCREWS

PARTS LAYOUT - BACK

## MODELS 7165,7166
## MODELS 7080,7100

## SEARS ROEBUCK & CO.

### 101.823, 101.823-1. IMPORTANT ALIGNMENT NOTES 101.823A, 101.823-1A

An isolation transformer between the power source and the receiver is recommended during any service or alignment operation which requires that service equipment be connected to the receiver. Failure to observe this precaution might damage service equipment.

*The variable should be rocked back and forth a degree or two while making the 600 KC adjustment.

The Alignment Procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

### ALIGNMENT PROCEDURE

Output Meter Connection..........Across Speaker Voice Coil
Output Meter Reading to Indicate 40 Milliwatts..........0.4 Volts
Generator Ground Lead Connection..........To B- through .1 Mfd. Capacitor
Connection of Generator Output Lead..........See Chart Below
Position of Volume Control..........Fully On (Clockwise)
Position of Pointer with Variable Fully Closed....To right of 540 KC Calibration Mark

| POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMER ADJUSTMENTS IN ORDER SHOWN | TRIMMER FUNCTION |
|---|---|---|---|---|---|
| Closed | 455 | 0.05 Mfd. | 1R5 Translator Grid | T2-T1 | I. F. |
| Open | 1610 | 0.05 Mfd. | Hazeltine Loop | C4 | Oscillator |
| 1400 | 1400 | 0.05 Mfd. | Hazeltine Loop | C1 | Antenna |
| *600 | 600 | 0.05 Mfd. | Hazeltine Loop | L1 | Padder |

### SPECIFICATIONS

Power Supply:
4 Large Flashlight "A" Batteries
1 #6480 - 67.5 Volt "B" Battery
105-125 Volts AC or DC
Frequency Range

"A" Drain . . . . . 0.050 Amperes
"B" Drain . . . . . 0.010 Amperes
Power Consumption 10 Watts
540 to 1610 KC

CHASSIS DIFFERENCES: Chassis 101.823 and 101.823A are mounted by two machine screws through the chassis. (See Page 2 "Parts Layout Back" for location of mounting screws.) Chassis 101.823-1 and 101.823-1A are mounted by one machine screw through the outside bottom of the case into the chassis. Both types of chasses are held at the top by machine screws through the carrying handle escutcheons.

### HOW TO ORDER PARTS

1. Use Correct Order Form.
2. On the Purchase Order always give the following information:
   (1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
   (2) The CHASSIS NUMBER, which is 101.823 or 101.823-A. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:
   Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of AA5, unless otherwise noted in the M. U. Code Column. Refer to "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of Mark-up Code.

REMOVING CHASSIS FROM CASE:

1. Open front cover, turn tuning knob to low frequency stop (54 on dial).
2. Remove volume and tuning knobs and dial pointer.
3. Close front cover.
4. Remove two screws holding carrying handle clips.
5. Open back cover.
6. Remove batteries.
7. Unsolder loop lead from variable capacitor and pull this lead out of the vinylite protective tubing.
8. Unsolder second loop lead at ground lug.
9. Remove two chassis mounting screws (See Tube and Battery Layout Illustration).
10. Pull chassis carefully from the case as far as it will go keeping the chassis square with the case.
11. Insert a screw driver or similar tool between chassis and case at the hinges and carefully bend the case to allow carrying strap screw anchors (riveted to the chassis) to clear hinges (See Parts Layout Front Illustration).
12. Pull chassis again squarely until speaker housing holds at the hinge side of the case.
13. Insert the screw driver between chassis and case at or near the speaker housing and gently pry the case to allow speaker to clear. The chassis can then be lifted clear of the case.

REPLACING CHASSIS INTO CASE:

To replace the chassis into the case the above procedure should be reversed and the following precautions taken:

1. Dress the loop leads in such manner as not to cut insulation against the edge of the chassis or case.
2. Guide the "on off" switch button through the hole in the front panel.

## MODEL 101.809, 101.811

### HOW TO ORDER PARTS

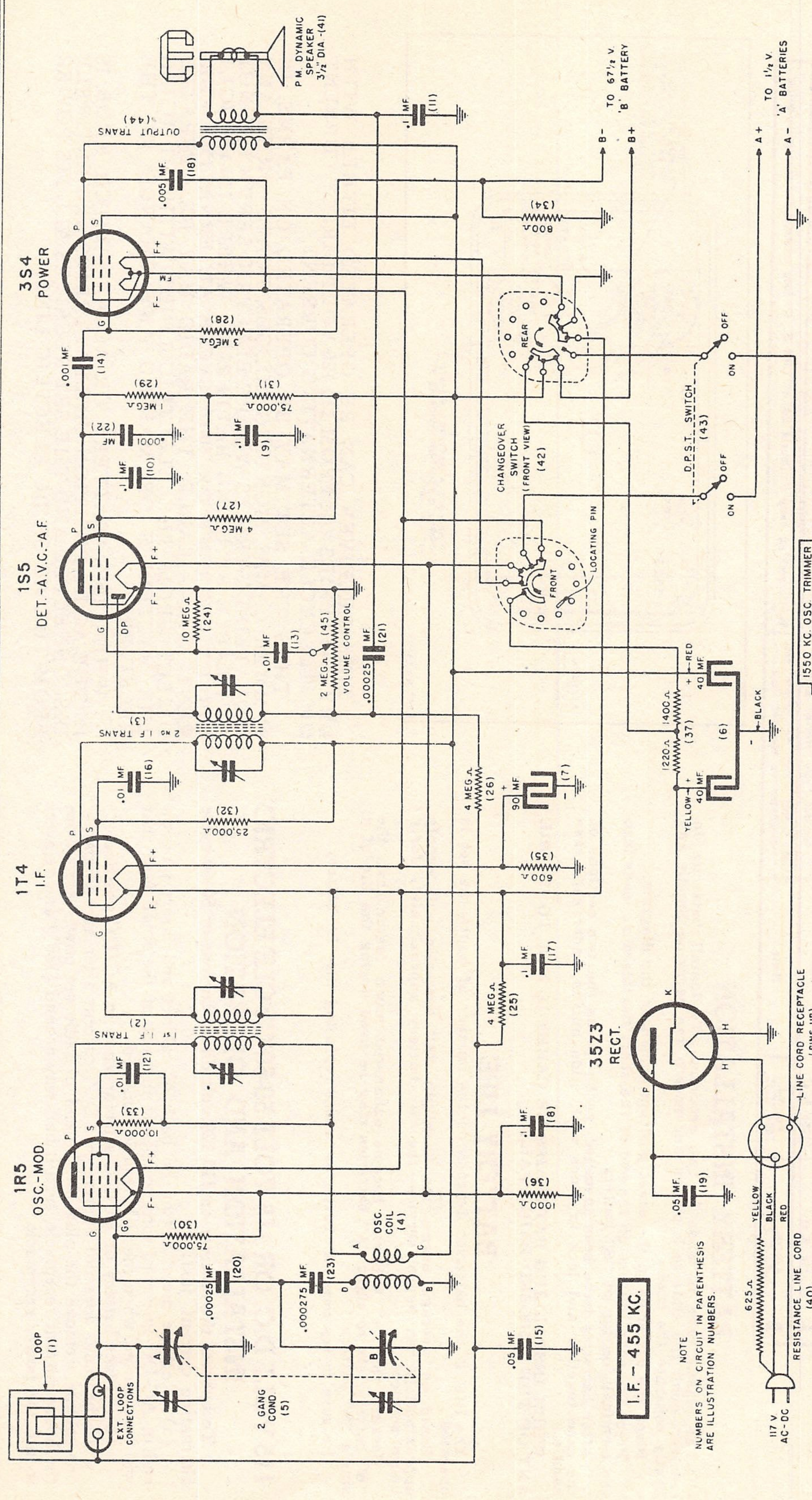
1. Use Correct Order Form.
2. On the Purchase Order always give the following information:
   (1) PART NUMBER (number printed on the part if different from that shown in this list) and DESCRIPTION for each part ordered. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
   (2) THE CHASSIS NUMBER, which is 101.811. This number is found on a metal plate (pictured above) at the rear of the chassis.
3. ORDERING INSTRUCTIONS:
   Send Purchase Orders DIRECT to SOURCE No. 101. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for source name and address.
4. MARK-UP: Selling Prices in the following list produce a mark-up of AA5, unless otherwise noted in the M. U. Code Column. See "DIV. 57 STANDARD NOMENCLATURE INDEX" for explanation of mark-up code.
5. In all correspondence relating to cabinets, always mention the source code letter stamped into the upper rear rail of consoles or the bottom of table models, and the CATALOG NUMBER shown on the sticker on the back, bottom or inside of cabinet.

### REPAIR PARTS LIST

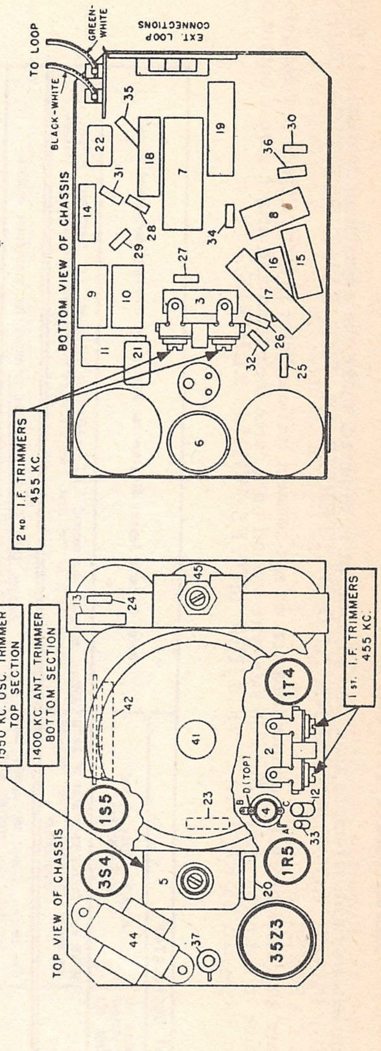
THE RETAIL SELLING PRICES SHOWN BELOW ARE VOID AFTER AUGUST 1, 1947. AFTER THIS DATE REFER TO DIV. 57 REPAIR PARTS STRAIGHT LIST. ALL PRICES PREPAID.

| SCHEMATIC LOCATION | PART NUMBER | DESCRIPTION | SEARS LIST PRICE EACH | MU CODE |
|---|---|---|---|---|
|  | R13961 | Button - Snap | $ .01 |  |
| C4,C8,C5 | R60413 | Capacitor - Variable Tuning | 5.35 |  |
| C1 |  | Capacitor - .001 Mfd. 600 V. | .15 |  |
| C7 |  | Capacitor - .01 Mfd. 600 V. | .18 |  |
| C11,C12,C13 |  | Capacitor - .05 Mfd. 200 V. | .21 |  |
| C14,C18,C22 |  | Capacitor - .005 Mfd. 600 V. | .17 |  |
| C17 |  | Capacitor - .01 Mfd. 400 V. | .18 |  |
| C20 |  | Capacitor - .1 Mfd. 200 V. | .27 |  |
| C21 |  | Capacitor - .1 Mfd. 200 V. H. T. | .22 |  |
| C24,C28 |  | Capacitor - .05 Mfd. 600 V. | .26 |  |
| C25 |  | Capacitor - .02 Mfd. 600 V. | .27 |  |
| C2,C10,C19 |  | Capacitor - .0001 Mfd. Mica | .20 |  |
| C23,C26,C27 | R60416 | Capacitor - Electrolytic, 20 Mfd. 25 V 40 Mfd. 150 V., 40 Mfd. 150 V. | 1.91 |  |
| L1 | R60465 | Coil - R. F. | 1.25 |  |
| L2 | R60448 | Coil - Oscillator | 1.53 |  |
| R16 | R60516 | Control - Tone and On-Off | 1.08 |  |
| R10 | R60505 | Control - Volume - 2 Megohm | .89 |  |
|  | R16706 | Cord - Power | .77 |  |
|  | R60506 | Dial | .26 |  |
|  | R60523 | Drum - Drum & Bushing Assembly | .42 |  |
|  | R60520 | Escutcheon - Plastic | 1.19 |  |
|  | R60482 | Knob - Phono-Radio | .14 |  |
|  | R60522 | Knob - Tone - On-Off | .14 |  |
|  | R60480 | Knob - Tuning | .14 |  |
|  | R60484 | Knob - Volume | .14 |  |
|  |  | Lamp Dial Mazda Type #47 | .18 |  |
|  | R54551 | Leaflet - Instruction | .20 |  |
|  | R60985 | Loop - Assembly with Board | 2.26 | A0 |
|  | R61129 | Pointer - Dial | $ .11 |  |
|  | R44145 | Plug - Female | .30 |  |
|  | R43423 | Pulley - Wood | .01 |  |
| R1 |  | Resistor - 1 Megohm 1/3 Watt | .15 |  |
| R2 |  | Resistor - 22,000 Ohm 1/3 Watt | .15 |  |
| R3 |  | Resistor - 470 Ohm 1/3 Watt | .15 |  |
| R4,R11 |  | Resistor - 2.2 Megohm 1/3 Watt | .15 |  |
| R5 |  | Resistor - 330,000 Ohm 1/3 Watt | .15 |  |
| R8 |  | Resistor - 47,000 Ohm 1/3 Watt | .15 |  |
| R9 |  | Resistor - 4.7 Megohm 1/3 Watt | .15 |  |
| R12,R13 |  | Resistor - 470,000 Ohm 1/3 Watt | .15 |  |
| R14 |  | Resistor - 150 Ohm 1/3 Watt | .15 |  |
| R17 |  | Resistor - 1200 Ohm 1 Watt | .21 |  |
| R15 | R40232 | Resistor - Glasohm 1 Watt 25 Ohm | .14 |  |
|  | R60533 | Shaft - Tuning Assembly | .18 |  |
|  | R44897 | Socket - Phono - 1 Prong | .07 |  |
|  | R60515 | Socket - Pilot Lamp | .24 |  |
|  | R57049 | Socket - 8 Prong - Lock-in | .13 |  |
|  | R61032 | Speaker - P. M. 8" | 9.84 | A0 |
|  | R61037 | Cone and Voice Coil | 3.56 | A5 |
|  | R61038 | Output Transformer | 2.48 | A5 |
|  | R60670 | String Assembly | .25 |  |
|  | R60517 | Switch - Phono - Radio | .68 |  |
| T1 | R60417 | Transformer - 1st I. F. | 2.24 |  |
| T2 | R60418 | Transformer - 2nd I. F. | 2.71 |  |

# SENTINEL RADIO CORP.


LOOP (1)
EXT. LOOP CONNECTIONS
2 GANG COND (5)
A
B
.05 MF (15)
.00025 MF (20)
.000275 MF (23)
OSC. COIL (4)
A
G
D
B
75,000Ω (30)
1R5 OSC.-MOD.
G
Go
P
S
F+
F-
10,000Ω (33)
.01 MF (12)
1000Ω (36)
.1 MF (8)
1st I.F. TRANS (2)
4 MEG.Ω (25)
.1 MF (17)
1T4 I.F.
600Ω (35)
25,000Ω (32)
.01 MF (16)
2nd I.F. TRANS (3)
4 MEG.Ω (26)
90 MF (7)
1S5 DET.-A.V.C.-A.F.
DP
10 MEG.Ω (24)
.01 MF (13)
2 MEG.Ω (45) VOLUME CONTROL
.00025 MF (21)
4 MEG.Ω (27)
.1 MF (10)
.0001 MF (22)
1 MEG.Ω (29)
75,000Ω (31)
.1 MF (9)
.001 MF (14)
3 MEG.Ω (28)
3S4 POWER
FM
800Ω (34)
.005 MF (18)
OUTPUT TRANS (44)
P.M. DYNAMIC SPEAKER 3½" DIA -(41)
.1 MF (11)
CHANGEOVER SWITCH (FRONT VIEW) (42)
REAR
FRONT
LOCATING PIN
B- TO 67½ V. 'B' BATTERY
B+
A+ TO 1½ V. 'A' BATTERIES
A-
D.P.S.T. SWITCH (43)
ON
OFF
RED
40 MF
1400Ω
1220Ω (37)
(6)
BLACK
YELLOW
35Z3 RECT.
K
H
P
LINE CORD RECEPTACLE (PINS UP)
.05 MF (19)
625Ω
YELLOW
BLACK
RED
RESISTANCE LINE CORD (40)
117 V. AC-DC
I.F. - 455 KC.

NOTE
NUMBERS ON CIRCUIT IN PARENTHESIS ARE ILLUSTRATION NUMBERS.


TO LOOP
GREEN-WHITE
BLACK-WHITE
EXT. LOOP CONNECTIONS
BOTTOM VIEW OF CHASSIS
2nd I.F. TRIMMERS 455 KC.
1550 KC OSC. TRIMMER TOP SECTION
1400 KC ANT. TRIMMER BOTTOM SECTION
1st I.F. TRIMMERS 455 KC.
TOP VIEW OF CHASSIS
D (TOP)
B
A
1T4
1S5
1R5
3S4
35Z3
41
42
44
45
5
23
24
13
20
37
33
12
1
2
3
6
7
8
9
10
11
14
15
16
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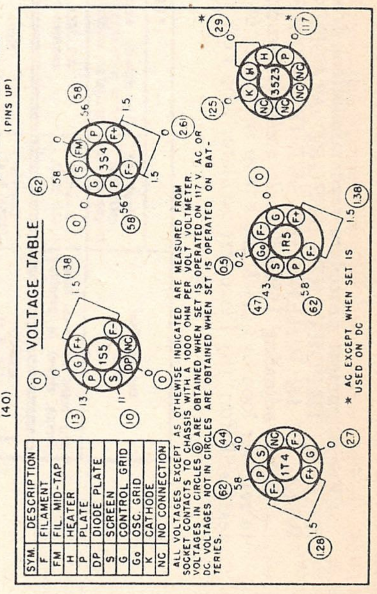
32
34
35
36

## VOLTAGE TABLE


1S5
3S4
1T4
1R5
35Z3
P
S
G
F+
F-
DP
NC
FM
Go
K
H
0
13
10
11
1.38
1.5
62
58
56
2.61
44
40
2.7
1.28
0.5
0.2
47
43
1.38
125
29
117
*

| SYM. | DESCRIPTION |
|---|---|
| F | FILAMENT |
| FM | FIL. MID-TAP |
| H | HEATER |
| P | PLATE |
| DP | DIODE PLATE |
| S | SCREEN |
| G | CONTROL GRID |
| Go | OSC. GRID |
| K | CATHODE |
| NC | NO CONNECTION |

ALL VOLTAGES EXCEPT AS OTHERWISE INDICATED ARE MEASURED FROM SOCKET CONTACTS TO CHASSIS WITH A 1000 OHM PER VOLT VOLTMETER. VOLTAGES IN CIRCLES ⓞ ARE OBTAINED WHEN SET IS OPERATED ON 117 V. AC OR DC. VOLTAGES NOT IN CIRCLES ARE OBTAINED WHEN SET IS OPERATED ON BATTERIES.

* AC EXCEPT WHEN SET IS USED ON DC

For parts list, see P.16-10

## ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right. If more than one adjustment is required, make the adjustment marked (1) first, (2) next. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA AND BATTERIES IN THE SAME POSITION THEY WILL BE IN WHEN THE SET IS IN THE CABINET.

**When adjusting 1550 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop.** Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

| Set receiver dial to: | | TEST OSCILLATOR | | | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|
| | | Adjust test oscillator frequency to: | Use dummy antenna in series with output of test oscillator consisting of: | Attach output of test oscillator to: | |
| Any point where no interfering signal is received | | Exactly 455 K.C. | 0.2 Mfd. condenser | High side to lug on stator of gang condenser to which loop lead is connected. | Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output. |
| 1 | Exactly 1550 K.C. | Exactly 1550 K.C. | None | Use Small Loop to couple test oscillator to receiver loop. | Adjust 1550 K. C. oscillator trimmer for maximum output. |
| 2 | Approx. 1400 K.C. | Approx. 1400 K.C. | None | Use Small Loop to couple test oscillator to receiver loop. | While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output. |

## BATTERY INSTALLATION

The plastic case is made in two sections. To install batteries in receiver, push the slide lock button underneath the carrying handle and gently separate the case.

Place the batteries in the exact position shown on the diagram.

Press the snap buttons on the end of the short flexible wire leads into the terminals on top of "B" battery.

After batteries have been installed, gently press the two sections of the case together and lock in place with slide button underneath case handle.

WHEN INSTALLING BATTERIES BE CAREFUL NOT TO INJURE ANY OF THE EXPOSED RADIO PARTS.

## BATTERY LIFE

The life of the batteries depends on the number of hours the set is operated.

Based on average usage, the flashlight "A" batteries will supply approximately ten hours' service—the "B" battery approximately forty hours' service.

Because the "A" batteries become exhausted much faster than the "B" battery, six to eight "A" batteries may be used during the life of a single "B" battery.

Be sure to try new "A" batteries before replacing the "B" battery.

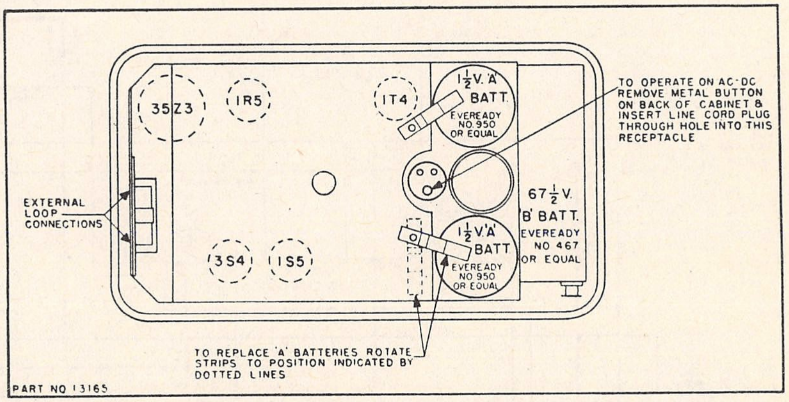
## 115 VOLT D.C. OR 115 VOLT 50-60 CYCLE ELECTRIC INSTALLATION AND OPERATION

To operate the receiver on 110-120 volt direct current or 50-60 cycle alternating current, just:

(a) Remove metal button on back of cabinet and insert plug on end of AC-DC line cord into receptacle in back of the small hole that will be exposed when metal button is removed.

(b) Place battery or AC-DC selector knob in AC/DC position.

If the radio does not operate on "DC" current after approximately one minute, remove the plug on the end of radio set power cord from the house current receptacle, turn it half way around (180°) and reinsert it into the power receptacle.

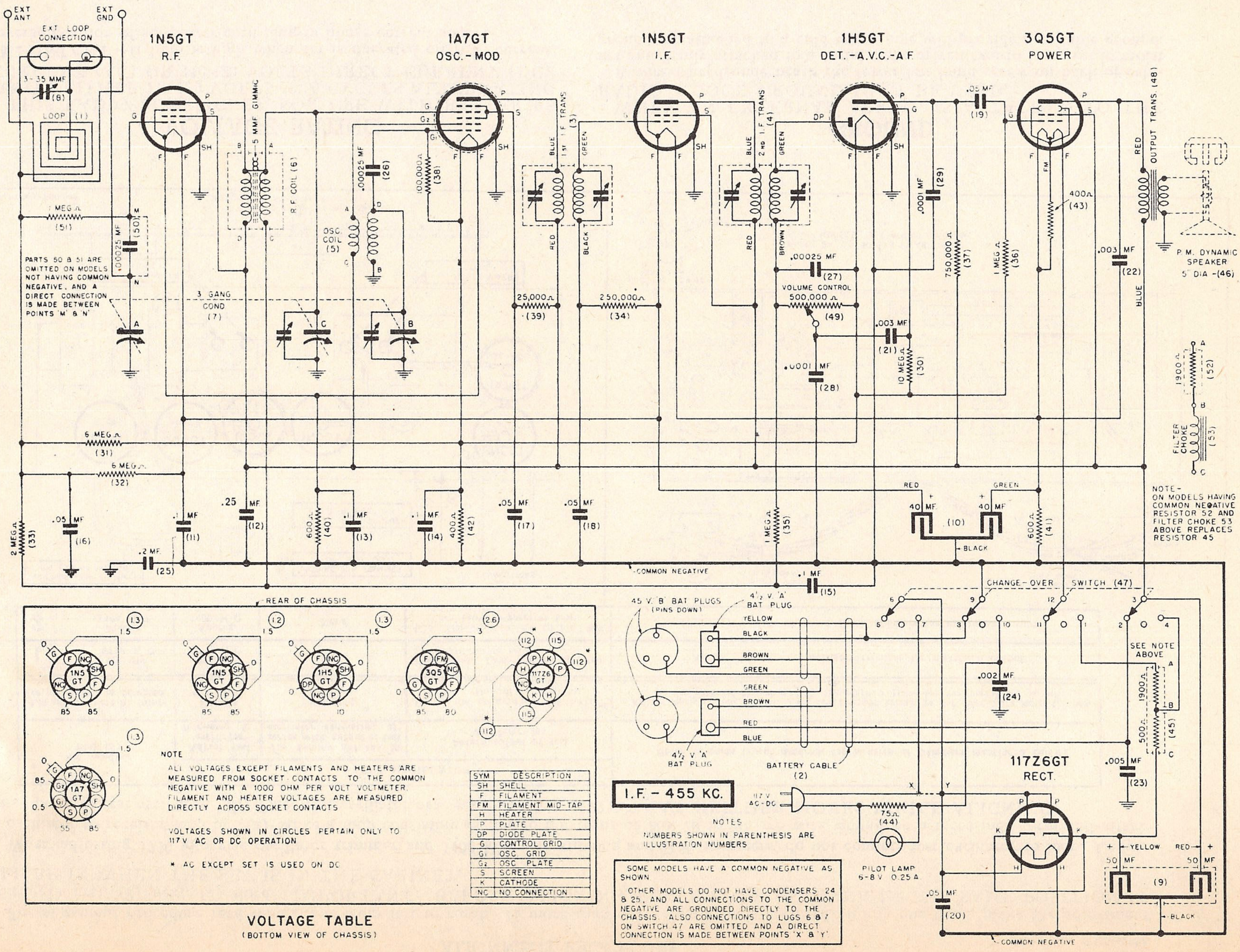

35Z3
1R5
1T4
3S4
1S5
$1\frac{1}{2}$ V. 'A' BATT. EVEREADY NO. 950 OR EQUAL
$1\frac{1}{2}$ V. 'A' BATT. EVEREADY NO. 950 OR EQUAL
$67\frac{1}{2}$ V. 'B' BATT. EVEREADY NO 467 OR EQUAL
EXTERNAL LOOP CONNECTIONS
TO OPERATE ON AC-DC REMOVE METAL BUTTON ON BACK OF CABINET & INSERT LINE CORD PLUG THROUGH HOLE INTO THIS RECEPTACLE
TO REPLACE 'A' BATTERIES ROTATE STRIPS TO POSITION INDICATED BY DOTTED LINES
PART NO 13165

THIS RECEIVER CAN BE OPERATED EITHER WITH DRY BATTERIES OR FROM 110-120 VOLT DIRECT CURRENT OR 50-60 CYCLE ALTERNATING CURRENT.

THUS THE SET MAY BE OPERATED ON FARMS, IN SUMMER CAMPS, HUNTING LODGES, BOATS, OR IN ANY ISOLATED DISTRICTS WHERE ELECTRIC SERVICE IS NOT AVAILABLE BY USING BATTERIES. WHERE 110-120 VOLT DIRECT CURRENT OR 50-60 CYCLE ALTERNATING CURRENT IS AVAILABLE, THE RADIO MAY BE OPERATED DIRECT FROM THE ELECTRIC LINES WITHOUT USING THE BATTERIES OR MAKING ANY CHANGE IN THE RECEIVER.

WHEN THE "BATTERY OR AC-DC" SWITCH KNOB IS IN THE AC-DC POSITION THE BATTERIES ARE ENTIRELY DISCONNECTED AND THE SET RECEIVES ALL ITS POWER FROM THE AC OR DC ELECTRIC LINE.

# SENTINEL RADIO CORP.


EXT ANT
EXT GND
EXT LOOP CONNECTION
3-35 MMF (8)
LOOP (1)
1N5GT R.F.
1A7GT OSC.-MOD
1N5GT I.F.
1H5GT DET.-A.V.C.-A F
3Q5GT POWER
5 MMF GIMMIC
R F COIL (6)
OSC. COIL (5)
.00025 MF (26)
100,000Ω (38)
1st I.F TRANS (3)
2nd I.F TRANS (4)
BLUE
GREEN
RED
BLACK
BROWN
.00025 MF (50)
1 MEG.Ω (51)
3 GANG COND (7)
PARTS 50 & 51 ARE OMITTED ON MODELS NOT HAVING COMMON NEGATIVE, AND A DIRECT CONNECTION IS MADE BETWEEN POINTS 'M' & 'N'
25,000Ω (39)
250,000Ω (34)
.00025 MF (27)
VOLUME CONTROL 500,000Ω (49)
.0001 MF (28)
.003 MF (21)
10 MEG.Ω (30)
.0001 MF (29)
750,000Ω (37)
1 MEG.Ω (36)
.05 MF (19)
400Ω (43)
.003 MF (22)
OUTPUT TRANS (48)
P.M. DYNAMIC SPEAKER 5" DIA -(46)
1900Ω (52)
FILTER CHOKE (53)
NOTE– ON MODELS HAVING COMMON NEGATIVE RESISTOR 52 AND FILTER CHOKE 53 ABOVE REPLACES RESISTOR 45
6 MEG.Ω (31)
6 MEG.Ω (32)
2 MEG.Ω (33)
.05 MF (16)
.2 MF (25)
.1 MF (11)
.25 MF (12)
600Ω (40)
.1 MF (13)
.1 MF (14)
400Ω (42)
.05 MF (17)
.05 MF (18)
1 MEG.Ω (35)
.1 MF (15)
40 MF (10)
600Ω (41)
COMMON NEGATIVE
REAR OF CHASSIS
CHANGE-OVER SWITCH (47)
45 V. 'B' BAT PLUGS (PINS DOWN)
4½ V. 'A' BAT PLUG
YELLOW
BATTERY CABLE (2)
.002 MF (24)
SEE NOTE ABOVE
1900Ω
500Ω (45)
.005 MF (23)
117 V AC-DC
75Ω (44)
PILOT LAMP 6-8 V 0.25 A
117Z6GT RECT.
.05 MF (20)
50 MF (9)
X
Y

I.F. – 455 KC.

NOTES

NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS

SOME MODELS HAVE A COMMON NEGATIVE AS SHOWN.

OTHER MODELS DO NOT HAVE CONDENSERS 24 & 25, AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS. ALSO CONNECTIONS TO LUGS 6 & 7 ON SWITCH 47 ARE OMITTED AND A DIRECT CONNECTION IS MADE BETWEEN POINTS 'X' & 'Y'

NOTE

ALL VOLTAGES EXCEPT FILAMENTS AND HEATERS ARE MEASURED FROM SOCKET CONTACTS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. FILAMENT AND HEATER VOLTAGES ARE MEASURED DIRECTLY ACROSS SOCKET CONTACTS

VOLTAGES SHOWN IN CIRCLES PERTAIN ONLY TO 117V AC OR DC OPERATION

* AC EXCEPT SET IS USED ON DC

| SYM | DESCRIPTION |
|---|---|
| SH | SHELL |
| F | FILAMENT |
| FM | FILAMENT MID-TAP |
| H | HEATER |
| P | PLATE |
| DP | DIODE PLATE |
| G | CONTROL GRID |
| $G_1$ | OSC. GRID |
| $G_2$ | OSC. PLATE |
| S | SCREEN |
| K | CATHODE |
| NC | NO CONNECTION |

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

©John F. Rider

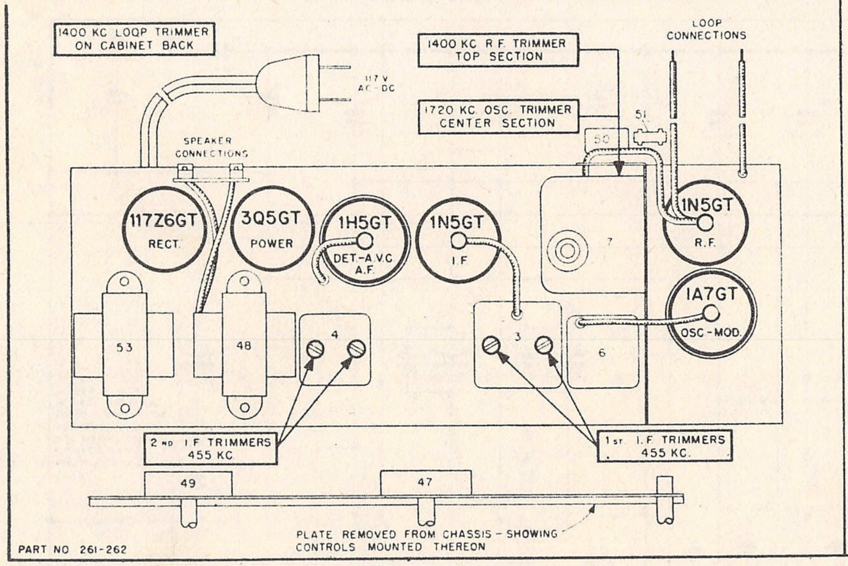
## ALIGNMENT PROCEDURE

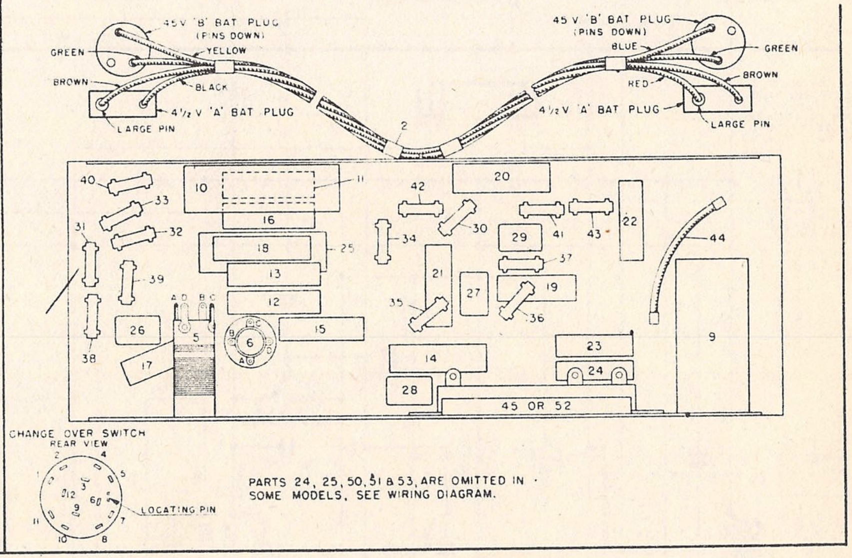
PART NO. 13335—262A

For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

**When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna and R.F. trimmers, do not connect test oscillator to loop.** Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

| Set receiver dial to: | TEST OSCILLATOR | | | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|
| | Adjust test oscillator frequency to: | Use dummy antenna in series with output of test oscillator consisting of: | Attach output of test oscillator to: | |
| Any point where no interfering signal is received. | Exactly 455 K.C. | 0.2 Mfd. condenser | High side to grid cap of 1A7GT tube. Do not remove cap. | Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output. |
| **1** Exactly 1730 K.C. | Exactly 1730 K.C. | None | Use Small Loop to couple test oscillator to receiver loop. | Adjust 1730 K. C. oscillator trimmer for maximum output. |
| **2** Approx. 1400 K.C. | Approx. 1400 K.C. | None | Use Small Loop to couple test oscillator to receiver loop. | Adjust 1400 K.C. loop and R.F. trimmers for maximum output. |


1400 KC LOOP TRIMMER ON CABINET BACK
117 V AC-DC
SPEAKER CONNECTIONS
1400 KC R.F. TRIMMER TOP SECTION
1720 KC OSC. TRIMMER CENTER SECTION
LOOP CONNECTIONS
51
50
117Z6GT RECT.
3Q5GT POWER
1H5GT DET-A.V.C. A.F.
1N5GT I.F.
7
1N5GT R.F.
1A7GT OSC-MOD.
53
48
4
3
6
2ND I.F. TRIMMERS 455 KC
1ST I.F. TRIMMERS 455 KC.
49
47
PLATE REMOVED FROM CHASSIS - SHOWING CONTROLS MOUNTED THEREON
PART NO 261-262


45 V 'B' BAT PLUG (PINS DOWN)
GREEN
YELLOW
BROWN
BLACK
4½ V 'A' BAT PLUG
LARGE PIN
2
45 V 'B' BAT PLUG (PINS DOWN)
BLUE
GREEN
BROWN
RED
4½ V 'A' BAT PLUG
LARGE PIN
40
10
11
42
20
33
32
16
31
25
34
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29
41
43
22
44
18
39
13
37
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14
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38
28
45 OR 52
CHANGE OVER SWITCH REAR VIEW
LOCATING PIN
PARTS 24, 25, 50, 51 & 53, ARE OMITTED IN SOME MODELS. SEE WIRING DIAGRAM.

## VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE WITH BATTERIES OR ON EITHER 110-120 VOLTS 50-60 CYCLES ALTERNATING CURRENT (AC) OR 110-120 VOLTS DIRECT CURRENT (DC).

**IMPORTANT**—If hum is high when set is operated on A.C. current, reverse position of set power cord plug in house current socket.

## GROUND

WHEN AN EXTERNAL AERIAL IS ATTACHED TO THE RADIO A GOOD GROUND MUST BE USED.

A wire placed underneath the lower left hand screw on back of cabinet and firmly attached to a metal stake driven two to four feet in moist ground, or attached to a cold water pipe will provide a suitable ground.

## CONTROLS

THE LEFT HAND KNOB controls the volume control.

THE CENTER KNOB is the voltage selector and on-off switch.

THE RIGHT HAND KNOB is the station selector.

## BATTERY INSTALLATION AND OPERATION

BATTERY EQUIPMENT:

Diagram shows proper location and connections of the following and similar types of batteries:

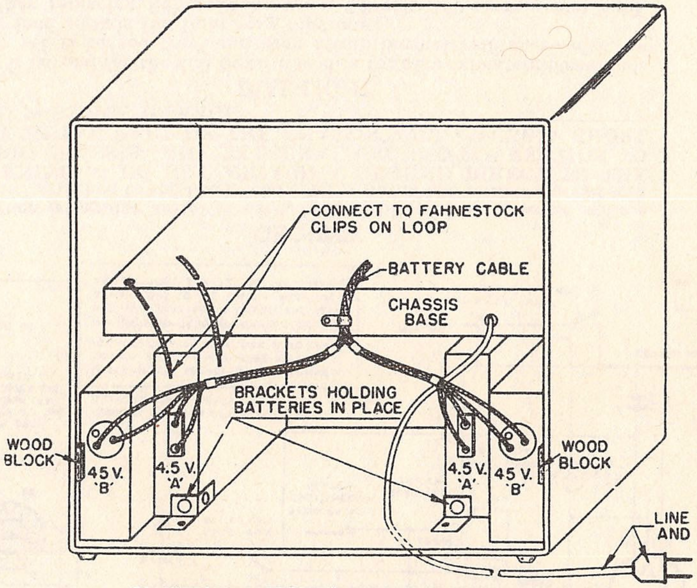
2—4½ VOLT "A" BATTERIES such as Eveready type 746.
2—45 VOLT "B" BATTERIES such as Eveready type 482.

## 115 VOLT D.C. OR 115 VOLT 50-60 CYCLE ELECTRIC INSTALLATION AND OPERATION

To operate the receiver on 110-120 volt direct current or 50-60 cycle alternating current, just:

(a) Bring line cord through opening in bottom of cabinet.
(b) Insert line cord plug into 110-115 volt AC or DC electric power socket.
(c) Rotate voltage selector knob to left hand AC/DC position.

If the radio does not operate on DC current after approximately one minute remove the plug on the end of radio line cord from the house current receptacle, turn it half way around (180°) and reinsert it into the power receptacle.



TO INSTALL BATTERIES REMOVE BACK FROM CABINET, AND PLACE BATTERIES AS SHOWN.
FOR AC/DC OPERATION BRING LINE CORD THROUGH OPENING IN BOTTOM OF CABINET.
ALWAYS KEEP BACK ON CABINET.

## PARTS LIST

| Illus. No. | Part No. | Part Name | Description | List Price |
|---|---|---|---|---|
| 1 | 13331 | Antenna | Loop Assembly | $1.50 |
| 2 | 12204 | Cable | Battery with 2 Three Prong "B" and 2 Two Prong "A" Plugs | .55 |
| 3 | 12182 | Coil | First I.F. Transformer | 1.05 |
| 4 | 11988 | Coil | Second I.F. Transformer | .75 |
| 5 | 12184 | Coil | Oscillator—used in Models not having common ground | .60 |
| 5 | 13566 | Coil | Oscillator—used in Models having common ground | .60 |
| 6 | 13323 | Coil | R.F. Coil | .50 |
| 7 | 12188 | Condenser | Tuning (Three Gang) | 2.50 |
| 8 | 11636 | Condenser | Trimmer (2-40 MMF.) | .20 |
| 9 | 13326 | Condenser | Tubular Dry Elec. (50-50 Mfd. 150 Volt) | .75 |
| 10 | 13242 | Condenser | Tubular Dry Elec. (40-40 Mfd. 25 Volt) | .50 |
| 11 | 1151 | Condenser | Tubular .1 Mfd. 200 Volt | .20 |
| 12 | 9032 | Condenser | Tubular .25 Mfd. 200 Volt | .23 |
| 13 | 1151 | Condenser | Tubular .1 Mfd. 200 Volt | .20 |
| 14 | 1151 | Condenser | Tubular .1 Mfd. 200 Volt | .20 |
| 15 | 1151 | Condenser | Tubular .1 Mfd. 200 Volt | .20 |
| 16 | 1147 | Condenser | Tubular .05 Mfd. 200 Volt | .19 |
| 17 | 1147 | Condenser | Tubular .05 Mfd. 200 Volt | .19 |
| 18 | 1147 | Condenser | Tubular .05 Mfd. 200 Volt | .19 |
| 19 | 1147 | Condenser | Tubular .05 Mfd. 200 Volt | .19 |
| 20 | 9457 | Condenser | Tubular .05 Mfd. 400 Volt | .20 |
| 21 | 1368 | Condenser | Tubular .003 Mfd. 400 Volt | .17 |
| 22 | 1368 | Condenser | Tubular .003 Mfd. 400 Volt | .17 |
| 23 | 1275 | Condenser | Tubular .005 Mfd. 400 Volt | .18 |
| 24 | 10762 | Condenser | Tubular .002 Mfd. 400 Volt used in Models having common ground | .19 |
| 25 | 12099 | Condenser | Tubular .2 Mfd. 400 Volt used in Models having common ground (with Red Dot) | .26 |
| 26 | 9458 | Condenser | Mica .00025 Mfd. | .21 |
| 27 | 9458 | Condenser | Mica .00025 Mfd. | .21 |
| 28 | 7934 | Condenser | Mica .0001 Mfd. | .21 |
| 29 | 7934 | Condenser | Mica .0001 Mfd. | .21 |
| 30 | 4804 | Resistor | Carbon 10 Megohm 1/3 Watt | .19 |
| 31 | 2333 | Resistor | Carbon 6 Megohm 1/3 Watt | .19 |
| 32 | 2333 | Resistor | Carbon 6 Megohm 1/3 Watt | .19 |
| 33 | 2705 | Resistor | Carbon 2 Megohm 1/3 Watt | .19 |
| 34 | 8906 | Resistor | Carbon 250,000 Ohm 1/3 Watt | .19 |
| 35 | 7998 | Resistor | Carbon 1 Megohm 1/3 Watt | .19 |
| 36 | 7998 | Resistor | Carbon 1 Megohm 1/3 Watt | .19 |
| 37 | 2673 | Resistor | Carbon 750,000 Ohm 1/3 Watt | .19 |
| 38 | 8000 | Resistor | Carbon 100,000 Ohm 1/3 Watt | .19 |
| 39 | 8907 | Resistor | Carbon 25,000 Ohm 1/3 Watt | .19 |
| 40 | 1562 | Resistor | Carbon 600 Ohm 1/3 Watt | .19 |
| 41 | 1562 | Resistor | Carbon 600 Ohm 1/3 Watt | .19 |
| 42 | 1152 | Resistor | Carbon 400 Ohm 1/3 Watt | .19 |
| 43 | 1152 | Resistor | Carbon 400 Ohm 1/3 Watt | .19 |
| 44 | 12084 | Resistor | Flexible 75 Ohm 2 Watt | .20 |
| 45 | 13327 | Resistor | Wire Wound (500 Ohm 3 Watt and 1900 Ohm 6 Watt) | .50 |
| 46 | 12211 | Speaker | P.M. Dynamic (5") | 3.25 |
| 47 | 12193 | Switch | Voltage Selector Switch | 1.00 |
| 48 | 13055 | Transformer | Output used in Models not having common ground | 1.00 |
| 48 | 12183 | Transformer | Output used in Models having common ground | 1.10 |
| 49 | 13324 | Volume Control | used in Models not having common ground | .60 |
| 49 | 13397 | Volume Control | used in Models having common ground | .70 |
| 50 | 9458 | Condenser | Mica .00025 Mfd. | .21 |
| 51 | 7998 | Resistor | Carbon 1 megohm 1/3 watt | .19 |
| 52 | 10831 | Resistor | Wire Wound 1900 ohm 6W used in Model having common ground | .55 |
| 53 | 12069 | Filter Choke | Used in Model having common ground | 1.00 |

## MISCELLANEOUS PARTS

| Part No. | Part Name | Description | List Price |
|---|---|---|---|
| 10292 | Bulb | 6.3 Volt .250 Amp. Dial Light No. 44 Bayonet Base | $0.10 |
| 8184 | Dial Cord | 24" of No. 18 Lb. Drive Cord | .15 |
| 12191 | Dial Shaft | Drive Shaft | .15 |
| 12221 | Dial Pointer | For Dial | .20 |
| 12222 | Dial Pointer | AC-DC Battery Indicator | .10 |
| 13325 | Dial Scale | Calibrated Scale | .35 |
| 12208 | Dial Crystal | For Dial | .30 |
| 12096 | Knob | | .10 |
| 11642 | Plug | Three Prong "B" | .10 |
| 12205 | Plug | Two Prong "A" | .08 |
| 13330 | Plate | Metal Control Face Plate for Cabinet | 1.00 |

# SENTINEL RADIO CORP.

TUNING CONTROL: Use this knob to tune in desired station.

VOLUME CONTROL and ON-OFF SWITCH Turn clockwise to increase volume.

FOR RADIO RECEPTION: Slide this switch knob to "RADIO" position.

FOR RECORD PLAYING: Slide switch knob to "PHONO" position.

Slide switch knob to "PHONO" position

**INSTRUCTIONS FOR PLAYING A 7", 10" OR 12" RECORD:**

A. LIFT CABINET LID AND PLACE RECORD ON TURNTABLE.

B. SLIDE RECORD SIZE-SELECTOR BUTTON TO PROPER POSITION. FOR 12" RECORD, SLIDE BUTTON TO 12 POSITION. FOR 10" RECORD, SLIDE BUTTON TO POSITION MARKED 10. FOR 7" RECORD, *DEPRESS* BUTTON AND SLIDE TO 7 POSITION.

C. PLACE "RADIO-PHONO" SWITCH IN PHONO POSITION.

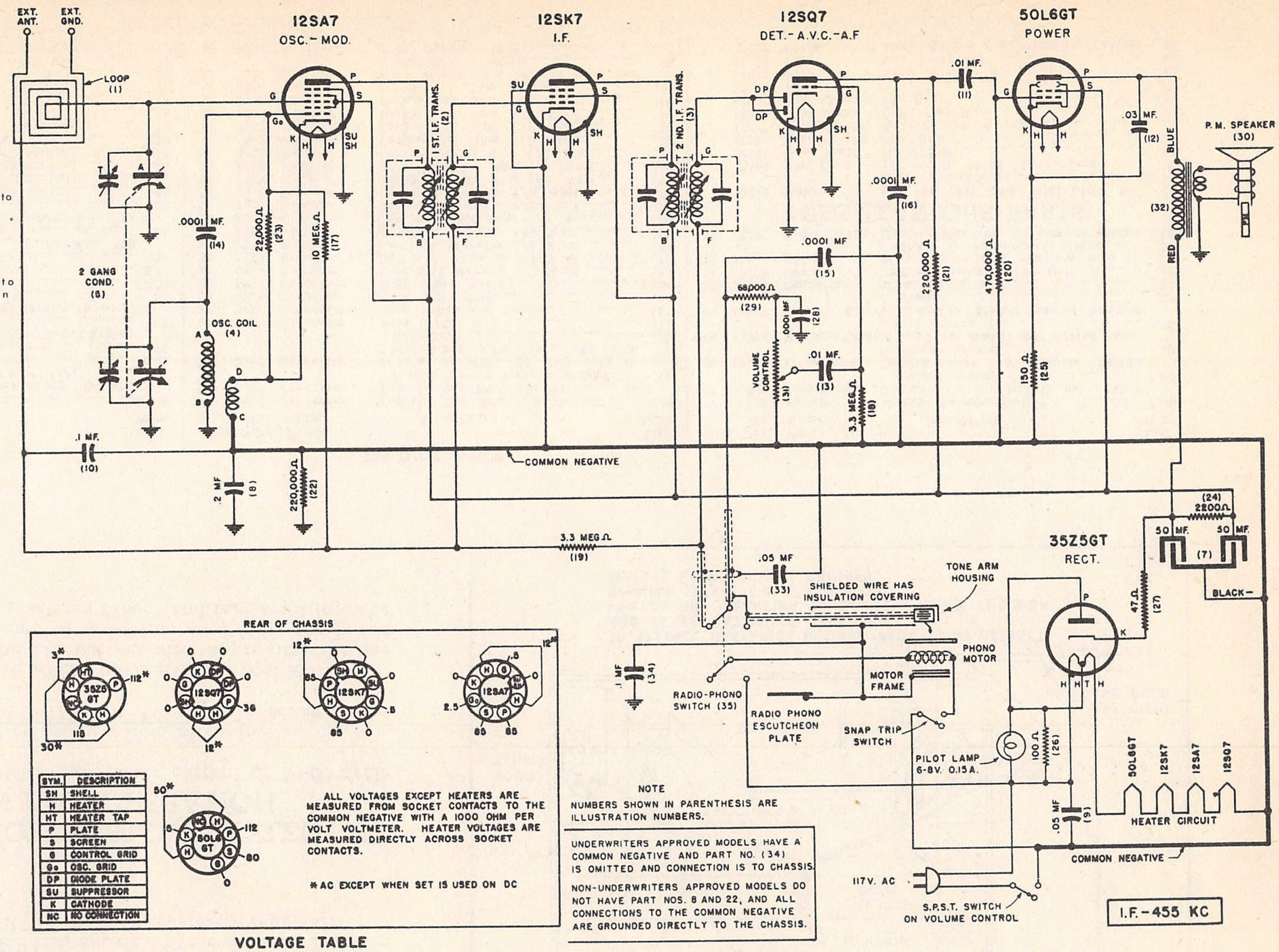
D. CLOSE LID—THIS WILL AUTOMATICALLY START RECORD PLAYING.

WHEN RECORD HAS BEEN COMPLETELY PLAYED, TURNTABLE WILL AUTOMATICALLY TURN OFF.

TO PLAY SAME RECORD AGAIN, JUST LIFT LID ALL THE WAY UP AND RECLOSE.

TO PLAY ANOTHER RECORD, REPLACE RECORD ON TURNTABLE AND PROCEED AS ABOVE.

*DO NOT HAVE MORE THAN ONE RECORD ON TURNTABLE.*


EXT. ANT.
EXT. GND.
LOOP (1)
12SA7 OSC.-MOD.
12SK7 I.F.
12SQ7 DET.-A.V.C.-A.F
50L6GT POWER
35Z5GT RECT.
P.M. SPEAKER (30)
2 GANG COND. (5)
.0001 MF. (14)
22,000 Ω (23)
10 MEG. Ω (17)
OSC. COIL (4)
1 ST. I.F. TRANS. (2)
2 ND. I.F. TRANS. (3)
.1 MF. (10)
.2 MF (8)
220,000 Ω (22)
COMMON NEGATIVE
3.3 MEG Ω (19)
.0001 MF (15)
.0001 MF (16)
68000 Ω (29)
.0001 MF (28)
VOLUME CONTROL (31)
.01 MF. (13)
3.3 MEG. Ω (18)
220,000 Ω (21)
470,000 Ω (20)
150 Ω (25)
.01 MF. (11)
.03 MF. (12)
BLUE
RED
(32)
(24) 2200 Ω
50 MF. 50 MF. (7)
BLACK-
47 Ω (27)
.05 MF (33)
SHIELDED WIRE HAS INSULATION COVERING
TONE ARM HOUSING
PHONO MOTOR
MOTOR FRAME
.1 MF (34)
RADIO-PHONO SWITCH (35)
RADIO PHONO ESCUTCHEON PLATE
SNAP TRIP SWITCH
PILOT LAMP 6-8V. 0.15A.
100 Ω (26)
.05 MF (9)
50L6GT 12SK7 12SA7 12SQ7
HEATER CIRCUIT
COMMON NEGATIVE
117V. AC
S.P.S.T. SWITCH ON VOLUME CONTROL
I.F.-455 KC
REAR OF CHASSIS
35Z5 GT: 3* 112* 118 30*
12SQ7: 0 0 0 0 0 36 12*
12SK7: 12* 0 85 0 .5 85 0
12SA7: 12* .5 0 0 2.5 85 85
50L6 GT: 80* 5 112 80 0

| SYM. | DESCRIPTION |
|---|---|
| SH | SHELL |
| H | HEATER |
| HT | HEATER TAP |
| P | PLATE |
| S | SCREEN |
| G | CONTROL GRID |
| Go | OSC. GRID |
| DP | DIODE PLATE |
| SU | SUPPRESSOR |
| K | CATHODE |
| NC | NO CONNECTION |

ALL VOLTAGES EXCEPT HEATERS ARE MEASURED FROM SOCKET CONTACTS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES ARE MEASURED DIRECTLY ACROSS SOCKET CONTACTS.

* AC EXCEPT WHEN SET IS USED ON DC

**VOLTAGE TABLE**
(BOTTOM VIEW OF CHASSIS)

NOTE
NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

UNDERWRITERS APPROVED MODELS HAVE A COMMON NEGATIVE AND PART NO. (34) IS OMITTED AND CONNECTION IS TO CHASSIS.

NON-UNDERWRITERS APPROVED MODELS DO NOT HAVE PART NOS. 8 AND 22, AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS.

## LOOP AERIAL

THE LOOP AERIAL SUPPLIED with the radio should provide ample reception in average locations.

Loop aerials are directional—the volume of a weak station may be improved, or undesired electrical noise may be reduced, by lifting and turning the radio to a different position. A trial will reveal position of best reception with least interference.

## OUTSIDE AERIAL

If the radio is used in shielded areas or located a great distance from broadcast stations, the volume of some or all stations may not be ample, in which case it would be necessary to ATTACH A 25-50 ft. OUTDOOR AERIAL TO THE BLUE LEAD COMING OUT OF THE REAR OF THE CHASSIS.

## GROUND

When a regular aerial is used, best result will be obtained with a ground attached to the black lead coming out of the rear of the chassis. WARNING — DO NOT ATTACH A GROUND DIRECT TO THE RADIO CHASSIS—ANY EXTERNAL GROUND CONNECTION TO ANY METAL PART OF THE CHASSIS WILL CAUSE A SHORT AND POSSIBLE DAMAGE.

## DIAL LIGHT

It is normal for the dial light to be dim for approximately 60 seconds after set is turned "on" and then attain normal brilliance—also, on very loud signals the light may fluctuate.

When replacing light, always use a 6.3 volt .150 ampere dial light.

For parts list, see P.16-19

SENTINEL RADIO CORP.

# ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

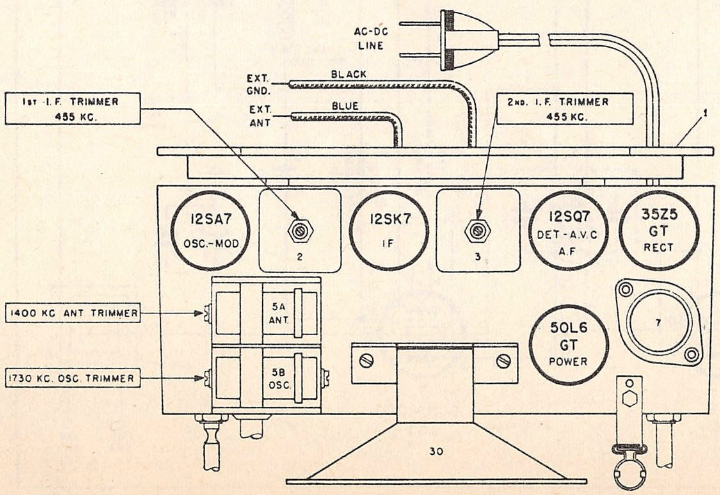
Before starting alignment:

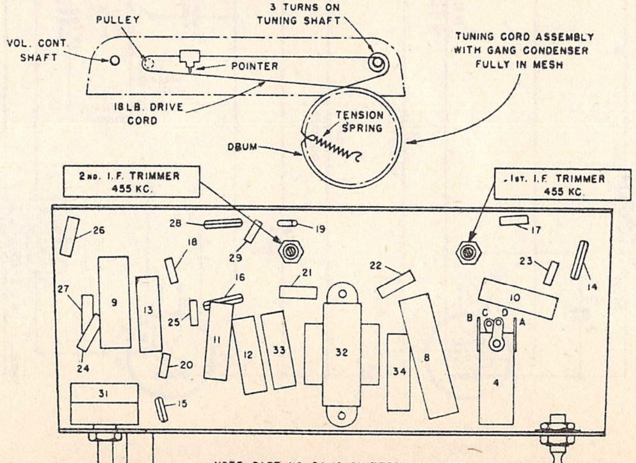
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

| Steps | Set receiver dial to: | TEST OSCILLATOR |  |  | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|
|  |  | Adjust test oscillator frequency to: | Use dummy antenna in series with output of test oscillator consisting of: | Attach output of test oscillator to: |  |
| 1 | Any point where no interfering signal is received. | 455 K. C. | .02 MFD. condenser | High side to rear stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser. | Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. |
| 2 | Exactly 1730 K. C. | Exactly 1730 K. C. | .00025 MFD. condenser | Receiver blue antenna lead<br>Receiver black ground lead | Adjust 1730 K. C. oscillator trimmer for maximum output. |
| 3 | Approx. 1400 K. C. | Exactly 1400 K. C. | .00025 MFD. condenser | Receiver blue antenna lead<br>Receiver black ground lead | While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output. |

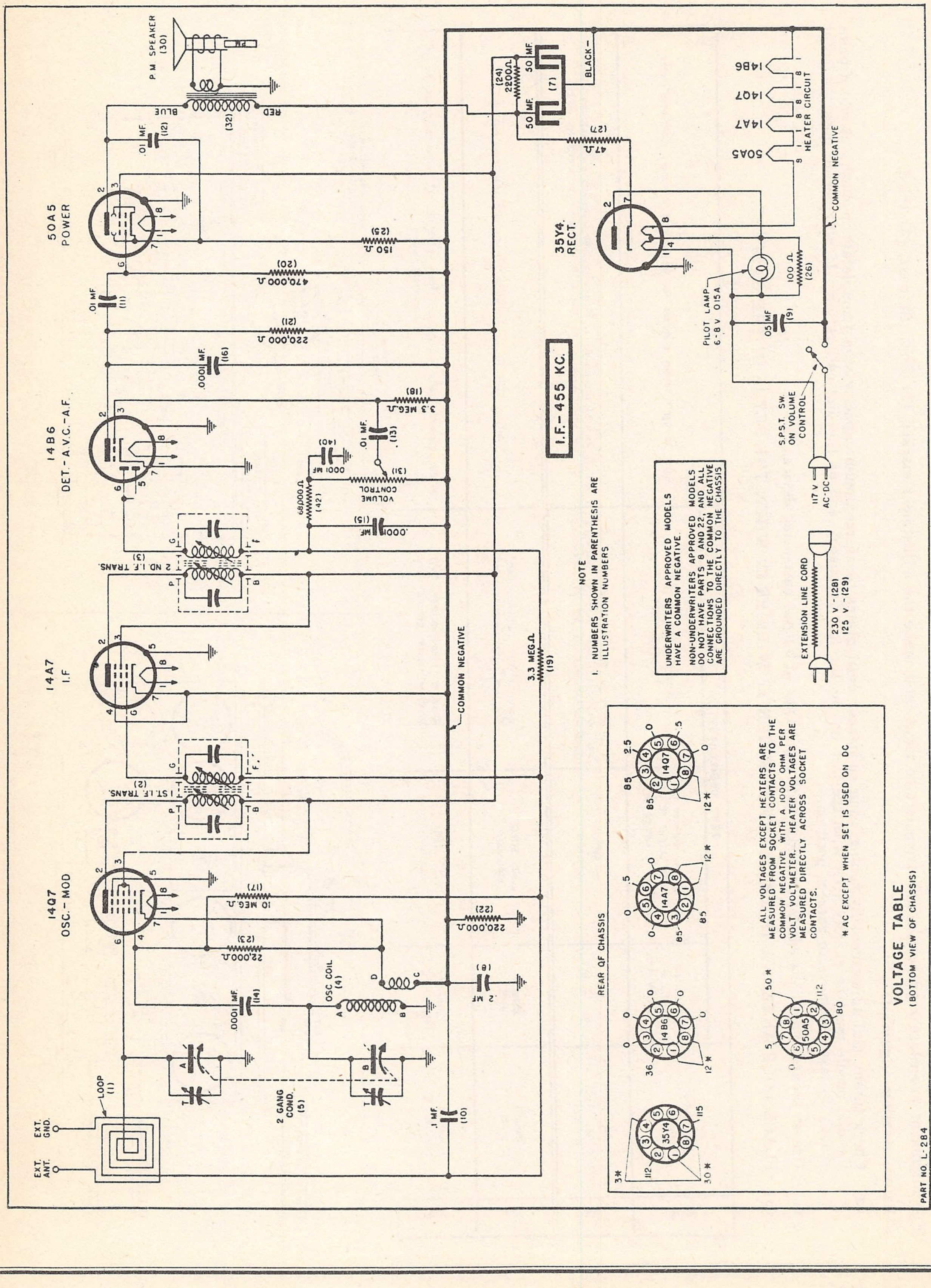

AC-DC LINE
EXT. GND.
BLACK
EXT. ANT
BLUE
1st I.F. TRIMMER 455 KC.
2nd. I.F. TRIMMER 455 KC.
1
12SA7 OSC.-MOD
2
12SK7 IF
3
12SQ7 DET-A.V.C A.F
35Z5 GT RECT
1400 KC ANT TRIMMER
1730 KC. OSC. TRIMMER
5A ANT
5B OSC
50L6 GT POWER
7
30


VOL. CONT SHAFT
PULLEY
3 TURNS ON TUNING SHAFT
POINTER
TUNING CORD ASSEMBLY WITH GANG CONDENSER FULLY IN MESH
18 LB. DRIVE CORD
TENSION SPRING
DRUM
2nd. I.F. TRIMMER 455 KC.
1st. I.F. TRIMMER 455 KC.
26
28
18
29
19
16
21
22
17
23
14
10
B C D A
27
9
13
25
11
12
33
32
34
8
4
24
20
31
15

NOTE-PART NO. 34 IS OMITTED ON UNDER-WRITERS APPROVED MODELS. PARTS NOS. 8 AND 22 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS, SEE WIRING DIAGRAM.

**MODELS L-284I, L-284NA, L-284NI, L-284NR, L-284W**

# SENTINEL RADIO CORP.


1407 OSC.-MOD
14A7 I.F.
14B6 DET.-A.V.C.-A.F.
50A5 POWER
35Y4 RECT.
P.M. SPEAKER (30)
BLUE
RED
(32)
LOOP (1)
EXT. ANT.
EXT. GND.
2 GANG COND. (5)
OSC COIL (4)
1ST I.F. TRANS. (2)
2 ND I.F. TRANS. (3)
VOLUME CONTROL (31)
COMMON NEGATIVE
3.3 MEG Ω (19)
10 MEG Ω (17)
22,000 Ω (23)
220,000 Ω (22)
.2 MF (8)
.1 MF (10)
.0001 MF (14)
.0001 MF (15)
680,000 Ω (42)
.0001 MF (40)
.01 MF (13)
3.3 MEG Ω (18)
.0001 MF (16)
220,000 Ω (21)
.01 MF (11)
470,000 Ω (20)
150 Ω (25)
.01 MF (12)
50 MF 50 MF (7)
(24) 2200 Ω
BLACK
47 Ω (27)
14B6 14Q7 14A7 50A5 HEATER CIRCUIT
PILOT LAMP 6-8 V 015A
100 Ω (26)
.05 MF (9)
S.P.S.T. SW. ON VOLUME CONTROL
117 V AC-DC
EXTENSION LINE CORD 230 V - (28) 125 V - (29)
REAR OF CHASSIS
35Y4
14B6
50A5
14A7
14Q7
115
112
30*
3*
36
12*
85
50*
80
2.5
5

I.F.- 455 KC.

NOTE

1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS

UNDERWRITERS APPROVED MODELS HAVE A COMMON NEGATIVE.

NON-UNDERWRITERS APPROVED MODELS DO NOT HAVE PARTS 8 AND 22, AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS

ALL VOLTAGES EXCEPT HEATERS ARE MEASURED FROM SOCKET CONTACTS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES ARE MEASURED DIRECTLY ACROSS SOCKET CONTACTS.

*AC EXCEPT WHEN SET IS USED ON DC

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

PART NO L-284

# ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.

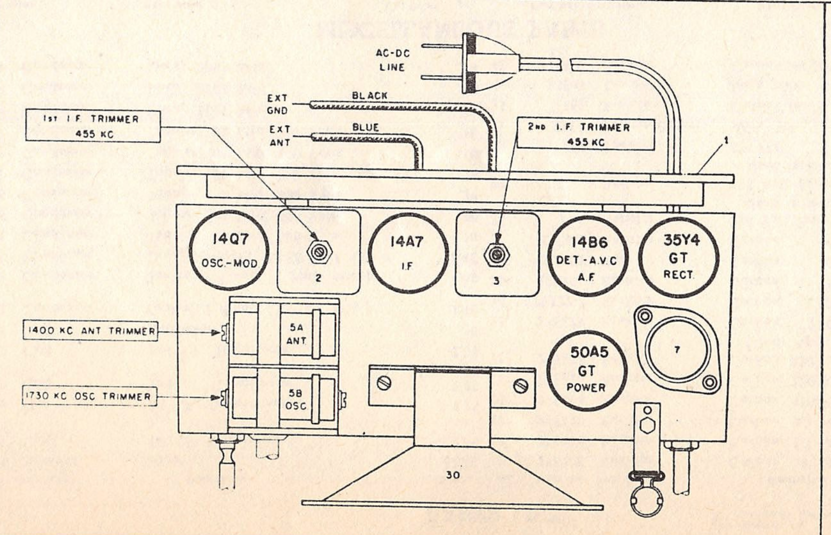
Before starting alignment:

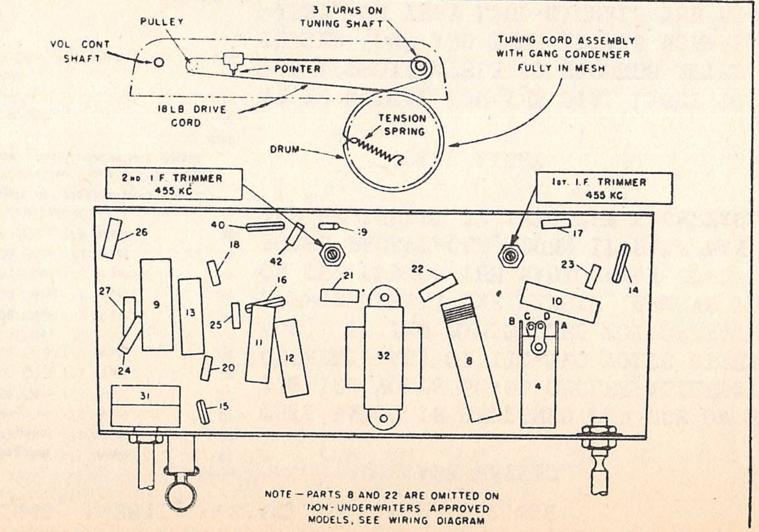
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

| Steps | Set receiver dial to: | TEST OSCILLATOR | | | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|
| | | Adjust test oscillator frequency to: | Use dummy antenna in series with output of test oscillator consisting of: | Attach output of test oscillator to: | |
| 1 | Any point where no interfering signal is received. | 455 K. C. | .02 MFD. condenser | High side to rear stator plates of tuning condenser. Low side to frame of condenser through a .02 Mfd. blocking condenser. | Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. |
| 2 | Exactly 1730 K. C. | Exactly 1730 K. C. | .00025 MFD. condenser | Receiver blue antenna lead<br>Receiver black ground lead | Adjust 1730 K. C. oscillator trimmer for maximum output. |
| 3 | Approx. 1400 K. C. | Exactly 1400 B. C. | .00025 MFD. condenser | Receiver blue antenna lead<br>Receiver black ground lead | While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output. |


AC-DC LINE
EXT GND
BLACK
EXT ANT
BLUE
1st I.F TRIMMER 455 KC
2nd I.F TRIMMER 455 KC
1
14Q7 OSC-MOD
2
14A7 I.F
3
14B6 DET-A.V.C A.F
35Y4 GT RECT
1400 KC ANT TRIMMER
5A ANT
1730 KC OSC TRIMMER
5B OSC
50A5 GT POWER
7
30


PULLEY
3 TURNS ON TUNING SHAFT
VOL CONT SHAFT
POINTER
TUNING CORD ASSEMBLY WITH GANG CONDENSER FULLY IN MESH
18LB DRIVE CORD
TENSION SPRING
DRUM
2nd I.F TRIMMER 455 KC
1st I.F TRIMMER 455 KC
26
40
19
17
18
42
21
22
23
14
27
9
13
16
25
11
12
32
8
10
B C D A
24
20
4
31
15

NOTE – PARTS 8 AND 22 ARE OMITTED ON NON-UNDERWRITERS APPROVED MODELS, SEE WIRING DIAGRAM

MODELS L-284I, L-284NA, L-284NI, L-284NR, L-284W
MODEL 247

## SENTINEL RADIO CORP.

## MODEL L-284W, L-284I, L-284NI, L-284NA, L-284NR

### PARTS LIST

| Ill. No. | Part No. | Part Name | Description | List Price |
|---|---|---|---|---|
| 1 | 20E24 | Antenna | Loop | $1.75 |
| 2 | 20E21 | Coil | 1st I.F. Transformer | 2.75 |
| | or | | | |
| 2 | 20E261 | Coil | 1st I.F. Transformer | 2.75 |
| 3 | 20E22 | Coil | 2nd I.F. Transformer | 2.75 |
| | or | | | |
| 3 | 20E261-2 | Coil | 2nd I.F. Transformer | 2.75 |
| 4 | 20E162 | Coil | Oscillator | .95 |
| 5 | 24E2 | Condenser | Tuning, 2 Gang (3 Hole Mtg.) | 3.40 |
| | or | | | |
| 5 | 24E18 | Condenser | Tuning, 2 Gang (2 Hole Mtg.) | 4.00 |
| 7 | 25E1 | Condenser | Dry Electrolytic, 50-50 Mfd. 150 V. | 1.40 |
| 8 | 23E421 | Condenser | Tubular, .2 Mfd. 400 Volts | .30 |
| 9 | 23E416 | Condenser | Tubular, .05 Mfd. 400 Volts | .20 |
| 10 | 23E418 | Condenser | Tubular, .1 Mfd. 400 Volts | .24 |
| 11 | 23E211 | Condenser | Tubular, .01 Mfd. 200 Volts | .18 |
| 12 | 23E211 | Condenser | Tubular, .01 Mfd. 200 Volts | .18 |
| 13 | 23E211 | Condenser | Tubular, .01 Mfd. 200 Volts | .18 |
| 14 | 23E39 | Condenser | Mica, .0001 Mfd. | .25 |
| 15 | 23E39 | Condenser | Mica, .0001 Mfd. | .25 |
| 16 | 23E39 | Condenser | Mica, .0001 Mfd. | .25 |
| 17 | 27E106 | Resistor | Carbon, 10 Megohm 1/3 Watt | .07 |
| 18 | 27E335 | Resistor | Carbon, 3.3 Megohm 1/3 Watt | .07 |
| 19 | 27E335 | Resistor | Carbon, 3.3 Megohm 1/3 Watt | .07 |
| 20 | 27E474 | Resistor | Carbon, 470,000 Ohm 1/3 Watt | .07 |
| 21 | 27E224 | Resistor | Carbon, 220,000 Ohm 1/3 Watt | .08 |
| 22 | 27E224 | Resistor | Carbon, 220,000 Ohm 1/3 Watt (Und. Appd. Only) | .08 |
| 23 | 27E223 | Resistor | Carbon, 22,000 Ohm 1/3 Watt | .08 |
| 24 | 27E222-3 | Resistor | Carbon, 2,200 Ohm 1 Watt | .14 |
| 25 | 27E151 | Resistor | Carbon, 150 Ohm 1/3 Watt | .08 |
| 26 | 27E101 | Resistor | Carbon, 100 Ohm 1/3 Watt | .08 |
| 27 | 27E470-2 | Resistor | Carbon, 47 Ohm 1/2 Watt | .08 |
| 28 | | Resistor | 230 Volt Extension Line Cord<br>Used in models not Underwriters Apprd. | |
| 29 | | Resistor | 125 Volt Extension Line Cord<br>Used in models not Underwriters Apprd. | |
| 30 | 1E9 | Speaker | 5" PM | 4.40 |
| 31 | 28E1 | Volume Control | With S.P.S.T. Switch | .75 |
| 32 | 22E2 | Transformer | Output for Speaker | 1.75 |
| 40 | 23E39 | Condenser | Mica, .0001 Mfd. | .25 |
| 42 | 27E683 | Resistor | Carbon, 68,000 Ohm, 1/3 Watt | .06 |

### MISCELLANEOUS PARTS

| Part No. | Part Name | Description | List Price |
|---|---|---|---|
| 7E31-1 | Cabinet | Walnut Plastic | $3.35 |
| 7E31-2 | Cabinet | Ivory Plastic | 4.85 |
| 7E1-1 | Cabinet | Amber Catalin | 17.00 |
| 7E1-5 | Cabinet | Ivory Catalin | 17.00 |
| 7E1-6 | Cabinet | Red Catalin | 17.00 |
| 7E70 | Cabinet Back | For Catalin Cabinet | .20 |
| 7E32 | Cabinet Back | For Walnut & Ivory Plastic Cabinets | .15 |
| 41E1 | Cord | 6 Ft. Rubber Line Cord | .40 |
| 20E12 | Dial Plate Assem. | Dial Back Plate Assem. Less Scale | .70 |
| 4E1 | Dial Cord | 30" of 18 Lb. Dial Drive Cord | .15 |
| 9E2 | Dial Crystal | Acetate Dial Crystal | .45 |
| 36E10 | Dial Scale | Calibrated Scale | .65 |
| 20E225-3 | Dial Shaft Assembly | Dial Drive Shaft with "C" Washer, Bearing & Lock Nut | .40 |
| 35E8 | Dial Pointer | Dial Indicator | .10 |
| 65E2 | Dial Spring | Tension Spring For Drive Cord, net | .02 |
| 37E17-1 | Knob | For Walnut Cabinet | .10 |
| 37E17-3 | Knob | For Ivory Cabinet | .10 |
| 37E29-4 | Knob | For Catalin Cabinet | .40 |
| 20E43 | Pilot Lamp Socket | Pilot Lamp Socket Assembly | .25 |
| 40E1 | Pilot Lamp | 6-8 Volt .150 Amp. Type 47 Lamp | .10 |

### VOLTAGE RATING

THIS RADIO IS DESIGNED FOR USE ON EITHER: 110-120 VOLTS 50-60 CYCLES ALTERNATING CURRENT (AC) OR 110-120 VOLTS DIRECT CURRENT (DC). IF THE RADIO DOES NOT OPERATE AFTER APPROXIMATELY ONE MINUTE, REMOVE THE PLUG ON THE END OF THE RADIO LINE CORD FROM THE POWER RECEPTACLE, TURN IT HALF WAY AROUND AND RE-INSERT IT INTO THE RECEPTACLE.

### DIAL LIGHT

IT IS NORMAL FOR THE DIAL LIGHT TO BE DIM FOR APPROXIMATELY 60 SECONDS AFTER SET IS TURNED "ON" AND THEN ATTAIN NORMAL BRILLIANCE —ALSO, ON VERY LOUD SIGNALS THE LIGHT MAY FLUCTUATE.

ALWAYS USE A 6.3 VOLT .150 AMPERE DIAL LIGHT.

## MODEL 247

### PARTS LIST

| Illus. No. | Part No. | Part Name | Description | List Price |
|---|---|---|---|---|
| 1 | 13275 | Antenna | Loop Assembly Mounted in Lid Cover. Mention Color of Cabinet. | $1.50 |
| 2 | 13262 | Coil | First I.F. Transformer | 1.25 |
| 3 | 13262 | Coil | Second I.F. Transformer | 1.25 |
| 4 | †13281 | Coil | Oscillator | .55 |
| 5 | 13143 | Condenser | Tuning (2 Gang) | 1.50 |
| 6 | 12935 | Condenser | Tubular Dry Elec. 40-40 Mfd. 150 V. | .75 |
| 7 | 13148 | Condenser | Tubular Dry Elec. 90 Mfd. 10 Volt. | .55 |
| 8 | 12630 | Condenser | Tubular .1 Mfd. 120 Volt | .19 |
| 9 | 12630 | Condenser | Tubular .1 Mfd. 120 Volt | .19 |
| 10 | 12630 | Condenser | Tubular .1 Mfd. 120 Volt | .19 |
| 11 | 12630 | Condenser | Tubular .1 Mfd. 120 Volt | .19 |
| 12 | 12631 | Condenser | Tubular .01 Mfd. 120 Volt | .19 |
| 13 | 12631 | Condenser | Tubular .01 Mfd. 120 Volt | .19 |
| 14 | 6591 | Condenser | Tubular .001 Mfd. 120 Volt | .19 |
| 15 | 1147 | Condenser | Tubular .05 Mfd. 200 Volt | .19 |
| 16 | 12631 | Condenser | Tubular .01 Mfd. 200 Volt | .19 |
| 17 | 12630 | Condenser | Tubular .1 Mfd. 120 Volt | .19 |
| 18 | 1275 | Condenser | Tubular .005 Mfd. 400 Volt | .18 |
| 19 | 9457 | Condenser | Tubular .05 Mfd. 400 Volt | .18 |
| 20 | 9458 | Condenser | Mica .00025 Mfd. + or — 20% | .21 |
| 21 | 9458 | Condenser | Mica .00025 Mfd. + or — 20% | .21 |
| 22 | 7954 | Condenser | Mica .0001 Mfd. + or — 20% | .21 |
| 23 | †13302 | Condenser | Mica .000275 Mfd. + or — 1% | .35 |
| 24 | 12632 | Resistor | Carbon 10 Meg Ohm 1/3 Watt | .19 |
| 25 | 12841 | Resistor | Carbon 4 Meg Ohm 1/3 Watt | .19 |
| 26 | 12841 | Resistor | Carbon 4 Meg Ohm 1/3 Watt | .19 |
| 27 | 12841 | Resistor | Carbon 4 Meg Ohm 1/3 Watt | .19 |
| 28 | 12224 | Resistor | Carbon 3 Meg Ohm 1/3 Watt | .19 |
| 29 | 12060 | Resistor | Carbon 1 Meg Ohm 1/3 Watt | .19 |
| 30 | 12840 | Resistor | Carbon 75,000 Ohm 1/3 Watt | .19 |
| 31 | 12840 | Resistor | Carbon 75,000 Ohm 1/3 Watt | .19 |
| 32 | 12699 | Resistor | Carbon 25,000 Ohm 1/3 Watt | .19 |
| 33 | 12634 | Resistor | Carbon 10,000 Ohm 1/3 Watt | .19 |
| 34 | 13168 | Resistor | Carbon 800 Ohm 1/3 Watt | .19 |
| 35 | 12898 | Resistor | Carbon 600 Ohm 1/3 Watt | .19 |
| 36 | 13193 | Resistor | Carbon 1,000 Ohm 1/3 Watt | .19 |
| 37 | *13149 | Resistor | Wire Wound 800 Ohms | .30 |
| 37 | ‡13364 | Resistor | Wire Wound 1220 & 1400 Ohm | .55 |
| 38 | *13266 | Resistor | Carbon 420 Ohm ½ Watt | .19 |
| 39 | 13150 | Resistor | Wire Wound 1,400 Ohm | .35 |
| 40 | 13247 | Resistor | Line Cord Assembly (625 Ohm) | 1.00 |
| 41 | 12605A | Speaker | P. M. (3½") | 2.00 |
| 42 | 13145 | Switch | Changeover | 1.10 |
| 43 | 12608 | Switch | Snap | .25 |
| 44 | 13141 | Transformer | Output | |
| 45 | 13144 | Volume Control | | .75 |

### MISCELLANEOUS PARTS

| Part No. | Part Name | Description | List Price |
|---|---|---|---|
| 13146 | Arm | For Voltage Selector Switch | $0.10 |
| 12956 | Bat. Connectors | B— & B+ Dot Snapper "B" Connectors (Set of Two) | .10 |
| 13152 | Battery Spring | "A" Battery Contacts | .05 |
| 13162 | Button Plug | Metal Plug for Cabinet Back | .08 |
| | Cabinet | Complete Cabinet Less Lid Assembly | 2.75 |
| | Cabinet Top | Top Section of Cabinet Only | 1.60 |
| | Cabinet Bottom | Bottom Section of Cabinet Only | 1.40 |
| 12735 | Chassis Plate | Metal Bottom Plate | .10 |
| 10335 | Chassis Fastener | Trimount Studs for Metal Bottom Plate (Pkg. of 12) | .10 |
| | Handle | For Cabinet | .35 |
| 12741 | Handle Ring | For Attaching Handle to Cabinet (Pkg. of 2) | .10 |
| 12795 | Knob Pointer | Dial Indicator | .15 |
| 12796 | Knob | For Tuning | .12 |
| 12851 | Knob | For Volume | .15 |
| 12609 | Latch Lift | Latch Lift Plate | .05 |
| 12610 | Latch Bar | Latch Lift Bar | .05 |
| 12738 | Lock Assembly | Lock Used to Hold Two Halves of Cabinet Together | .15 |
| 13064 | Loop Jack | External Loop Jack | .12 |
| 13147 | Plug | Three Prong | .20 |
| 13164 | Socket | Female Receptacle Used on Resistor Line Cord | .15 |

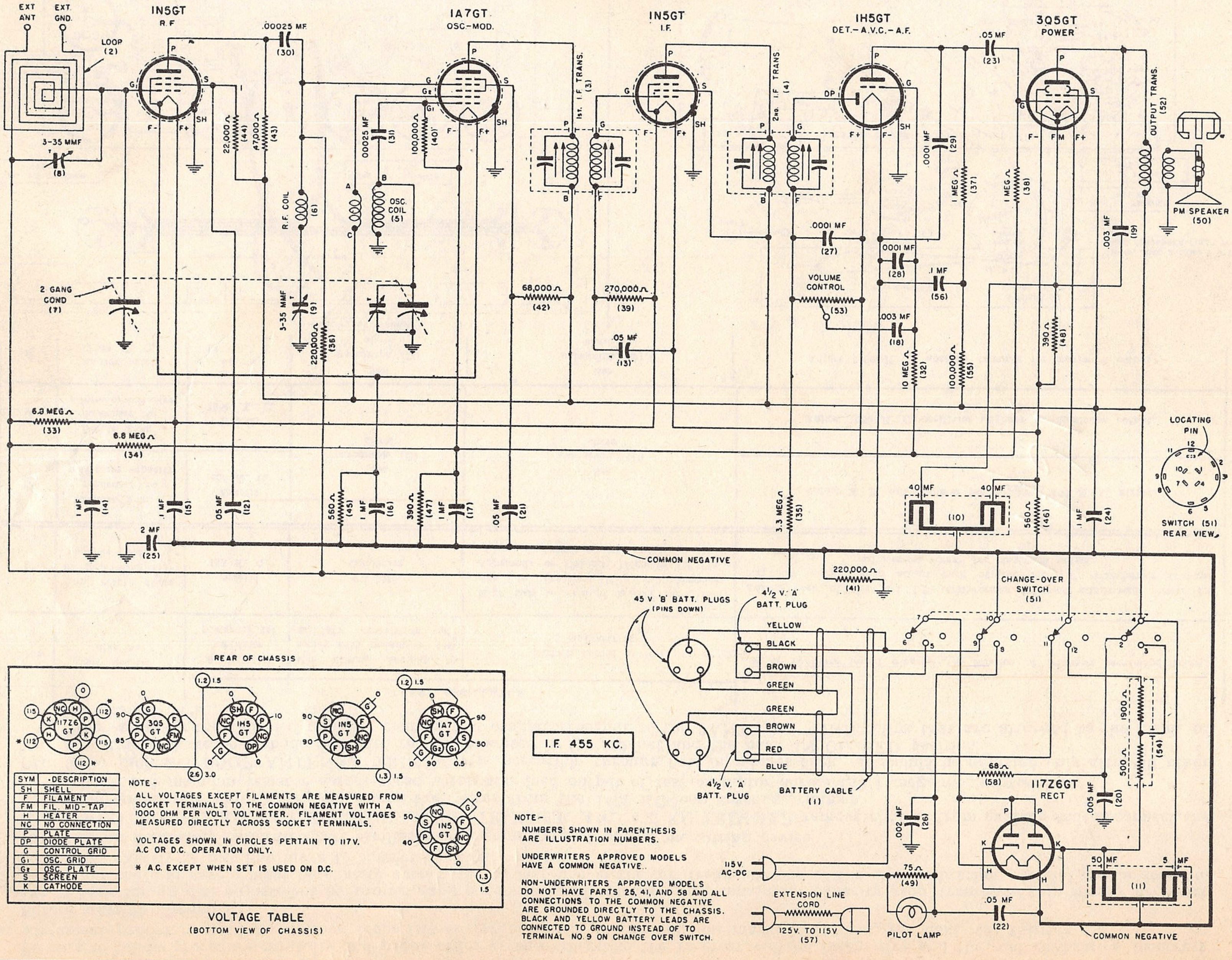
*NOTE: These resistors were used in first production only, they were replaced with 1 No. 13245a 950 Ohm Wire Wound and 1 No. 13267a 270 Ohm 1 Watt Resistor.

‡Part No. 13364 Wire Wound Resistor having 1220 and 1400 Ohm sections replaced No. 13149, 13266 and 13150 Resistors in latest production.

†NOTE—Replaces part No. 13142 Oscillator Coil and 13179 Mica .00024 Mfd. Padder Condenser which were used in first production. It is important to remember that the 13142 and 13281 Oscillator Coils and 13179 .00024 Mfd. and 13302 .000275 Mfd. Condenser cannot be interchanged. When 13281 Coil is used the .000275 Mfd. Padder Condenser 13302 must be used.
With 13142 Oscillator Coil the .00024 Mfd. Condenser 13179 must be used.
Sets having part No. 13281 Oscillator Coil and 13302 Mica .000275 Condenser can be identified by the letter "A" which will be found stamped on the back of the chassis.

# SENTINEL RADIO CORP.

**MODELS 285P,1U285P**


EXT ANT
EXT. GND.
LOOP (2)
3-35 MMF (8)
IN5GT R.F
.00025 MF (30)
22,000Ω (44)
47,000Ω (43)
R.F. COIL (6)
3-35 MMF (9)
220,000Ω (36)
2 GANG COND (7)
IA7GT OSC-MOD.
.00025 MF (31)
100,000Ω (40)
OSC. COIL (5)
1st. I.F. TRANS. (3)
68,000Ω (42)
IN5GT I.F.
270,000Ω (39)
.05 MF (13)
2nd. I.F. TRANS. (4)
IH5GT DET.-A.V.C.-A.F.
.0001 MF (27)
VOLUME CONTROL (53)
.0001 MF (28)
.003 MF (18)
10 MEG Ω (32)
.0001 MF (29)
1 MEG Ω (37)
.1 MF (56)
100,000Ω (55)
.05 MF (23)
1 MEG Ω (38)
390Ω (48)
3Q5GT POWER
.003 MF (19)
OUTPUT TRANS. (52)
PM SPEAKER (50)
6.3 MEG Ω (33)
6.8 MEG Ω (34)
1 MF (14)
2 MF (25)
.1 MF (15)
.05 MF (12)
560Ω (45)
.1 MF (16)
390Ω (47)
.1 MF (17)
.05 MF (21)
3.3 MEG Ω (35)
COMMON NEGATIVE
40 MF 40 MF (10)
560Ω (46)
.1 MF (24)
LOCATING PIN
SWITCH (51) REAR VIEW
220,000Ω (41)
CHANGE-OVER SWITCH (51)
45 V 'B' BATT. PLUGS (PINS DOWN)
4½ V. 'A' BATT. PLUG
YELLOW
BLACK
BROWN
GREEN
GREEN
BROWN
RED
BLUE
4½ V. 'A' BATT. PLUG
BATTERY CABLE (1)
1900Ω
500Ω (54)
68Ω (58)
.005 MF (20)
.002 MF (26)
117Z6GT RECT
115V AC-DC
75Ω (49)
EXTENSION LINE CORD 125V. TO 115V (57)
PILOT LAMP
.05 MF (22)
50 MF 5 MF (11)
COMMON NEGATIVE
I.F. 455 KC.
REAR OF CHASSIS
117Z6 GT
3Q5 GT
IH5 GT
IN5 GT
IA7 GT
IN5 GT

| SYM | ·DESCRIPTION |
|---|---|
| SH | SHELL |
| F | FILAMENT |
| FM | FIL. MID-TAP |
| H | HEATER |
| NC | NO CONNECTION |
| P | PLATE |
| DP | DIODE PLATE |
| G | CONTROL GRID |
| $G_1$ | OSC. GRID |
| $G_2$ | OSC. PLATE |
| S | SCREEN |
| K | CATHODE |

NOTE -

ALL VOLTAGES EXCEPT FILAMENTS ARE MEASURED FROM SOCKET TERMINALS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER. FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

VOLTAGES SHOWN IN CIRCLES PERTAIN TO 117V. A.C OR D.C. OPERATION ONLY.

* A.C. EXCEPT WHEN SET IS USED ON D.C.

VOLTAGE TABLE

(BOTTOM VIEW OF CHASSIS)

NOTE -

NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

UNDERWRITERS APPROVED MODELS HAVE A COMMON NEGATIVE.

NON-UNDERWRITERS APPROVED MODELS DO NOT HAVE PARTS 25, 41, AND 58 AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS. BLACK AND YELLOW BATTERY LEADS ARE CONNECTED TO GROUND INSTEAD OF TO TERMINAL NO. 9 ON CHANGE OVER SWITCH.

## ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect
For alignment procedure read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third, etc.

Before starting alignment:

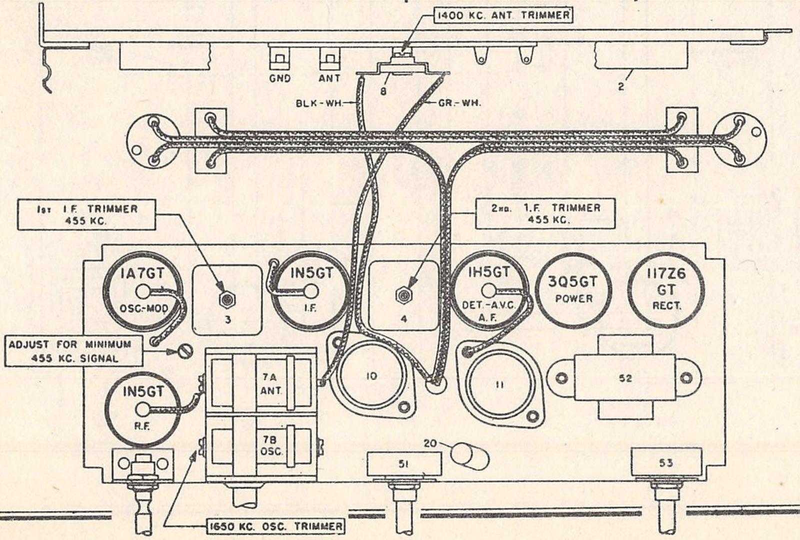
(a) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

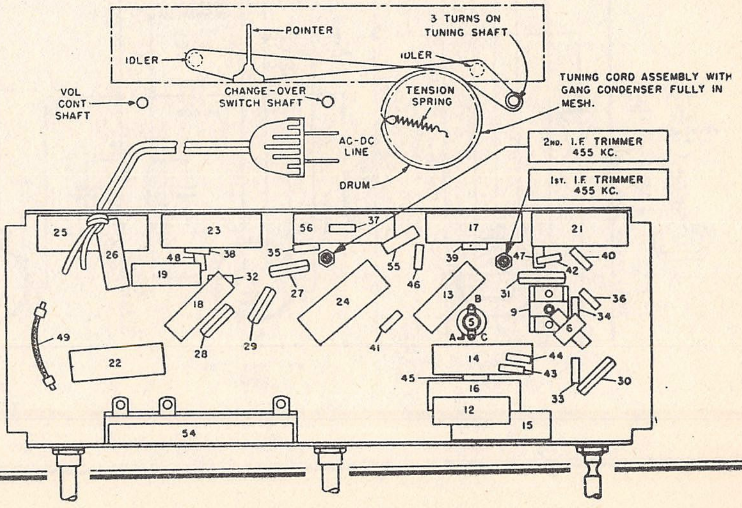
(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) WHEN ADJUSTING 1650 KC OSCILLATOR TRIMMER AND 455 KC TRIMMER remove chassis from cabinet and disconnect the white-green and white-black loop connection wires from the 1400 KC loop antenna trimmer.
Attach a 1 megohm resistor across these wires and feed output of test oscillator across the 1 megohm resistor.

(d) THE 1400 KC LOOP ANTENNA TRIMMER is accessible through hole in cabinet back. It should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet and the back IN CLOSED position.
When aligning the 1400 KC trimmer connect test oscillator output to the "ANT" and "GND" clips that are attached to the inside of the cabinet back.

| Steps | Set receiver dial to: | TEST OSCILLATOR | | | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|
| | | Adjust test oscillator frequency to: | Use dummy antenna in series with output of test oscillator consisting of: | Attach output of test oscillator to | |
| 1 | Any point where no interfering signal is received | Exactly 455 K. C. | 0.2 Mfd. Condenser | High side to grid of 1A7GT tube, Low side to chassis (if non-Underwriter Approved) or Common Negative (if Underwriter Approved). | Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output. |
| 2 | Rotate gang condenser to maximum capacity | Exactly 455 K. C. | See paragraph (C) above | See paragraph (C) above | Adjust R. F. coil trimmer for **minimum** 455 K. C. signal. |
| 3 | Rotate gang condenser to minimum capacity | Exactly 1650 K. C. | | | Adjust 1650 K. C. oscillator trimmer for maximum output. |
| 4 | Approximately 1400 K. C. | Approx. 1400 K. C. | See paragraph (D) above | See paragraph (D) above | Adjust 1400 K. C. antenna trimmer for maximum output. |


1400 KC. ANT TRIMMER
GND
ANT
BLK-WH.
GR.-WH.
8
2
1st I.F. TRIMMER 455 KC.
2ND. I.F. TRIMMER 455 KC.
1A7GT OSC-MOD
3
IN5GT I.F.
4
IH5GT DET.-A.V.C. A.F.
3Q5GT POWER
117Z6 GT RECT.
ADJUST FOR MINIMUM 455 KC. SIGNAL
IN5GT R.F.
7A ANT.
7B OSC.
10
11
52
20
51
53
1650 KC. OSC. TRIMMER


POINTER
3 TURNS ON TUNING SHAFT
IDLER
IDLER
VOL CONT SHAFT
CHANGE-OVER SWITCH SHAFT
TENSION SPRING
TUNING CORD ASSEMBLY WITH GANG CONDENSER FULLY IN MESH.
AC-DC LINE
DRUM
2ND. I.F. TRIMMER 455 KC.
1st. I.F. TRIMMER 455 KC.
25
26
23
48
38
19
35
56
37
17
21
47
42
40
32
27
18
28
29
24
55
46
39
13
31
B
C
A
9
6
36
34
49
22
41
14
44
43
45
16
12
15
33
30
54

# SENTINEL RADIO CORP.

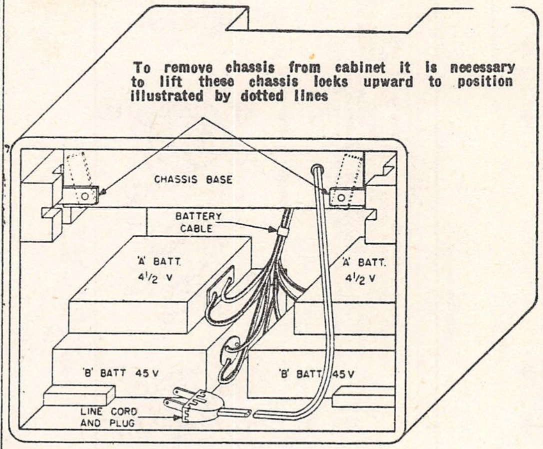
**MODELS 285P,1U285P**

## PARTS LIST

| Illus. No. | Part No. | Part Name | Description |
|---|---|---|---|
| 1 | 20E79 | Cable | Battery with 2 "B" and 2 "A" Plugs |
| 2 | 20E82 | Coil | Honey Comb Type Loop with Back |
| | | or | |
| 2 | 20E160-1 | Coil | Flat Type Loop with Back |
| 3 | 20E53 | Coil | 1st I.F. Transformer |
| 4 | 20E54 | Coil | 2nd I.F. Transformer |
| 5 | 20E52 | Coil | Oscillator |
| 6 | 2E19 | Coil | R. F. |
| 7 | 24E2 | Condenser | Tuning, 2 Gang, 2 Hole Mtg—with Pulley |
| | | or | |
| 7 | 24E18 | Condenser | Tuning, 2 Gang, 3 Hole Mtg—with Pulley |
| 8 | 24E3 | Condenser | Trimmer, 3-35 MMF |
| 9 | 24E3 | Condenser | Trimmer, 3-35 MMF |
| 10 | 25E4 | Condenser | Dry Elec. 40-40 Mfd. 25 Volt |
| | | or | |
| 10 | 25E18 | Condenser | Dry Elec. 50-50 Mfd. 150 Volt, Und. Approved Models only |
| 11 | 25E1 | Condenser | Dry Elec. 50-50 Mfd. 150 Volt |
| | | or | |
| 11 | 25E17 | Condenser | Dry Elec. 40-40 Mfd. 25 Volt, Und. Approved Models only |
| 12 | 23E216 | Condenser | Tubular, .05 Mfd. 200 Volt |
| 13 | 23E216 | Condenser | Tubular, .05 Mfd. 200 Volt |
| 14 | 23E218 | Condenser | Tubular, .1 Mfd. 200 Volt |
| 15 | 23E218 | Condenser | Tubular, .1 Mfd. 200 Volt |
| 16 | 23E218 | Condenser | Tubular, .1 Mfd. 200 Volt |
| 17 | 23E218 | Condenser | Tubular, .1 Mfd. 200 Volt |
| 18 | 23E406 | Condenser | Tubular, .003 Mfd. 400 Volt |
| 19 | 23E406 | Condenser | Tubular, .003 Mfd. 400 Volt |
| 20 | 23E408 | Condenser | Tubular, .005 Mfd. 400 Volt |
| 21 | 23E416 | Condenser | Tubular, .05 Mfd. 400 Volt |
| 22 | 23E416 | Condenser | Tubular, .05 Mfd. 400 Volt |
| 23 | 23E416 | Condenser | Tubular, .05 Mfd. 400 Volt |
| 24 | 23E418 | Condenser | Tubular, .1 Mfd. 400 Volt |
| 25 | 23E421 | Condenser | Tubular, .2 Mfd. 400 Volt Und. App'd Only |
| 26 | 23E405 | Condenser | Tubular, .002 Mfd. 400 Volt |
| 27 | 23E39 | Condenser | Mica, .0001 Mfd |
| 28 | 23E39 | Condenser | Mica, .0001 Mfd |
| 29 | 23E39 | Condenser | Mica, .0001 Mfd |
| 30 | 23E42 | Condenser | Mica, .00025 Mfd |
| 31 | 23E42 | Condenser | Mica, .00025 Mfd |
| 32 | 27E106 | Resistor | Carbon, 10 Megohm, 1/3 W. |
| 33 | 27E685 | Resistor | Carbon, 6.8 Megohm, 1/3 W. |
| 34 | 27E685 | Resistor | Carbon, 6.8 Megohm, 1/3 W. |
| 35 | 27E335 | Resistor | Carbon 3.3 Megohm, 1/3 W. |
| 36 | 27E224 | Resistor | Carbon, 220,000 Ohm, 1/3 W. |
| 37 | 27E105 | Resistor | Carbon, 1 Megohm, 1/3 W. |
| 38 | 27E105 | Resistor | Carbon, 1 Megohm, 1/3 W. |
| 39 | 27E1002 | Resistor | Carbon, 270,000 Ohm, 1/3 W. |
| 40 | 27E104 | Resistor | Carbon, 100,000 Ohm, 1/3 W. |
| 41 | 27E224 | Resistor | Carbon, 220,000 Ohm, 1/3 W. Und. App'd Only |
| 42 | 27E683 | Resistor | Carbon, 68,000 Ohm, 1/3 W. |
| 43 | 27E473 | Resistor | Carbon, 47,000 Ohm, 1/3 W. |
| 44 | 27E223 | Resistor | Carbon, 22,000 Ohm, 1/3 W. |
| 45 | 27E561 | Resistor | Carbon, 560 Ohm, 1/3 W. |
| 46 | 27E561 | Resistor | Carbon, 560 Ohm, 1/3 W. |
| 47 | 27E391 | Resistor | Carbon, 390 Ohm, 1/3 W. |
| 48 | 27E391 | Resistor | Carbon, 390 Ohm, 1/3 W. |
| 49 | 27E1001 | Resistor | Flexible Wire Wound 75 Ohm, 2 W. |
| 50 | 1E12 | Speaker | 5" PM |
| 51 | 29E5 | Switch | Changeover |
| 52 | 22E9 | Transformer | Output |
| | | or | |
| 52 | 22E7 | Transformer | Output—Und. Approved Models only |
| 53 | 28E6 | Volume Control | 1 Megohm |
| | | or | |
| 53 | 28E12 | Volume Control | 1 Megohm—Und. Approved only |
| 54 | 27E1000 | Resistor | Fixed Wire Wound 2 Sect. Candohm |
| 55 | 27E104 | Resistor | Carbon, 100,000 Ohm, 1/3 W. |
| 56 | 23E218 | Condenser | Tubular, .1 Mfd. 200 Volt |
| 58 | 27E680 | Resistor | Carbon 68 Ohm 1/3 W. |

## MISCELLANEOUS RARTS

| Part No. | Part Name | Description |
|---|---|---|
| 20E79 | Battery Cable | Complete with "A" & "B" Batt. Plugs |
| 17E3-2 | "A" Battery Plug | 2 Prong "A" Battery Plug |
| 17E3-5 | "B" Battery Plug | 3 Prong "B" Battery Plug |
| 7E43-1 | Cabinet | Complete Cabinet, less Back |
| 7E44-1 | Cabinet Back | Back only, for Honey-Comb Type Loop |
| 7E87-1 | Cabinet Back | Back only, for Flat Type Loop |
| 20E78 | Dial Plate Assem. | Dial Back Plate |
| 9E4 | Dial Crystal | Acetate Crystal |
| 4E1 | Dial Cord | 18 lb. Dial Drive Cord |
| 48E1 | Dial Escutcheon | Plastic Escutcheon |
| 36E15 | Dial Scale | Calibrated Dial Scale |
| 65E2 | Dial Spring | Tension Spring for Drive Cord |
| 68E5 | Dial Shaft | Dial Drive Shaft |
| 35E10 | Dial Pointer | For Dial |
| 37E21-1 | Knob | |
| 37E21-3 | Knob | Marked "AC-DC-OFF-BATT" |
| 20E25 | Pilot Lamp Socket | Pilot Lamp Socket Assembly |
| 40E2 | Pilot Lamp | 6-8 Volt .250 Amp. Type No. 44 Lamp |


To remove chassis from cabinet it is necessary to lift these chassis locks upward to position illustrated by dotted lines

TO INSTALL BATTERIES, OPEN CABINET BACK AND PLACE BATTERIES AS SHOWN.

FOR AC/DC OPERATION, BRING LINE CORD THROUGH OPENING IN RIGHT SIDE OF CABINET BACK.

ALWAYS KEEP BACK CLOSED.

## ELECTRIC OPERATION

To operate the receiver on 110 to 120 Volt direct current or 110 to 120 Volt, 50 to 60 Cycle, alternating current:

(A) Open hinged cabinet back outward by pulling on the tab attached to the right side of the back, then take out the power line cord, and reclose back.

(B) Insert line cord plug into 110 to 120 Volt AC or DC electric power outlet.

(C) Turn voltage selector knob to center "AC-DC" position.

If the current supply is DIRECT CURRENT and the radio does not play after it has been turned on for approximately one minute, reverse radio plug connection at electric power receptacle.

## INSTALLATION OF REQUIRED BATTERIES

Diagram shows proper location and connections of the following required types of batteries.

2 Sentinel number 38A 4½ Volt "A" Batteries or equivalent such as Ray-O-Vac type 83A, etc.

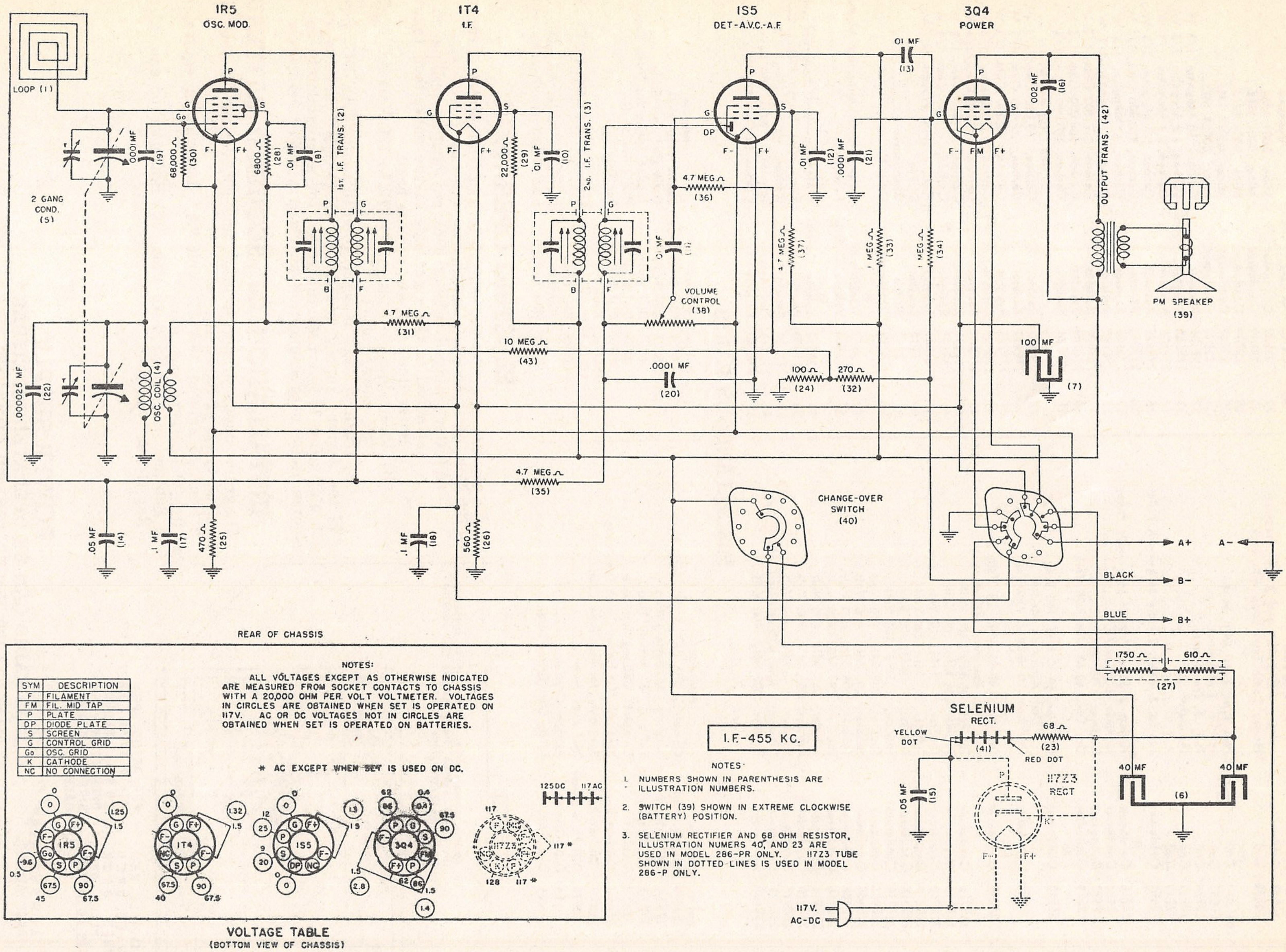
2 Sentinel number 3870 45 Volt "B" Batteries or equivalent such as Ray-O-Vac type 7830.

## POWER SUPPLY

THIS RADIO CAN BE OPERATED ON EITHER:
110 TO 120 VOLTS DIRECT CURRENT
OR
110 TO 120 VOLT, 50 TO 60 CYCLE ALTERNATING CURRENT
OR
BATTERIES—2 - 4½ VOLT "A" AND 2 - 45 VOLT "B"

**MODELS 286P,286PR**

# SENTINEL RADIO CORP.


IR5
OSC. MOD.
IT4
I.F.
IS5
DET-A.V.C.-A.F.
3Q4
POWER
LOOP (1)
2 GANG COND. (5)
.0001 MF (19)
68,000 ∿ (30)
6800 ∿ (28)
.01 MF (8)
1st. I.F. TRANS. (2)
22,000 ∿ (29)
.01 MF (10)
2nd. I.F. TRANS. (3)
4.7 MEG ∿ (36)
.01 MF (11)
VOLUME CONTROL (38)
4.7 MEG ∿ (37)
.01 MF (12)
.0001 MF (21)
1 MEG ∿ (33)
1 MEG ∿ (34)
.01 MF (13)
.002 MF (16)
OUTPUT TRANS. (42)
PM SPEAKER (39)
100 MF (7)
4.7 MEG ∿ (31)
10 MEG ∿ (43)
.0001 MF (20)
100 ∿ (24)
270 ∿ (32)
.000025 MF (22)
OSC. COIL (4)
4.7 MEG ∿ (35)
.05 MF (14)
.1 MF (17)
470 ∿ (25)
.1 MF (18)
560 ∿ (26)
CHANGE-OVER SWITCH (40)
A+
A−
BLACK
B−
BLUE
B+
1750 ∿
610 ∿
(27)
SELENIUM RECT.
YELLOW DOT
(41)
68 ∿
(23)
RED DOT
117Z3 RECT
40 MF
40 MF
(6)
.05 MF (15)
117V. AC-DC
REAR OF CHASSIS
125DC
117AC
117
117 *
128
117 *

**I.F.-455 KC.**

NOTES·

1. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. SWITCH (39) SHOWN IN EXTREME CLOCKWISE (BATTERY) POSITION.
3. SELENIUM RECTIFIER AND 68 OHM RESISTOR, ILLUSTRATION NUMERS 40, AND 23 ARE USED IN MODEL 286-PR ONLY. 117Z3 TUBE SHOWN IN DOTTED LINES IS USED IN MODEL 286-P ONLY.

| SYM | DESCRIPTION |
|---|---|
| F | FILAMENT |
| FM | FIL. MID TAP |
| P | PLATE |
| DP | DIODE PLATE |
| S | SCREEN |
| G | CONTROL GRID |
| Go | OSC. GRID |
| K | CATHODE |
| NC | NO CONNECTION |

NOTES:

ALL VOLTAGES EXCEPT AS OTHERWISE INDICATED ARE MEASURED FROM SOCKET CONTACTS TO CHASSIS WITH A 20,000 OHM PER. VOLT VOLTMETER. VOLTAGES IN CIRCLES ARE OBTAINED WHEN SET IS OPERATED ON 117V. AC OR DC VOLTAGES NOT IN CIRCLES ARE OBTAINED WHEN SET IS OPERATED ON BATTERIES.

* AC EXCEPT WHEN SET IS USED ON DC.

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

# ALIGNMENT PROCEDURE

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure, read tabulations from left to right. Make the adjustment marked (1) first, (2) next, (3) third.

**ALWAYS HAVE METAL BOTTOM PLATE MOUNTED ON CHASSIS WHEN ALIGNING SET.**

Before starting alignment:

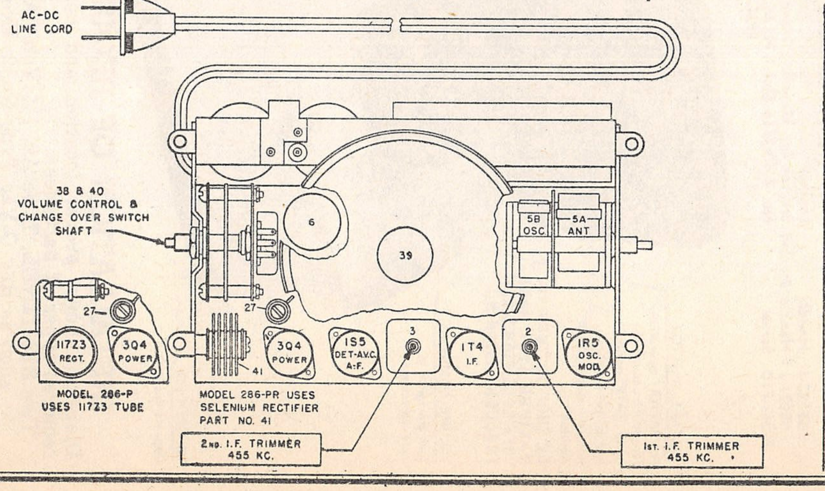
(A) Check tuning dial adjustment by tuning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the bottom edge of the large 5 in the 55 calibration number at the low frequency end of the dial scale. If dial indicator does not point exactly to the bottom edge of the large 5, move knob to correct position.

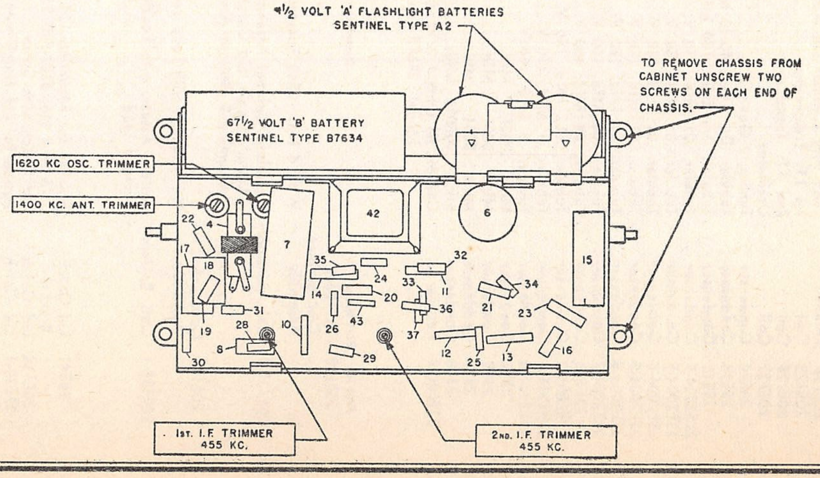
(B) Use an accurately calibrated test oscillator with some type of output measuring device.

(C) WHEN ADJUSTING THE 1620 KC OSCILLATOR TRIMMER, remove chassis from cabinet and disconnect the loop connection wires from the loop. Attach a 1 megohm resistor across these connections and feed output of test oscillator across the 1 megohm resistor.

(D) THE 1400 KC LOOP ANTENNA TRIMMER should be adjusted only after all other adjustments have been made and with the set mounted in the cabinet, and the loop in an upright position. When aligning the 1400 KC Antenna Trimmer, couple test oscillator to receiver loop by: (1) make loop consisting of five to ten turns of No. 20 to No. 30 size wire, wound on a 2" or 3" form; (2) connect this loop across output of test oscillator; (3) place test oscillator loop near radio loop. BE SURE THAT NEITHER LOOP MOVES WHILE ALIGNING.

| Steps | Set receiver dial to: | TEST OSCILLATOR | | | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|
| | | Adjust test oscillator frequency to: | Use dummy antenna in series with output of test oscillator consisting of: | Attach output of test oscillator to | |
| 1 | Any point where no interfering signal is received | Exactly 455 K. C. | 0.2 Mfd. Condenser | High side to grid of 1R5 tube. Low side to chassis. | Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output. |
| 2 | Rotate gang condenser to minimum capacity | Exactly 1620 K. C. | See paragraph (C) above | See paragraph (C) above | Adjust 1620 K. C. oscillator trimmer for maximum output. |
| 3 | Approximately 1400 K. C. | Approx. 1400 K. C. | See paragraph (D) above | See paragraph (D) above | Adjust 1400 K. C. antenna trimmer for maximum output. |


AC-DC LINE CORD
38 & 40 VOLUME CONTROL & CHANGE OVER SWITCH SHAFT
6
39
5B OSC.
5A ANT
27
11723 RECT.
3Q4 POWER
41
3Q4 POWER
1S5 DET-AVC. A-F.
3
1T4 I.F.
2
1R5 OSC. MOD.
MODEL 286-P USES 11723 TUBE
MODEL 286-PR USES SELENIUM RECTIFIER PART NO. 41
2ND. I.F. TRIMMER 455 KC.
1ST. I.F. TRIMMER 455 KC.


4½ VOLT 'A' FLASHLIGHT BATTERIES SENTINEL TYPE A2
TO REMOVE CHASSIS FROM CABINET UNSCREW TWO SCREWS ON EACH END OF CHASSIS.
67½ VOLT 'B' BATTERY SENTINEL TYPE B7634
1620 KC OSC. TRIMMER
1400 KC. ANT. TRIMMER
42
6
7
15
22
4
17
18
19
30
31
28
8
10
35
14
24
26
43
20
33
11
32
36
37
29
34
21
23
12
25
13
16
1ST. I.F. TRIMMER 455 KC.
2ND. I.F. TRIMMER 455 KC.

**MODELS 286P,286PR**

# SENTINEL RADIO CORP.

## PARTS LIST

| Illus. No. | Part No. | Part Name | Description | List Price |
|---|---|---|---|---|
| 1 | 20E134 | Antenna | Loop with Cabinet Lid Assem. | $3.55 |
| 2 | 20E125 | Coil | 1st I.F. Transformer | 3.00 |
| 3 | 20E125 | Coil | 2nd I.F. Transformer | 3.00 |
| 4 | 20E127 | Coil | Oscillator | 1.00 |
| 5 | 24E20 | Condenser | Tuning, 2 Gang | 3.40 |
| 6 | 25E13 | Condenser | Tubular, Dry Elect. 40-40 Mfd. 150 Volt | 1.15 |
| 7 | 25E12 | Condenser | Tubular, Dry Elect. 100 Mfd. 10 Volt | .80 |
| 8 | 23E2004-5 | Condenser | Tubular, .01 Mfd. 150 V. | .40 |
| 10 | 23E2004-5 | Condenser | Tubular, .01 Mfd. 150 V. | .40 |
| 11 | 23E2004-5 | Condenser | Tubular, .01 Mfd. 150 V. | .40 |
| 12 | 23E2004-5 | Condenser | Tubular, .01 Mfd. 150 V. | .40 |
| 13 | 23E2004-5 | Condenser | Tubular, .01 Mfd. 150 V. | .40 |
| 14 | 23E2004-7 | Condenser | Tubular, .05 Mfd. 150 V. | .40 |
| 15 | 23E416 | Condenser | Tubular, .05 Mfd. 400 V. | .25 |
| 16 | 23E2004-2 | Condenser | Tubular, .002 Mfd. 150 V. | .40 |
| 17 | 23E2004-8 | Condenser | Tubular, .1 Mfd. 150 V. | .45 |
| 18 | 23E2004-8 | Condenser | Tubular, .1 Mfd. 150 V. | .45 |
| 19 | 23E9 | Condenser | Mica, .0001 Mfd. | .20 |
| 20 | 23E9 | Condenser | Mica, .0001 Mfd. | .20 |
| 21 | 23E9 | Condenser | Mica, .0001 Mfd. | .20 |
| 22 | 23E8 | Condenser | Mica, .000025 Mfd. | .23 |
| 23 | 27E680-2 | Resistor | Carbon, 68 Ohm 1/2 W. (used in Model 286PR only) | .07 |

| Illus. No. | Part No. | Part Name | Description | List Price |
|---|---|---|---|---|
| 24 | 27E101-7 | Resistor | Carbon, 100 Ohm, 1/4 W. | .07 |
| 25 | 27E471-7 | Resistor | Carbon, 470 Ohm, 1/4 W. | .06 |
| 26 | 27E561-7 | Resistor | Carbon, 560 Ohm, 1/4 W. | .06 |
| 27 | 27E1003 | Resistor | Wire Wound 1750 and 610 Ohms, 7 W. | .85 |
| 28 | 27E682-7 | Resistor | Carbon, 6,800 Ohm, 1/4 W. | .06 |
| 29 | 27E223-7 | Resistor | Carbon, 22,000 Ohm, 1/4 W. | .06 |
| 30 | 27E683-7 | Resistor | Carbon, 68,000 Ohm, 1/4 W. | .06 |
| 3' | 27E475-7 | Resistor | Carbon, 4.7 Megohm, 1/4 W. | .06 |
| 32 | 27E271-7 | Resistor | Carbon, 270 Ohm, 1/4 W. | .08 |
| 33 | 27E105-7 | Resistor | Carbon, 1 Meg Ohm, 1/4 W. | .06 |
| 34 | 27E105-7 | Resistor | Carbon, 1 Meg Ohm, 1/4 W. | .06 |
| 35 | 27E475-7 | Resistor | Carbon, 4.7 Meg Ohm, 1/4 W. | .06 |
| 36 | 27E475-7 | Resistor | Carbon, 4.7 Meg Ohm, 1/4 W. | .06 |
| 37 | 27E475-7 | Resistor | Carbon, 4.7 Meg Ohm, 1/4 W. | .06 |
| 38 | 28E14 | Vol. Control | 2 Megohm | .80 |
| 39 | 1E19 | Speaker | 4 Inch P.M. | 4.00 |
| 40 | 29E11 | Switch | Power Selector | 2.25 |
| 41 | 57E1 | Rectifier | Selenium (Used in Model 286PR only) | 2.00 |
|  | OR |  |  |  |
| 41 | 57E1-4 | Rectifier | Selenium (Round Type) used in Model 286PR only | 2.00 |
| 42 | 22E16 | Transformer | Output | 2.25 |
| 43 | 27E106-7 | Resistor | Carbon, 10 Megohm, 1/4 W. | .06 |

## MISCELLANEOUS PARTS

| Part No. | Part Name | Description | List Price |
|---|---|---|---|
| 20E128 | "A" Batt. Con. Bracket Assembly | With 4 No. 10E43 Trimount Studs | .60 |
| 20E130-1 | Cab. Assembly | Complete Cabinet Assembly with Lid & Loop, Handle, Lid Catch & Push Button Assembly & Bottom Assembly | 9.00 |
| 20E134 | Cab. Lid. Assembly | Lid Assembly with Loop and Hinges | 3.55 |
| 20E135-1 | Cab. Bottom | Bottom Assem. with Locking Slotted Head Stud | 2.10 |

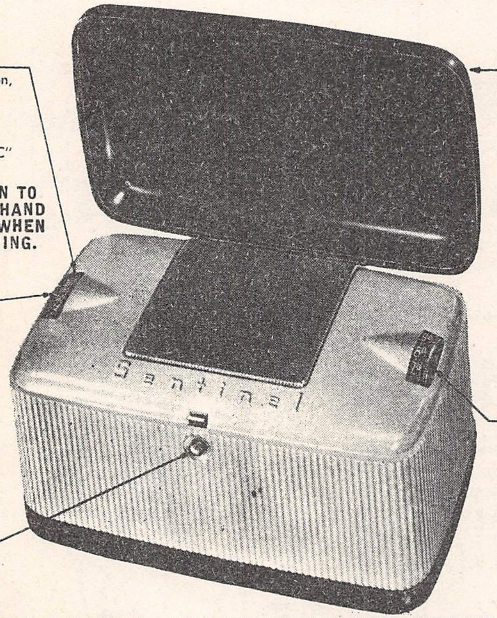
| Part No. | Part Name | Description | List Price |
|---|---|---|---|
| 30E25-1 | Cab. Center Section | Less Lid and Bottom Assemblies, with Handle, Spkr. Screen, Lid Catch & Push Button | 4.30 |
| 20E131 | Chassis Plate | Bottom Shield Plate for Chassis | .85 |
| 20E136-1 | Hinge | Hinge & Spring Assembly with 2 No. 82E36-F10 No. 4 24x1/4 Mtg. Screws | .40 |
| 37E44-1 | Knob | Calibrated Dial Knob | .88 |
| 37E34-1 | Knob | "Off-AC-DC-Batt." | .85 |
| 37E32-1 | Knob | Tuning and Volume Knobs | .53 |
| 20E129 | "B" Batt. Connector | B— and B+ Batt. Connector Assembly | .50 |

## HARDWARE

| Part No. | Part Name | Description | List Price |
|---|---|---|---|
| 15E41 | Lid Catch Bracket | Bracket for Mounting Lid Catch, With 2 No. 82E3-F10 Screws | .12 |
| 20E138 | Lid Catch | Lid Catch with Screw | .25 |
| 37E35-1 | Lid Catch Button | Button for Lid Catch with No. 13E3-F10 No. 4 40x1/4 Hex Screw and No. 11E3-F10 Lockwasher | .14 |
| 55E22-1 | Handle | Leather | .50 |
| 55E21-1 | Handle Bracket | Bracket for Mounting Handle | .25 |
| 71E42-F10 | Screw | No. 4 40x3/16 Slot B.H.I.M. | .30/C |

| Part No. | Part Name | Description | List Price |
|---|---|---|---|
| 78E142-F50 | Screw | No. 2 56x3/16 Rec. Oval Hd. B.M. | 1.25/C |
| 82E3-F10 | Screw | No. 4 24x1/4 Rec. Hd. Type 25 | .93/C |
| 82E36-F10 | Screw | No. 6 20x5/16 Rec. Hd. Type 25 | 2.25/C |
| 10E41 | Stud | Trimount for Mounting Chassis Bottom Shield | 1.15/C |
| 10E43 | Stud | Trimount for Mounting "A" Batt. Contact Brkt. Assem. | 1.15/C |
| 65E8 | Spring | Lid Index Spring | .09 |
| 66E12-1 | Screen | Speaker Screen Grille | .60 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.



VOLTAGE SELECTOR

For BATTERY operation, turn to maximum right hand "BATT" position.

For AC-DC operation, turn to middle "AC-DC" position.

**BE SURE TO TURN TO MAXIMUM LEFT HAND "OFF" POSITION WHEN THROUGH LISTENING.**

VOLUME CONTROL

Turn clockwise to increase volume.

LOOP AERIAL

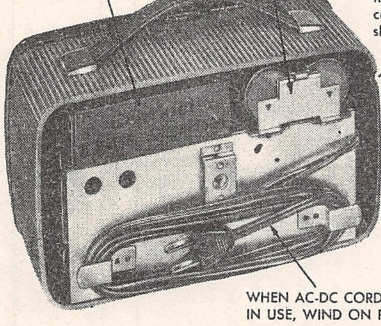
Always have Loop in upright position when operating set.

TUNING CONTROL

Use this control to tune receiver to desired station.

TO OPEN LID

Depress this button.



67½ Volt "B" Battery SENTINEL Type B7634

TWO 1½ Volt "A" Batteries SENTINEL Type A2

TO REMOVE: Press lightly on battery contact plate.

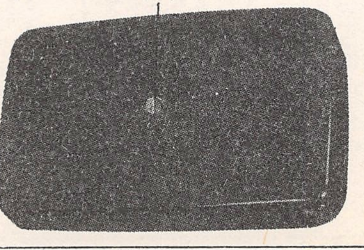
FOR AC-DC OPERATION

Remove back, unwind line cord from reel, place in slot and close back.

WHEN AC-DC CORD IS NOT IN USE, WIND ON REEL.

TO REMOVE CABINET BACK

Turn slotted screw with thin dime or screw driver and gently separate.



## INSTALLATION OF REQUIRED BATTERIES

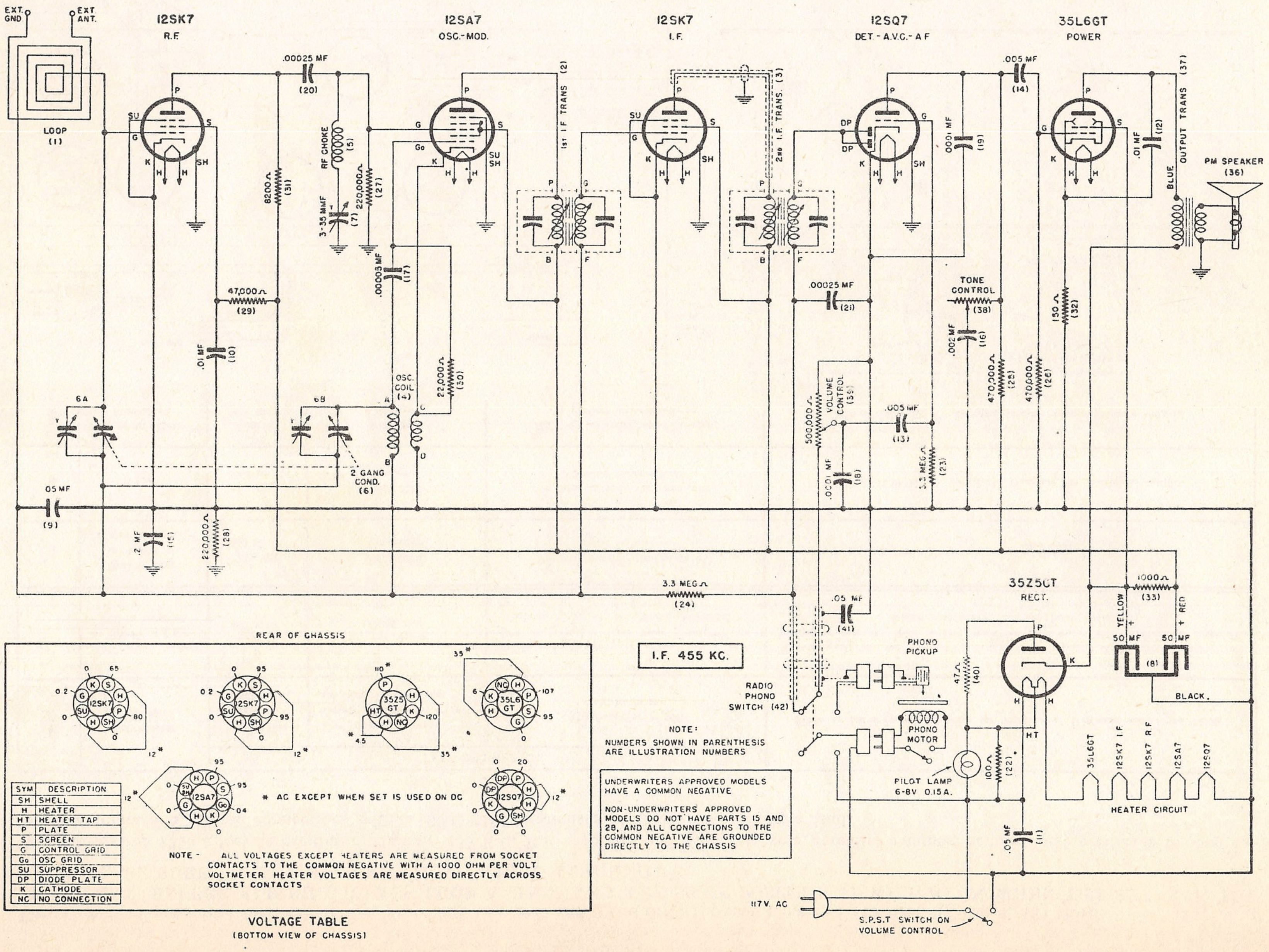
Diagram shows proper location and connections of the following required types of batteries:

Two SENTINEL, Type A2, 1½ Volt "A" batteries, or equivalent, such as Ray-O-Vac Type No. 2, Eveready 750, etc.

One SENTINEL Type B7634, 67½ Volt "B" battery, or equivalent, such as Ray-O-Vac Type 4367, Eveready 467, etc.

## SENTINEL RADIO CORP.

## MODELS 293CT,1U293CT


EXT. GND
EXT ANT.
LOOP (1)
12SK7 R.F.
12SA7 OSC.-MOD.
12SK7 I.F.
12SQ7 DET-A.V.C.-A F
35L6GT POWER
35Z5GT RECT.
.00025 MF (20)
RF CHOKE (5)
3-35 MMF (7)
220,000Ω (27)
8200Ω (31)
47,000Ω (29)
.01 MF (10)
6A
6B
2 GANG COND. (6)
.05 MF (9)
.2 MF (15)
220,000Ω (28)
.00005 MF (17)
OSC. COIL (4)
22,000Ω (30)
1st I F TRANS (2)
2nd I.F. TRANS. (3)
.00025 MF (21)
500,000Ω VOLUME CONTROL (35)
.0001 MF (18)
.005 MF (13)
3.3 MEG Ω (23)
.0001 MF (19)
TONE CONTROL (38)
.002 MF (16)
470,000Ω (25)
470,000Ω (26)
.005 MF (14)
150Ω (32)
.01 MF (12)
OUTPUT TRANS (37)
BLUE
PM SPEAKER (36)
3.3 MEG Ω (24)
.05 MF (41)
1000Ω (33)
YELLOW
RED
50 MF
50 MF
(8)
BLACK.
RADIO PHONO SWITCH (42)
PHONO PICKUP
PHONO MOTOR
47Ω (40)
100Ω (22)
PILOT LAMP 6-8V 0.15A.
HT
35L6GT
12SK7 I F
12SK7 R F
12SA7
12SQ7
HEATER CIRCUIT
.05 MF (11)
117V. AC
S.P.S.T SWITCH ON VOLUME CONTROL
REAR OF CHASSIS
12SK7
12SK7
35Z5 GT
35L6 GT
12SA7
12SQ7
0
65
0 2
80
95
110
120
4.5
35
107
6
12
04
20

I.F. 455 KC.

NOTE:
NUMBERS SHOWN IN PARENTHESIS
ARE ILLUSTRATION NUMBERS

UNDERWRITERS APPROVED MODELS HAVE A COMMON NEGATIVE

NON-UNDERWRITERS APPROVED MODELS DO NOT HAVE PARTS 15 AND 28, AND ALL CONNECTIONS TO THE COMMON NEGATIVE ARE GROUNDED DIRECTLY TO THE CHASSIS

| SYM | DESCRIPTION |
|---|---|
| SH | SHELL |
| H | HEATER |
| HT | HEATER TAP |
| P | PLATE |
| S | SCREEN |
| G | CONTROL GRID |
| Go | OSC GRID |
| SU | SUPPRESSOR |
| DP | DIODE PLATE |
| K | CATHODE |
| NC | NO CONNECTION |

* AC EXCEPT WHEN SET IS USED ON DC

NOTE - ALL VOLTAGES EXCEPT HEATERS ARE MEASURED FROM SOCKET CONTACTS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLTMETER HEATER VOLTAGES ARE MEASURED DIRECTLY ACROSS SOCKET CONTACTS

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

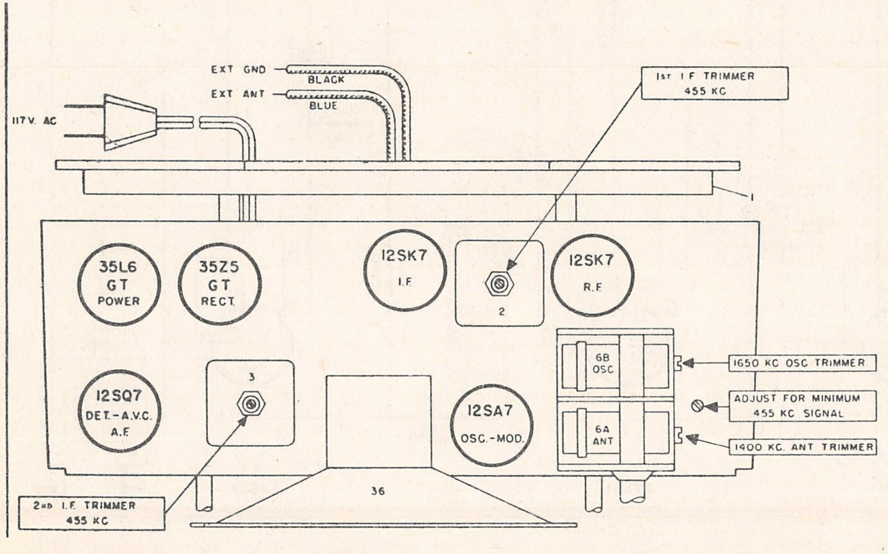
SENTINEL RADIO CORP.

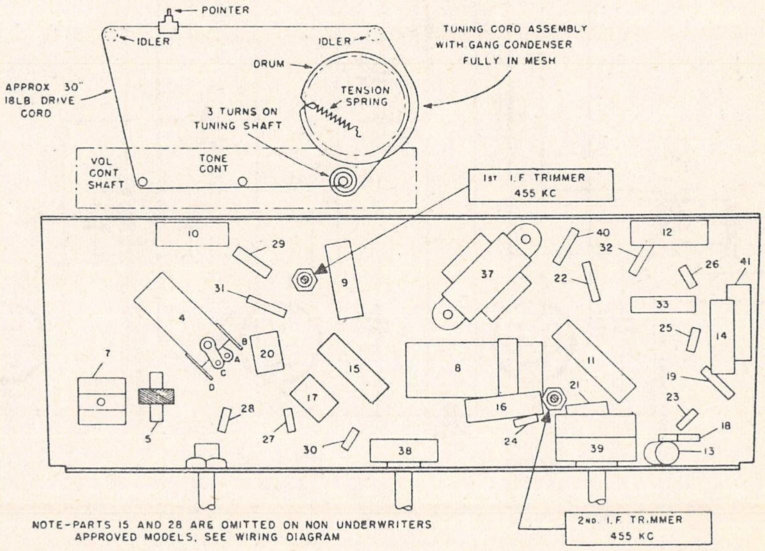
# ALIGNMENT PROCEDURE

For Alignment procedure read tabulations from left to right, and make the adjustment marked (1) first, (2) next, (3) third.
IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET. BE SURE THAT IT DOES NOT MOVE WHILE ALIGNING.

When adjusting 1650 kilocycle oscillator trimmer, 455 K.C. R.F. trimmer and 1400 kilocycle antenna trimmer, connect test oscillator to loop external antenna and ground connections with a .0002 Mfd. condenser in series with antenna lead.

| Steps | Set receiver dial to: | TEST OSCILLATOR | | | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|
| | | Adjust test oscillator frequency to: | Use dummy antenna in series with output of test oscillator consisting of: | Attach output of test oscillator to | |
| | Any point where no interfering signal is received | Exactly 455 K. C. | 0.2 Mfd. Condenser | High side to grid of 12SA7 tube. Low side to chassis (if Model 293CT) or Common Negative (if Model 1U-293CT). | Adjust each of the 2nd I.F. transformer trimmer adjustment screws for maximum output, then adjust each of the 1st I.F. transformer trimmer adjustment screws for maximum output. |
| 1 | Rotate gang condenser to maximum capacity | Exactly 455 K. C. | .0002 Mfd. Condenser | To loop external antenna and ground connections | Adjust R. F. coil trimmer for **minimum** 455 K. C. signal. |
| 2 | Rotate gang condenser to minimum capacity | Exactly 1650 K. C. | .0002 Mfd. Condenser | To loop external antenna and ground connections | Adjust 1650 K. C. oscillator trimmer for maximum output. |
| 3 | Approximately 1400 K. C. | Approx. 1400 K. C. | .0002 Mfd. Condenser | To loop external antenna and ground connections | Adjust 1400 K. C. antenna trimmer for maximum output. |


117V. AC
EXT GND
EXT ANT
BLACK
BLUE
1st I F TRIMMER 455 KC
1
35L6 GT POWER
35Z5 GT RECT.
12SK7 I.F.
2
12SK7 R.F.
12SQ7 DET.-A.V.C. A.F.
3
12SA7 OSC.-MOD.
6B OSC
6A ANT
1650 KC OSC TRIMMER
ADJUST FOR MINIMUM 455 KC SIGNAL
1400 KC. ANT TRIMMER
36
2nd I.F. TRIMMER 455 KC


POINTER
IDLER
IDLER
DRUM
TUNING CORD ASSEMBLY WITH GANG CONDENSER FULLY IN MESH
TENSION SPRING
APPROX 30" 18LB DRIVE CORD
3 TURNS ON TUNING SHAFT
VOL CONT SHAFT
TONE CONT
1st I.F TRIMMER 455 KC
10
29
9
31
4
8
A
C
D
20
7
5
28
27
30
15
17
38
37
8
16
11
21
24
39
40
32
12
22
26
41
33
25
14
19
23
18
13
2nd I.F TRIMMER 455 KC

NOTE-PARTS 15 AND 28 ARE OMITTED ON NON UNDERWRITERS APPROVED MODELS. SEE WIRING DIAGRAM

# SENTINEL RADIO CORP.

## RADIO PARTS LIST

## MODEL 293-CT, 1U-293-CT

| Illus. No. | Part No. | Part Name | Description | List Price |
|---|---|---|---|---|
| 1 | 20E67 | Antenna | Antenna Loop & Mounting Assembly | $1.70 |
| 2 | 20E21 | Coil | Ist I. F. Transformer | 2.75 |
| | or | | | |
| 2 | 20E261 | Coil | Ist I. F. Transformer | 2.75 |
| 3 | 20E22 | Coil | 2nd I. F. Transformer | 2.75 |
| | or | | | |
| 3 | 20E261-2 | Coil | 2nd I. F. Transformer | 2.75 |
| 4 | 20E64 | Coil | Oscillator | 1.10 |
| 5 | 2E19 | Coil | R. F. Choke | .65 |
| 6 | 24E8 | Condenser | Tuning, 2 Gang | 3.50 |
| | or | | | |
| 6 | 24E6 | Condenser | Tuning, 2 Gang | 3.50 |
| 7 | 24E3 | Condenser | Trimmer, (3-35 MMF Working) | .32 |
| 8 | 25E6 | Condenser | Tubular, Dry Elect. 50-50 Mfd. 150 V. | 1.15 |
| 9 | 23E216 | Condenser | Tubular, .05 Mfd. 200 V. | .18 |
| 10 | 23E211 | Condenser | Tubular, .01 Mfd. 200 V. | .18 |
| 11 | 23E416 | Condenser | Tubular, .05 Mfd. 400 V. | .20 |
| 12 | 23E411 | Condenser | Tubular, .01 Mfd. 400 V. | .18 |
| 13 | 23E408 | Condenser | Tubular, .005 Mfd. 400 V. | .18 |
| 14 | 23E408 | Condenser | Tubular, .005 Mfd. 400 V. | .18 |
| 15 | 23E421 | Condenser | Tubular, .2 Mfd. 400 V. (1U293CT Only) | .30 |
| 16 | 23E405 | Condenser | Tubular, .002 Mfd. 400 V. | .18 |
| 17 | 23E37 | Condenser | Mica, .00005 Mfd. | .22 |
| 18 | 23E39 | Condenser | Mica, .0001 Mfd. | .25 |
| 19 | 23E39 | Condenser | Mica, .0001 Mfd. | .25 |
| 20 | 23E42 | Condenser | Mica, .00025 Mfd. | .25 |
| 21 | 23E42 | Condenser | Mica, .00025 Mfd. | .25 |
| 22 | 27E101-2 | Resistor | Carbon, 100 Ohm 1/2 W. | .08 |
| 23 | 27E335 | Resistor | Carbon, 3.3 Megohm 1/3 W. | .07 |
| 24 | 27E335 | Resistor | Carbon, 3.3 Megohm 1/3 W. | .07 |
| 25 | 23E474 | Resistor | Carbon, 470,000 Ohm 1/3 W. | .07 |
| 26 | 27E474 | Resistor | Carbon, 470,000 Ohm 1/3 W. | .07 |
| 27 | 27E224 | Resistor | Carbon, 220,000 Ohm 1/3 W. | .08 |
| 28 | 27E224 | Resistor | Carbon, 220,000 Ohm 1/3 W. (1U-293CT Only) | .08 |
| 29 | 27E473 | Resistor | Carbon, 47,000 Ohm 1/3 W. | .07 |
| 30 | 27E223 | Resistor | Carbon, 22,000 Ohm 1/3 W. | .08 |
| 31 | 27E822 | Resistor | Carbon, 8,200 Ohm 1/3 W. | .07 |
| 32 | 27E151 | Resistor | Carbon, 150 Ohm 1/3 W. | .08 |
| 33 | 27E102-3 | Resistor | Carbon, 1,000 Ohm 1 W. | .11 |
| 36 | 1E1 | Speaker | 4" x 6" Elliptical P. M. (less Transformer | 4.00 |
| 37 | 22E8 | Transformer | Output for Speaker | 1.70 |
| 38 | 28E8 | Tone Control | | .60 |
| 39 | 28E7 | Volume Control | 500,000 Ohm, with S.P.S.T. Switch | .80 |
| 40 | 27E470-2 | Resistor | Carbon, 47 Ohm 1/2 W. | .08 |
| 41 | 23E416 | Condenser | Tubular, .05 Mfd. 400 V. | .20 |
| 42 | 20E203 | Switch | Radio Phono, D.P.D.T. | .70 |

## MISCELLANEOUS PARTS

| Part No. | Part Name | Description | List Price |
|---|---|---|---|
| 40E1 | Bulb | 6-8 Volt, .150 Amp. Dial Light, #47 | $ .10 |
| 65E2 | Dial Cord Spring | Tension Spring Net | .02 |
| 4E1 | Dial Cord | 30" of 18 lb. Drive Cord | .15 |
| 20E225-7 | Dial Shaft Assem. | Dial Drive Shaft, with "C" Washer, Bearing & Lock Nut | .40 |
| 20E65 | Dial Back Plate | Backplate Assembly less Calibrated Scale | .90 |
| 36E16 | Dial Scale | Calibrated Glass Scale | $ .60 |
| 35E13 | Dial Pointer | Dial Indicator | .15 |
| 37E21-17 | Knob | | .10 |
| 20E184-1 | Socket Assem. | 2-Contact, for Phono Motor | .55 |
| 20E185-1 | Socket Assem. | 4-Contact, for Phono-Pick Up | .64 |

## GROUND

When a regular aerial is used, best results will be obtained with a ground attached to the black lead coming out of the rear of the chassis.

WARNING—DO NOT ATTACH A GROUND DIRECT TO THE RADIO CHASSIS OR RECORD CHANGER. Any external ground connection to any metal part of the chassis or record changer may cause a short and possible damage.

## FUNCTION OF CONTROLS

THE LEFT HAND KNOB controls the volume control and off-and-on switch.

THE RIGHT HAND KNOB is the station selector.

THE CENTER KNOB is the tone control.

THE "PHONO-RADIO" SWITCH is located in the lower left hand corner of the record-changer compartment.

## MODEL 284GA, 1U284GA

### PARTS LIST

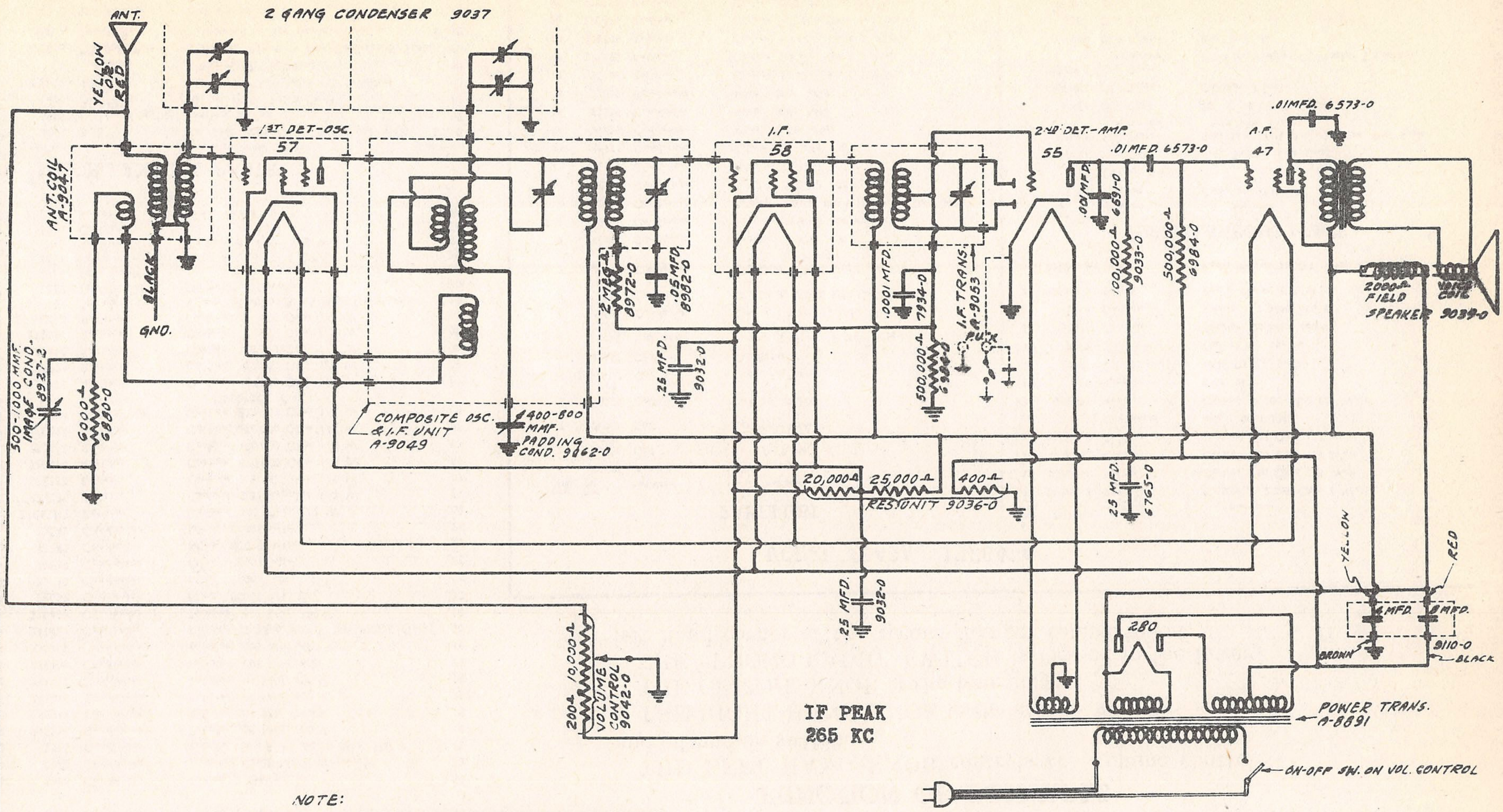
| Illus. No. | Part No. | Part Name | Description |
|---|---|---|---|
| 1 | 20E24 | Antenna | Loop |
| 2 | 20E21 | Coil | 1st I.F. Trans. |
| | OR | | |
| 2 | 20E261 | Coil | 1st. I.F. Trans. |
| 3 | 20E22 | Coil | 2nd I.F. Trans. |
| | OR | | |
| 3 | 20E261-2 | Coil | 2nd I.F. Trans. |
| 4 | 20E162 | Coil | Oscillator |
| 5 | 24E2 | Condenser | Tuning, 2 Gang (3 Hole Mtg.) |
| | OR | | |
| 5 | 24E18 | Condenser | Tuning, 2 Gang (2 Hole Mtg.) |
| 7 | 25E1 | Condenser | Dry Elect. (50-50 Mfd.) 150 V. |
| | OR | | |
| 7 | 25E18 | Condenser | Dry Elect. (50-50 Mfd.) 150 V. Und. App'd only |
| 8 | 23E421 | Condenser | Tubular, .2 Mfd. 400 V. |
| 9 | 23E416 | Condenser | Tubular, .05 Mfd. 400 V. |
| 10 | 23E418 | Condenser | Tubular, .1 Mfd. 400 V. (Und. App'd only) |
| 11 | 23E211 | Condenser | Tubular, .01 Mfd. 200 V. |
| 12 | 23E414 | Condenser | Tubular, .03 Mfd. 400 V. |
| 13 | 23E211 | Condenser | Tubular, .01 Mfd. 200 V. |
| 14 | 23E39 | Condenser | Mica, .0001 Mfd. |
| 15 | 23E39 | Condenser | Mica, .0001 Mfd. |
| 16 | 23E39 | Condenser | Mica, .0001 Mfd: |
| 17 | 23E106 | Resistor | Carbon, 10 Megohm 1/3 Watt |
| 18 | 27E335 | Resistor | Carbon, 3.3 Megohm 1/3 Watt |
| 19 | 27E335 | Resistor | Carbon, 3.3 Megohm 1/3 Watt |
| 20 | 27E474 | Resistor | Carbon, 470,000 Ohm 1/3 Watt |
| 21 | 27E224 | Resistor | Carbon, 220,000 Ohm 1/3 Watt |
| 22 | 27E224 | Resistor | Carbon, 220,000 Ohm 1/3 Watt Und. App'd only |
| 23 | 27E223 | Resistor | Carbon, 22,000 Ohm 1/3 Watt |
| 24 | 27E222-3 | Resistor | Carbon, 2,200 Ohm 1 Watt |
| 25 | 27E151 | Resistor | Carbon, 150 Ohm 1/3 Watt |
| 26 | 27E101 | Resistor | Carbon, 100 Ohm 1/3 Watt |
| 27 | 27E470-2 | Resistor | Carbon, 47 Ohm 1/2 Watt |
| 28 | 23E39 | Condenser | Mica, .0001 Mfd. |
| 29 | 27E683 | Resistor | Carbon, 68,000 Ohm 1/3 Watt |
| 30 | 1E9 | Speaker | 5" P. M. |
| 31 | 28E1 | Vol. Control | With S.P.S.T. Switch |
| 32 | 22E2 | Transformer | Output for Speaker |
| 33 | 23E416 | Condenser | Tubular, .05 Mfd. 400 V. |
| 34 | 23E418 | Condenser | Tubular, .1 Mfd. 400 V. |
| 35 | 20E203-2 | Switch | Radio Phono D.P.D.T. |
| | OR | | |
| 35 | 20E203-4 | Switch | Radio Phono D.P.D.T. Und. App'd only |

### MISCELLANEOUS PARTS

| Part No. | Part Name | Description |
|---|---|---|
| 7E106 | Cabinet | Complete Cabinet |
| 7E59 | Cabinet Back | |
| 41E1 | Line Cord | 6 Ft. Rubber Line Cord |
| 5E14-1 | Dial Plate Assembly | Dial Back Plate Assembly Less Dial Scale and Drive Shaft |
| 4E1 | Dial Cord | 30" of 18 Lb. Dial Drive Cord |
| 36E10-2 | Dial Scale | Calibrated Scale |
| 20E225-3 | Dial Shaft Assembly | Drive Shaft with "C" Washer & Locknut |
| 35E8 | Dial Pointer | Dial Indicator |
| 65E2 | Dial Spring | Tension Spring for Drive Cord |
| 37E27-1 | Knob | |
| 20E43 | Pilot Lamp Socket | Pilot Lamp Socket Assembly |
| 40E1 | Pilot Lamp | 6-8 Volt .150 Amp. Type 47 Lamp |

MODEL 510

# SENTINEL RADIO CORP.

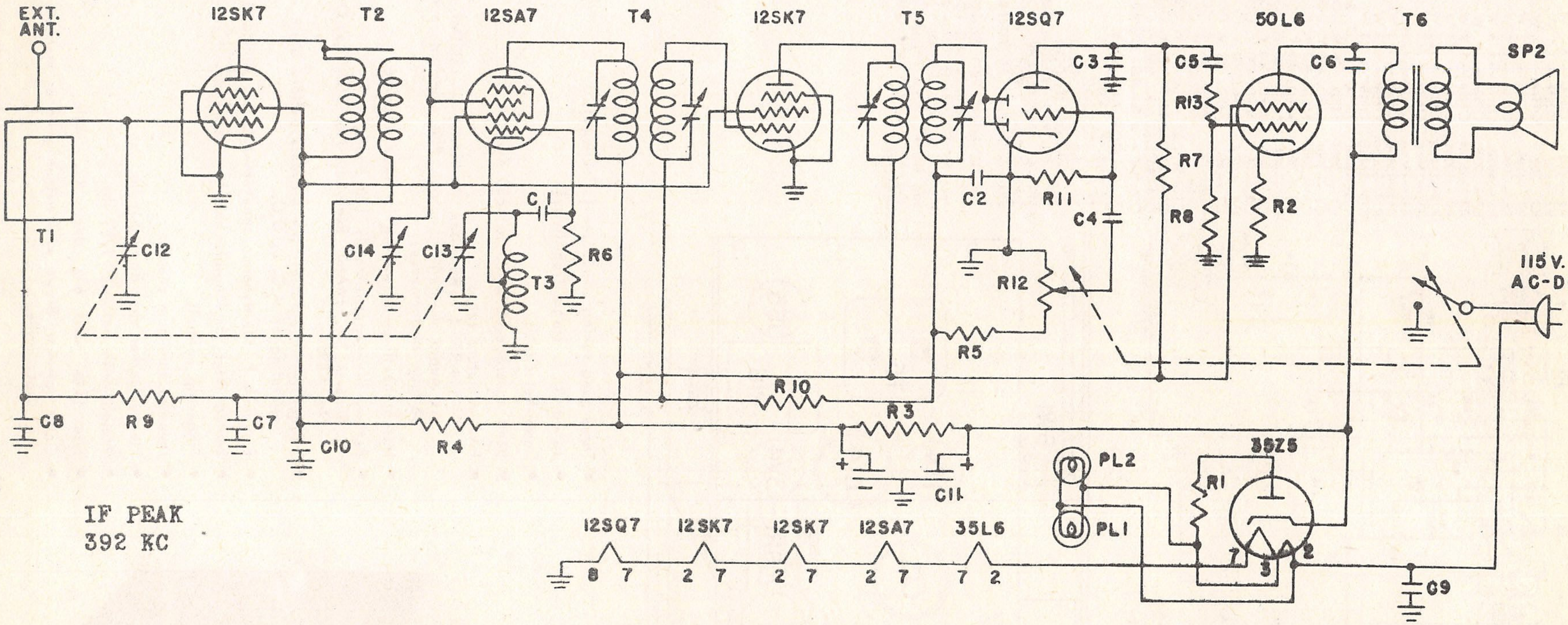

ANT.
YELLOW OR RED
BLACK
GND.
ANT. COIL A-9047
500-1000 MMF. IMAGE COND. 8927-2
6000Ω 6880-0
2 GANG CONDENSER 9037
1ST DET-OSC. 57
COMPOSITE OSC. & I.F. UNIT A-9049
400-800 MMF. PADDING COND. 9062-0
2 MEG Ω 8972-0
.05 MFD. 8982-0
.25 MFD. 9032-0
I.F. 58
.0001 MFD. 7934-0
I.F. TRANS. A-9053
500,000Ω 6984-0
P.U.
X
20,000Ω
25,000Ω
400Ω
RES. UNIT 9036-0
.25 MFD. 9032-0
200Ω 10,000Ω VOLUME CONTROL 9042-0
2ND DET.-AMP. 55
.001 MFD. 6691-0
.01 MFD. 6573-0
100,000Ω 9033-0
500,000Ω 6984-0
.25 MFD. 6765-0
A.F. 47
.01 MFD. 6573-0
2000Ω FIELD
VOICE COIL
SPEAKER 9039-0
YELLOW
RED
4 MFD.
8 MFD.
9110-0
BROWN
BLACK
280
POWER TRANS. A-8891
ON-OFF SW. ON VOL. CONTROL

IF PEAK
265 KC

NOTE:

1. DOTTED LINES DENOTE SHIELDING
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NOS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. WHEN PHONO. JKS. ARE USED CATHODE OF 55 TUBE IS CONNECTED TO POINT MARKED "X"
5. I.F. = 265

# SETCHELL CARLSON INC.


EXT. ANT.
12SK7
T2
12SA7
T4
12SK7
T5
12SQ7
50L6
T6
SP2
T1
C12
C14
C13
C1
T3
R6
C2
R11
C3
C4
C5
R13
R7
R8
R2
C6
R12
R5
115 V. AC-DC
R10
R3
C8
R9
C7
C10
R4
C11
PL2
PL1
35Z5
R1
C9
12SQ7
12SK7
12SK7
12SA7
35L6
8 7
2 7
2 7
2 7
7 2

IF PEAK
392 KC

R1 - 25 OHMS 1/2 WATT RESISTOR TOL. 10%
R2 - 180 " " " " " "
R3 - 1200 " " " " " "
R4 - 15M " " " " " "
R5 - 50M " 1/3 " " " "
R6 - 50M " " " " " "
R7 - 500M " " " " " "
R8 - 1 MEG " " " " " "
R9 - 1 MEG " " " " " "
R10 - 2MEG " " " " " "
R11 - 5MEG " " " " "
R12 - 500M " POT. WITH SWITCH
R13 - 100M " 1/3 WATT RESISTOR TOL. 0%

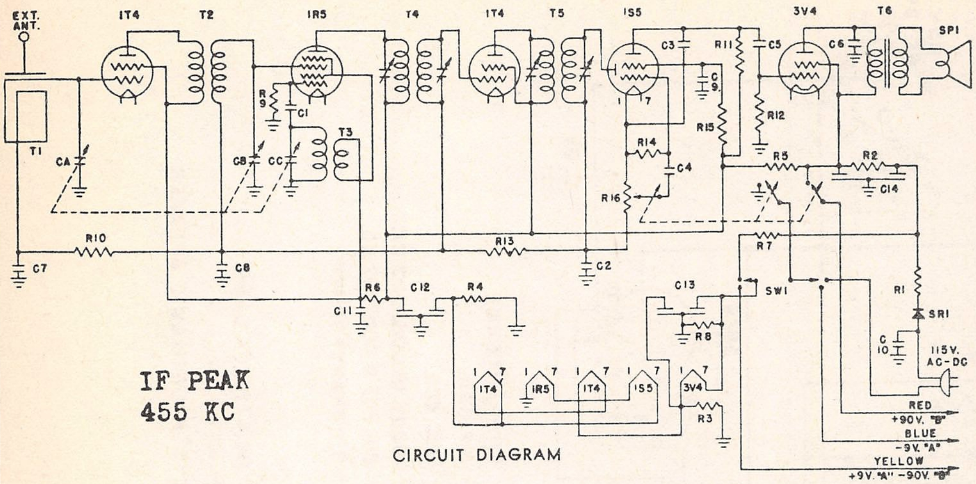
C1 - .0001 MFD. 400V. CONDENSER TOL. 10%
C2 - .0001 " " " " "
C3 - .0001 " " " " "
C4 - .006 " " " " "
C5 - .01 " " " " "
C6 - .02 " " " " "
C7 - .05 " 200V. " " "
C8 - .05 " " " " "
C9 - .05 " 400 V. " " "
C10 - .1 " 200 V. " " "
C11 - 50+50 " 150V. " " "
C12 - ANT. SECTION OF GANG CONDENSER
C13 - OSC " " " "
C14 - R.F. " " " "

T1 - LOOP ANTENNA
T2 - R F COIL
T3 - OSC. COIL
T4 - INPUT IF COIL 392 KC
T5 - OUTPUT IF COIL 392 KC
T6 - O.P. TRANSFORMER

PL1 - NO. 47 PILOT LAMP
PL2 - " " " "
SP2 - 6" P.M. DYNAMIC SPEAKER

MODEL 447

# SETCHELL CARLSON INC.


EXT. ANT.
1T4
T2
1R5
T4
1T4
T5
1S5
3V4
T6
SP1
T1
CA
CB
CC
C1
R9
T3
C3
R11
C5
C6
C9
R14
C4
R15
R12
R16
R5
R2
C14
R7
R10
C7
C8
R13
C2
R6
C12
R4
C11
C13
SW1
R8
R1
SR1
C10
115 V. AC-DC
RED +90V. "B"
BLUE -9V. "A"
YELLOW +9V. "A" -90V. "B"
R3

**IF PEAK 455 KC**

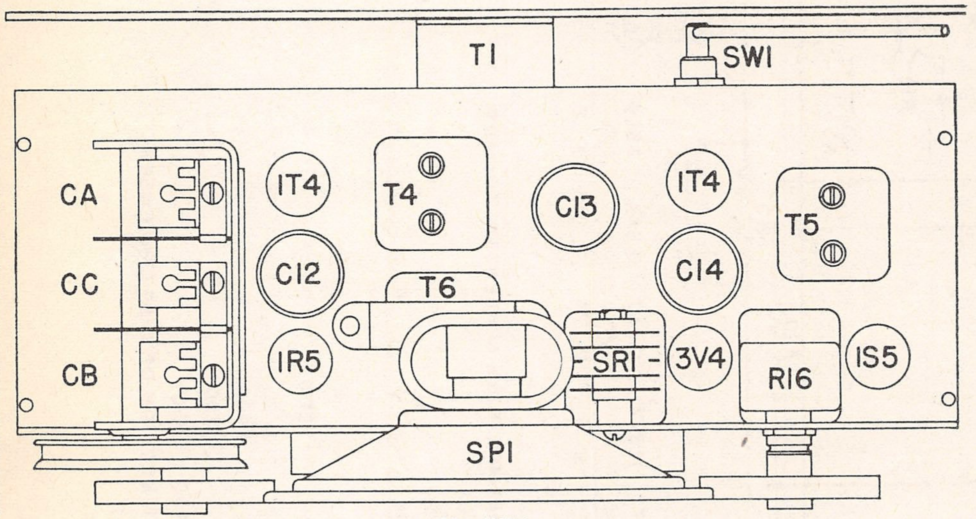
CIRCUIT DIAGRAM

R1 —100 OHM — 5 W. RESISTOR
R2 —150 OHM — 1 W. RESISTOR
R3 —700 OHM — 1 W. RESISTOR
R4 —1200 OHM — 1/2 W. RESISTOR
R5 —3000 OHM — 1/2 W. RESISTOR
R6 —5000 OHM — 1/3 W. RESISTOR
R7 —2000 OHM — 10 W. RESISTOR
R8 —25 M OHM — 1/3 W. RESISTOR
R9 —100M OHM — 1/3 W. RESISTOR
R10—1Meg. OHM — 1/3 W. RESISTOR
R11—1Meg. OHM — 1/3 W. RESISTOR
R12—1Meg. OHM — 1/3 W. RESISTOR
R13—2Meg. OHM — 1/3 W. RESISTOR
R14—5Meg. OHM — 1/3 W. RESISTOR
R15—5Meg. OHM — 1/3 W. RESISTOR
R16—500M OHM — POT. & 2 P SW.
C1 —.0001 MFD. 400 V. CONDENSER
C2 —.0001 MFD. 400 V. CONDENSER
C3 —.0001 MFD. 400 V. CONDENSER
C4 —.004 MFD. 400 V. CONDENSER
C5 —.004 MFD. 400 V. CONDENSER
C6 —.004 MFD. 400 V. CONDENSER
C7 —.05 MFD. 200 V. CONDENSER
C8 —.05 MFD. 200 V. CONDENSER
C9 —.05 MFD. 200 V. CONDENSER
C10—.05 MFD. 400 V. CONDENSER
C11—.1 MFD. 200 V. CONDENSER
C12—50+50 MFD. 150 V. CONDENSER
C13—50+50 MFD. 150 V. CONDENSER
C14—50+50 MFD. 150 V. CONDENSER
C A-B-C — 3 GANG. CONDENSER

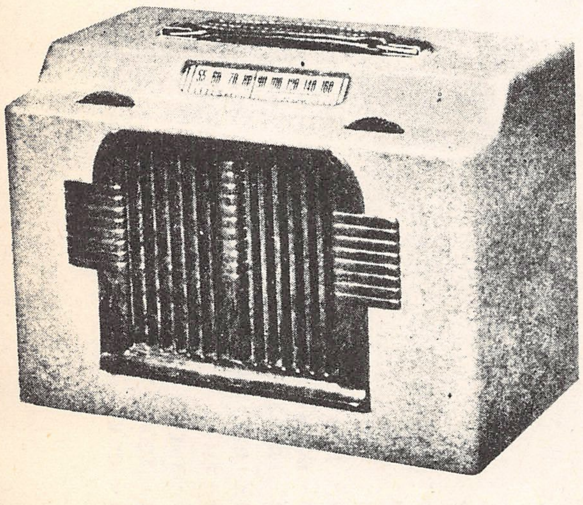
T1 —LOOP ANTENNA
T2 —R. F. COIL
T3 —OSC. COIL
T4 —455 KC. IF. COIL
T5 —455 KC. IF. COIL
T6 —OUTPUT TRANSFORMER
SP1 —5" PM SPEAKER
SW1—2 POLE 2 POS. SWITCH
SR1 —SELENIUM RECTIFIER

## ALIGNMENT PROCEDURE

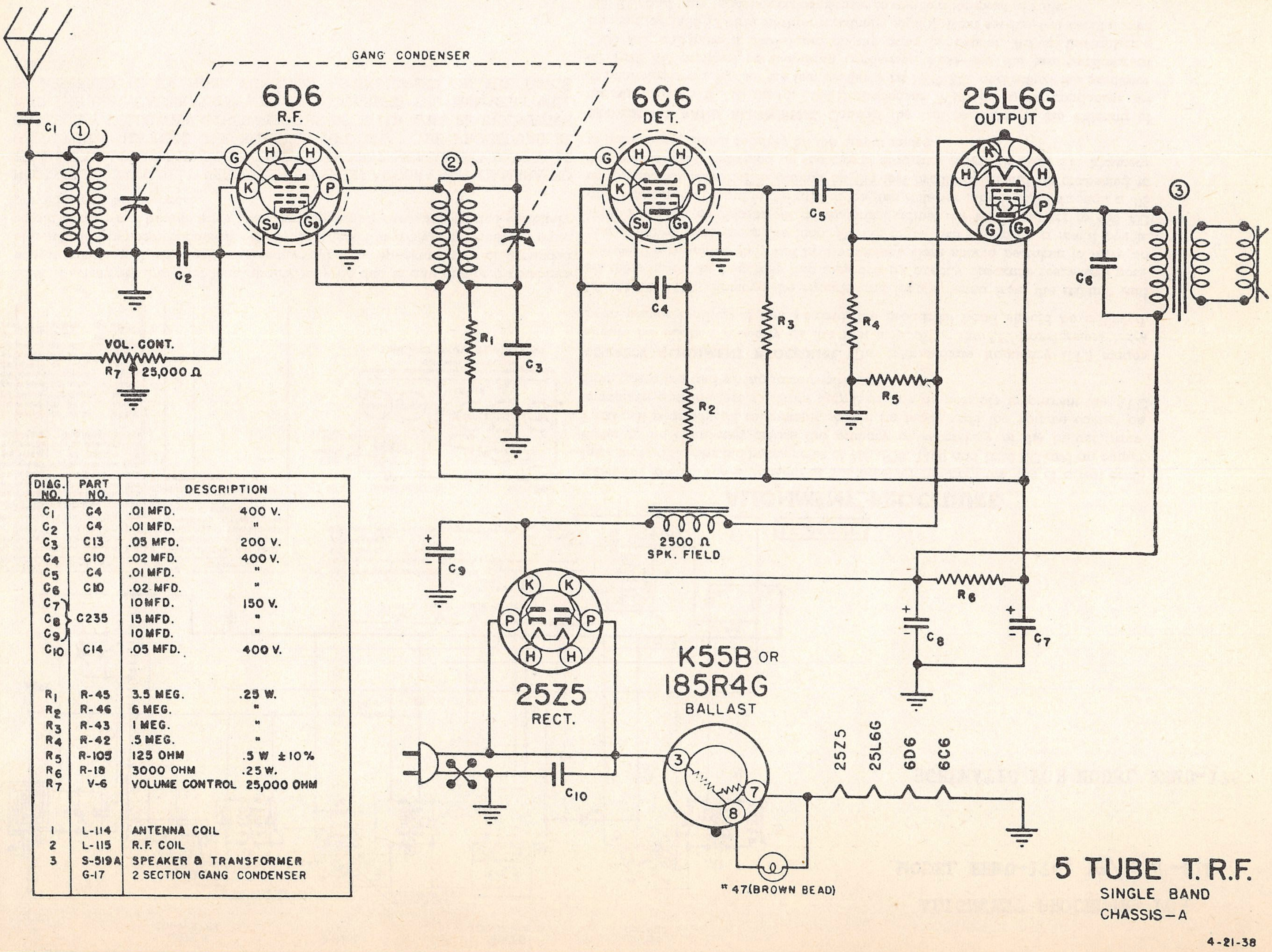
I. F. Alignment 455 KC (Connect to 1R5 Grid) Loop and R. F. Alignment—1400, 1000 and 600 KC. Dial Pointer Setting—535 KC with fully closed condenser.


T1
SW1
CA
CC
CB
1T4
T4
C13
1T4
T5
C12
C14
T6
1R5
SR1
3V4
R16
1S5
SP1

TOP VIEW



- Three-gang tuning condenser (selectivity).
- Tuned R. F. stage (sensitivity).
- Super-het circuit.
- Band coverage—540 KC to 1650 KC.
- Five miniature tubes—1—1T4-RF, 1—1R5-Mixer, 1—1T4-IF, 1—1S5-Det. and 1st Audio, 1—3V4-Pr. output. Plus selenium rectifier (6-tube performance).
- Instant heating—no waiting for tube warm-up.
- Battery life—approximately 170 hours. Burgess No. F6A60, Eveready No. 753, Ray-O-Vac No. AB994.
- Trigger switch automatically prevents battery drain when operating on A.C. or D.C.
- Five-inch P. M. dynamic speaker—1.47 oz. Alnico 5.
- Sealed filter for long-life hum-free operation.
- Finger-tip controls.
- Inverted aluminum chassis.
- Heavy leather snap-down handle.
- Weight with batteries 12½ lbs.
- Size: 11¾" wide, 6¾" deep, 8¼" high.
- Color optional: Brown with walnut grille or maroon with ivory grille.


GANG CONDENSER
6D6
R.F.
6C6
DET.
25L6G
OUTPUT
G
H
K
P
Su
Gs
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
R1
R2
R3
R4
R5
R6
①
②
③
VOL. CONT.
R7
25,000 Ω
2500 Ω
SPK. FIELD
25Z5
RECT.
K55B OR
185R4G
BALLAST
3
7
8
25Z5
25L6G
6D6
6C6
# 47 (BROWN BEAD)

| DIAG. NO. | PART NO. | DESCRIPTION | |
|---|---|---|---|
| C1 | C4 | .01 MFD. | 400 V. |
| C2 | C4 | .01 MFD. | " |
| C3 | C13 | .05 MFD. | 200 V. |
| C4 | C10 | .02 MFD. | 400 V. |
| C5 | C4 | .01 MFD. | " |
| C6 | C10 | .02 MFD. | " |
| C7 | C235 | 10 MFD. | 150 V. |
| C8 | | 15 MFD. | " |
| C9 | | 10 MFD. | " |
| C10 | C14 | .05 MFD. | 400 V. |
| R1 | R-45 | 3.5 MEG. | .25 W. |
| R2 | R-46 | 6 MEG. | " |
| R3 | R-43 | 1 MEG. | " |
| R4 | R-42 | .5 MEG. | " |
| R5 | R-105 | 125 OHM | .5 W ±10% |
| R6 | R-18 | 3000 OHM | .25 W. |
| R7 | V-6 | VOLUME CONTROL | 25,000 OHM |
| 1 | L-114 | ANTENNA COIL | |
| 2 | L-115 | R.F. COIL | |
| 3 | S-519A | SPEAKER & TRANSFORMER | |
| | G-17 | 2 SECTION GANG CONDENSER | |

**5 TUBE T.R.F.**

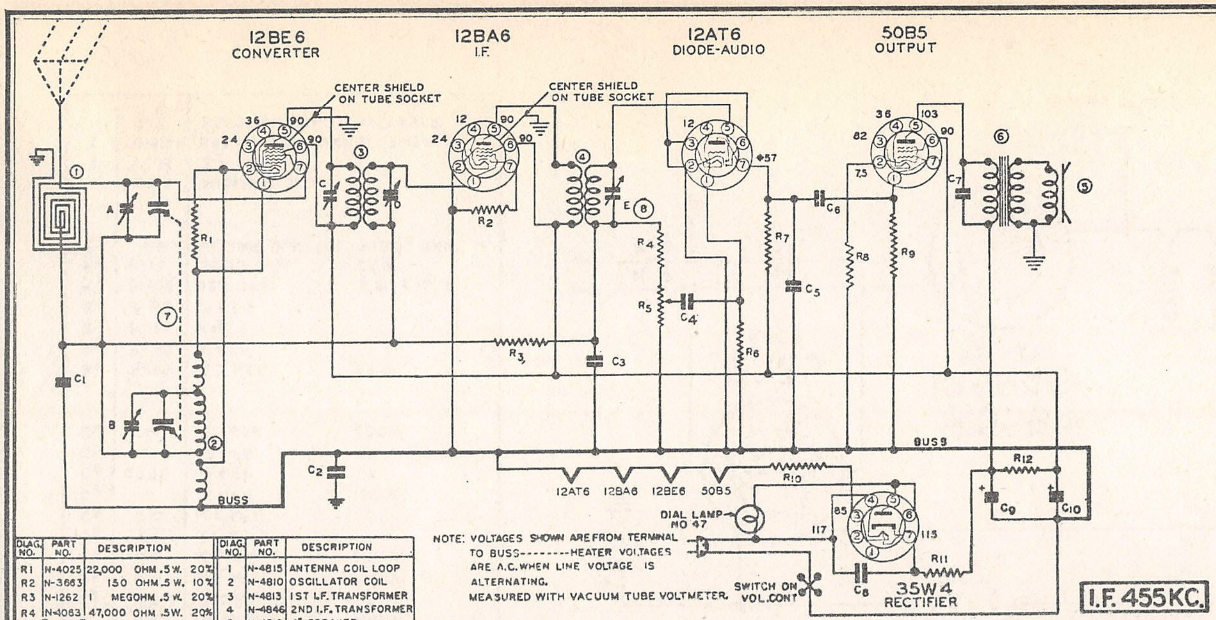
SINGLE BAND

CHASSIS-A

4-21-38

## ALIGNMENT PROCEDURE FOR
## MODEL RBMU-176, RK/RKRU-215

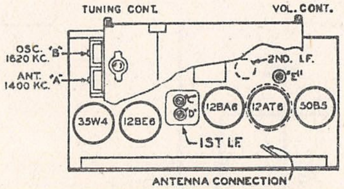
## SCHEMATIC FOR MODEL RBMU-176


12BE6
CONVERTER
12BA6
I.F.
12AT6
DIODE-AUDIO
50B5
OUTPUT
CENTER SHIELD ON TUBE SOCKET
CENTER SHIELD ON TUBE SOCKET
36
24
90
90
12
24
90
12
57
36
103
82
7.5
90
A
B
C
D
E
①
②
③
④
⑤
⑥
⑦
⑧
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
BUSS
BUSS
12AT6 12BA6 12BE6 50B5
DIAL LAMP NO 47
SWITCH ON VOL.CONT
85
117
115
35W4
RECTIFIER
I.F. 455KC.

NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS--------HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.
MEASURED WITH VACUUM TUBE VOLTMETER.

| DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| R1 | N-4025 | 22,000 OHM .5W. 20% |
| R2 | N-3663 | 150 OHM .5W. 10% |
| R3 | N-1262 | 1 MEGOHM .5W. 20% |
| R4 | N-4063 | 47,000 OHM .5W. 20% |
| R5 | N-4843<br>N-4999 | .5 MEGOHM VOL. CON. |
| R6 | N-4028 | 6.8 MEGOHM .5W. 20% |
| R7 | N-4026 | 220,000 OHM .5W. 20% |
| R8 | N-5632 | 220 OHM .5W. 10% |
| R9 | N-4027 | 470,000 OHM .5W. 20% |
| R10 | N-5631 | 22 OHM 1.W. 10% |
| R11 | N-4022 | 33 OHM .5W. 20% |
| R12 | N-5358 | 1000 OHM 1.W. 10% |
| C1 | N-1345 | .05 MFD. 200 V. |
| C2 | N-1345 | .05 MFD. 200 V. |
| C3 | N-1374 | 100 MMFD. MICA |
| C4 | N-4894 | .005 MFD. 800 V. |
| C5 | N-4890 | .0005 MFD. 600 V. |
| C6 | N-1344 | .01 MFD. 400 V. |
| C7 | N-1376 | .02 MFD. 400 V. |
| C8 | N-1346 | .05 MFD. 400 V. |
| C9 | N-3302 | 35 MFD. 150 V. ELECT. |
| C10 |  | 30 MFD. 150 V. ELECT. |

| DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | N-4815 | ANTENNA COIL LOOP |
| 2 | N-4810 | OSCILLATOR COIL |
| 3 | N-4813 | 1ST I.F. TRANSFORMER |
| 4 | N-4846 | 2ND I.F. TRANSFORMER |
| 5 | N-4318 | 4" SPEAKER |
| 6 | N-3899 | OUTPUT TRANSFORMER |
| 7 | N-4812 | 2 GANG CONDENSER |
| 8 | N-4046 | TRIMMER |


TUNING CONT.
VOL. CONT.
OSC. "B" 1620 KC.
ANT. "A" 1400 KC.
2ND. I.F.
"E"
"C"
"D"
35W4
12BE6
12BA6
12AT6
50B5
1ST I.F.
ANTENNA CONNECTION

TUBE AND TRIMMER LOCATIONS

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

**NOTE:** IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

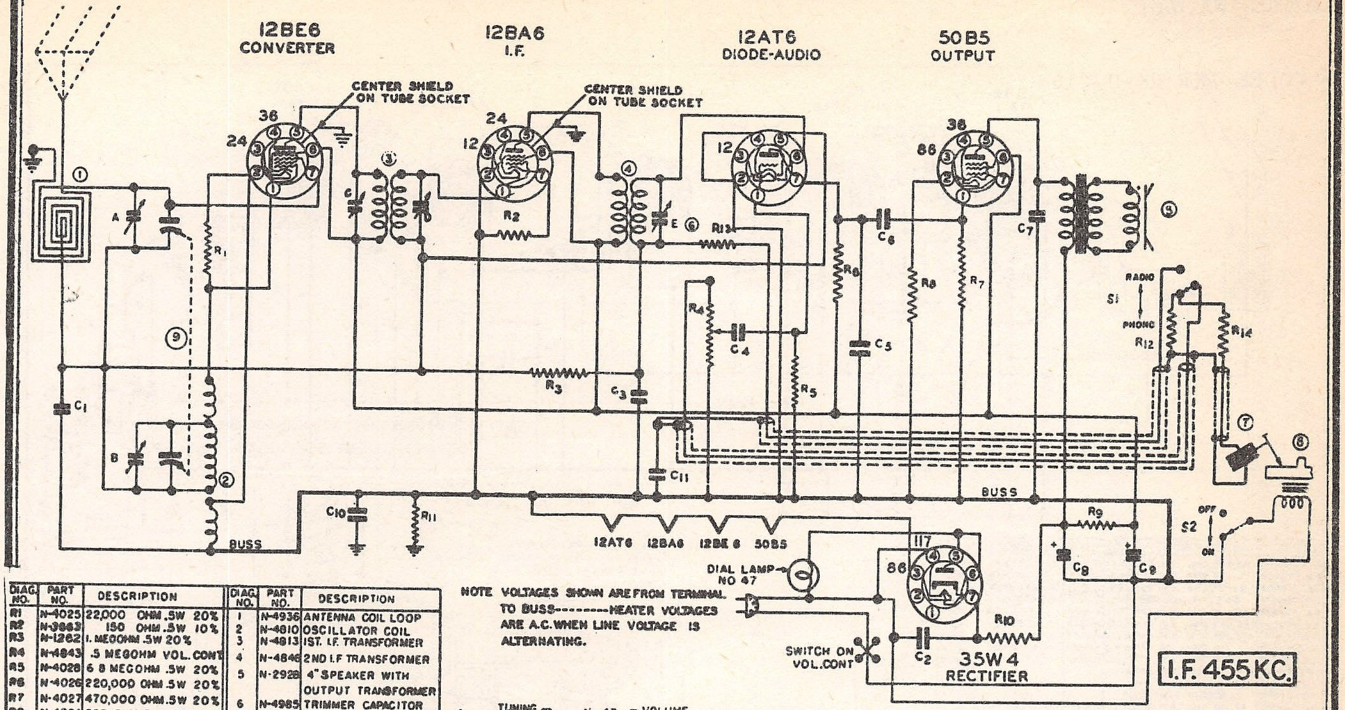
## ALIGNMENT PROCEDURE

**GENERAL DATA.** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

**I.F. ALIGNMENT.** Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective position on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12BE6) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

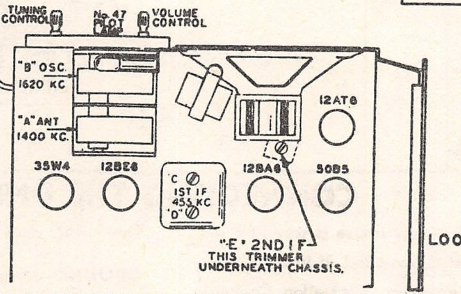
**BROADCAST BAND ALIGNMENT.** Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on the gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.



NOTE VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS--------HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.

| DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| R1 | N-4025 | 22,000 OHM .5W 20% |
| R2 | N-3863 | 150 OHM .5W 10% |
| R3 | N-1262 | 1. MEGOHM .5W 20% |
| R4 | N-4843 | .5 MEGOHM VOL. CONT |
| R5 | N-4028 | 6 8 MEGOHM .5W 20% |
| R6 | N-4026 | 220,000 OHM .5W 20% |
| R7 | N-4027 | 470,000 OHM .5W 20% |
| R8 | N 4024 | 220 OHM .5W 10% INSUL |
| R9 | N-5359 | 1000 OHM 1.W 10% INSUL |
| R10 | N-5403 | 33 OHM .5W 20% INSUL |
| R11 | N-4026 | 220,000 OHM .5W 20% |
| R12 | N-4988 | 220,000 OHM .5W 20% INS |
| R13 | N-4087 | 47000 OHM .5W 20% INS |
| R14 | N-5405 | 470,000 OHM .5W 20% INS |
| C1 | N-1345 | .05 MFD 200V |
| C2 | N-1346 | .05 MFD. 400V |
| C3 | N-1374 | .0001 MFD 500V |
| C4 | N-4894 | .005 MFD. 600V |
| C5 | N-2306 | .0002 MFD. 500V |
| C6 | N-1344 | .01 MFD. 400V |
| C7 | N-1376 | .02 MFD. 400V |
| C8<br>C9 | N-4986 | 40 MFD. 150V<br>40 MFD. 150V ELECT. |
| C10 | N-1345 | .05 MFD 200V |
| C11 | N-1345 | .05 MFD. 200V |

| DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | N-4936 | ANTENNA COIL LOOP |
| 2 | N-4810 | OSCILLATOR COIL |
| 3 | N-4813 | IST. I.F. TRANSFORMER |
| 4 | N-4846 | 2ND I.F TRANSFORMER |
| 5 | N-2928 | 4" SPEAKER WITH OUTPUT TRANSFORMER |
| 6 | N-4985 | TRIMMER CAPACITOR |
| 7 | N-4967 | PHONO PICKUP |
| 8 | N-3848 | MOTOR |
| 9 | N-4972 | 2 GANG CONDENSER |
| S1 | N-2409 | RADIO PHONO SW. |
| S2 | N-3140 | MOTOR SW. |



5 TUBE AC-DC

SUPERHETERODYNE
SINGLE BAND
DRAWN W.F. APPROVED

## CONNECTING THE UNIT

Before connecting the unit, be sure that your house is wired for the voltage and current for which the set is designed. If in doubt, call your local power company for the necessary information. Connecting the set to a supply outlet furnishing the wrong type of current will result in improper operation or damage.

**POWER SUPPLY.** This Radio-Phonograph is designed to operate on an alternating current supply (AC) ranging from 110 to 120 volts. The current must be 60 cycles. Never plug into a D.C. outlet.

**GROUND.** No ground connection should be used when operating this receiver. The receiver gets its ground connection through the power line and any external connection to the chassis may cause a short circuit and consequent damage.

**CAUTION.** *Do not place receiver on hot objects such as stoves, radiators, etc. Heat will damage the internal components of the unit.*

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

**NOTE:** IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

## ALIGNMENT PROCEDURE

**GENERAL DATA.** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

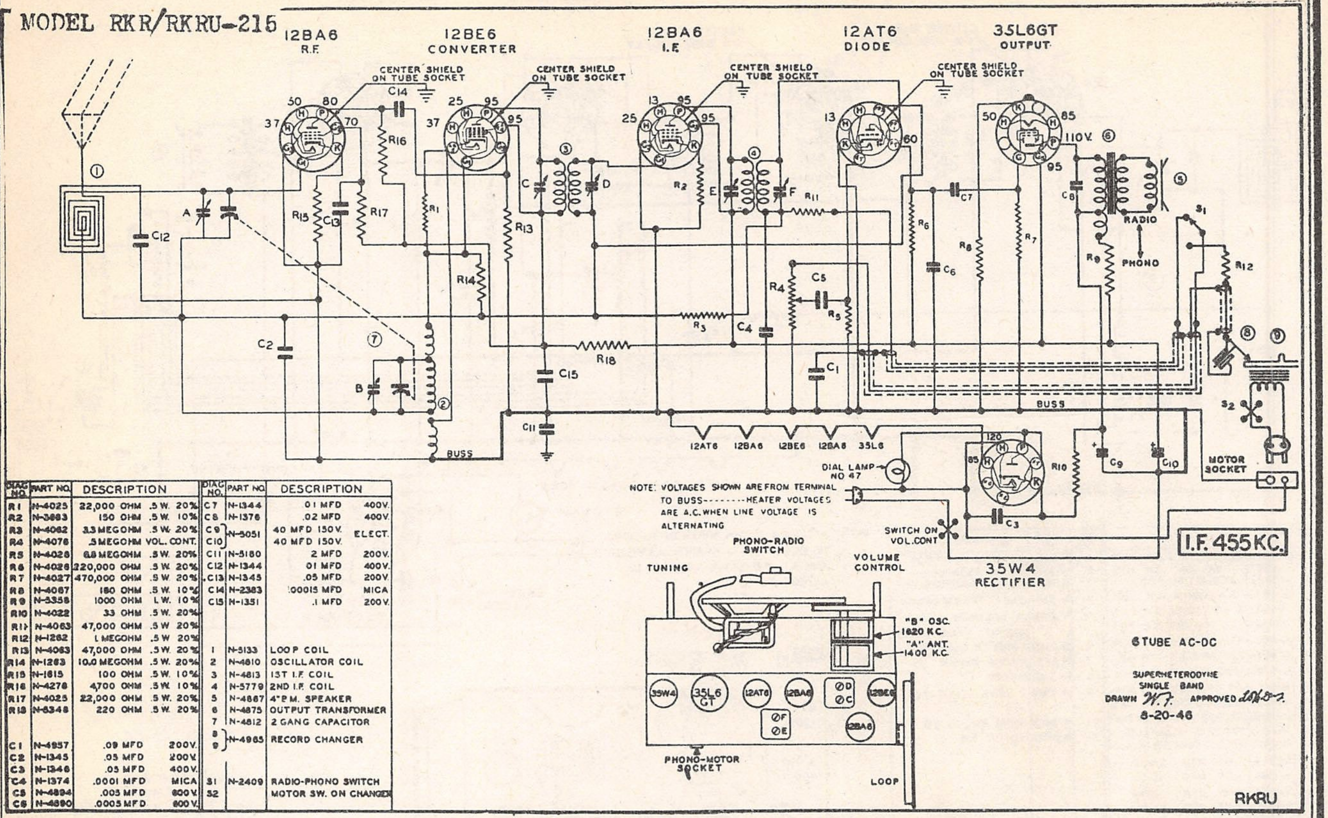
**I. F. ALIGNMENT.** Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the converter tube through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT.** Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next — set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

MODELS RK-215,RKRU-215
MODELS WA.WAU

SONORA RADIO & TELEV. CORP.

MODEL RKR/RKRU-215



| DIAG NO. | PART NO. | DESCRIPTION |
|---|---|---|
| R1 | N-4025 | 22,000 OHM .5 W. 20% |
| R2 | N-3883 | 150 OHM .5 W. 10% |
| R3 | N-4062 | 3.3 MEGOHM .5 W. 20% |
| R4 | N-4076 | .5 MEGOHM VOL. CONT. |
| R5 | N-4028 | 6.8 MEGOHM .5 W. 20% |
| R6 | N-4026 | 220,000 OHM .5 W. 20% |
| R7 | N-4027 | 470,000 OHM .5 W. 20% |
| R8 | N-4067 | 180 OHM .5 W. 10% |
| R9 | N-5358 | 1000 OHM 1 W. 10% |
| R10 | N-4022 | 33 OHM .5 W. 20% |
| R11 | N-4063 | 47,000 OHM .5 W 20% |
| R12 | N-1262 | 1 MEGOHM .5 W 20% |
| R13 | N-4063 | 47,000 OHM .5 W. 20% |
| R14 | N-1263 | 10.0 MEGOHM .5 W. 20% |
| R15 | N-1615 | 100 OHM .5 W. 10% |
| R16 | N-4278 | 4,700 OHM .5 W. 10% |
| R17 | N-4025 | 22,000 OHM .5 W. 20% |
| R18 | N-6348 | 220 OHM .5 W. 20% |
| C1 | N-4957 | .09 MFD 200V. |
| C2 | N-1345 | .05 MFD 200V. |
| C3 | N-1346 | .05 MFD 400V. |
| C4 | N-1374 | .0001 MFD MICA |
| C5 | N-4894 | .005 MFD 600 V. |
| C6 | N-4890 | .0005 MFD 600 V. |

| DIAG NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C7 | N-1344 | .01 MFD 400V. |
| C8 | N-1376 | .02 MFD 400V. |
| C9<br>C10 | N-5051 | 40 MFD 150V.<br>40 MFD 150V. ELECT. |
| C11 | N-5180 | 2 MFD 200V. |
| C12 | N-1344 | .01 MFD 400V. |
| C13 | N-1345 | .05 MFD 200V. |
| C14 | N-2383 | .00015 MFD MICA |
| C15 | N-1351 | .1 MFD 200V. |
| 1 | N-5133 | LOOP COIL |
| 2 | N-4810 | OSCILLATOR COIL |
| 3 | N-4813 | 1ST I.F. COIL |
| 4 | N-5779 | 2ND I.F. COIL |
| 5 | N-4867 | 4" P.M. SPEAKER |
| 6 | N-4875 | OUTPUT TRANSFORMER |
| 7 | N-4812 | 2 GANG CAPACITOR |
| 8<br>9 | N-4965 | RECORD CHANGER |
| S1 | N-2409 | RADIO-PHONO SWITCH |
| S2 | | MOTOR SW. ON CHANGER |

## CONNECTING THE UNIT

Before connecting the unit, be sure that your house is wired for the voltage and current for which the set is designed. If in doubt, call your local power company for the necessary information. Connecting the set to a supply outlet furnishing the wrong type of current will result in improper operation or damage.

**POWER SUPPLY.** This Radio-Phonograph is designed to operate on an alternating current supply (AC) ranging from 110 to 120 volts. The current must be 60 cycles. Never plug into a D.C. outlet.

**GROUND.** No ground connection should be used when operating this receiver. The receiver gets its ground connection through the power line and any external connection to the chassis may cause a short circuit and consequent damage.

**CAUTION.** *Do not place receiver on hot objects such as stoves, radiators, etc. Heat will damage the internal components of the unit.*

MODEL WA/WAU

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## ALIGNMENT PROCEDURE

**GENERAL DATA.** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

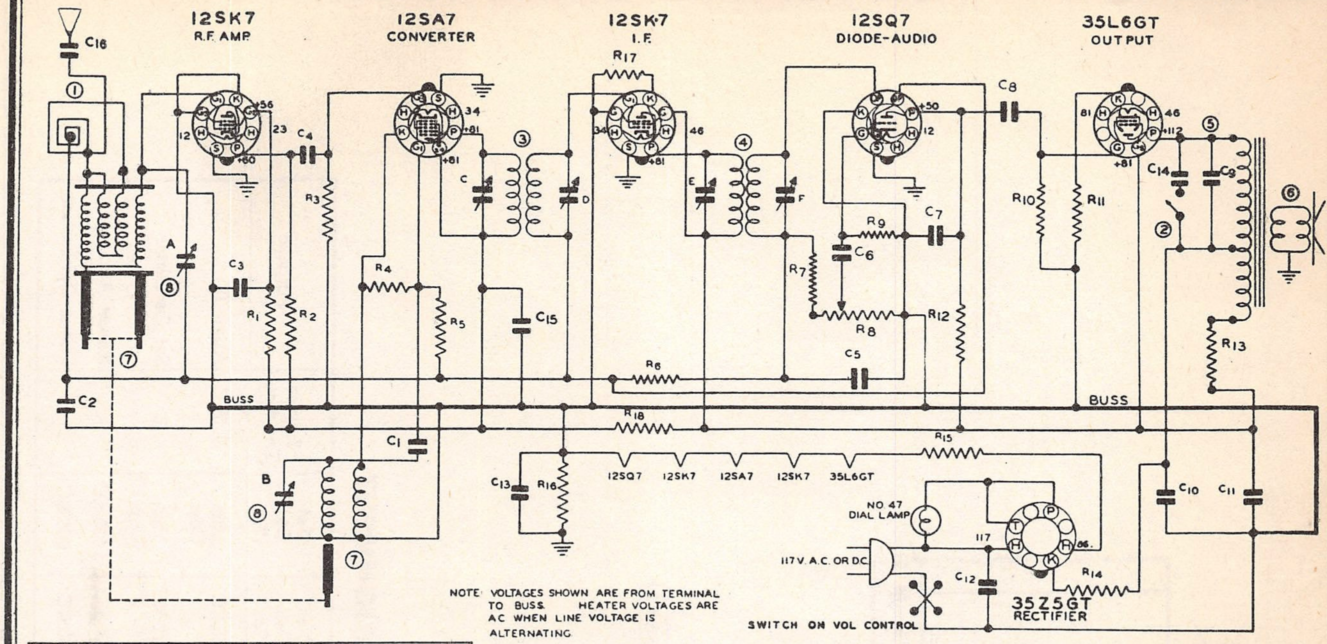
**I.F. ALIGNMENT.** Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT.** Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

For alignment of Models RK-215.RKRU-215, see P.16-2

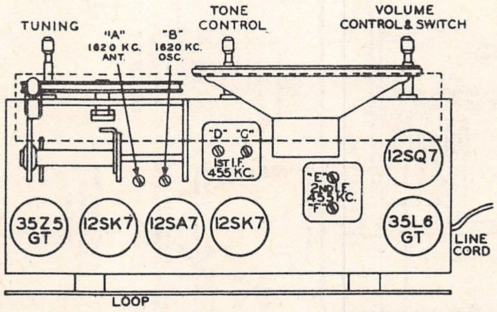
## SONORA RADIO & TELEV. CORP.

## MODELS RQ-222, RQU-222



NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS. HEATER VOLTAGES ARE AC WHEN LINE VOLTAGE IS ALTERNATING.

| DIAG. NO. | PART NO. | DESCRIPTION | DIAG. NO. | PART NO | DESCRIPTION |
|---|---|---|---|---|---|
| C1 | N-1342 | 50 MMFD MICA 20% | R6 | N-4062 | 3.3 MEGOHM .5W. 20% |
| C2 | N-1345 | .05 MFD 200V. 20% | R7 | N-4063 | 47,000 OHM .5W. 20% |
| C3 | N-1345 | .05 MFD 200V. 20% | R8 | N-5026 | 0.5 MEGOHM VOL. CONT. |
| C4 | N-2383 | 150 MMFD MICA 20% | R9 | N-4061 | 4.7 MEGOHM .5W. 20% |
| C5 | N-1374 | 100 MMFD MICA 20% | R10 | N-4027 | 470,000 OHM .5W. 20% |
| C6 | N-4894 | .005 MFD 600V. -15+40% | R11 | N-4067 | 180 OHM .5W. 10% |
| C7 | N-4890 | .0005 MFD 600V. -25+60% | R12 | N-4988 | 220,000 OHM .5W. INS. 20% |
| C8 | N-1344 | .01 MFD 400V. 20% | R13 | N-5623 | 1500 OHM 1.W. 10% |
| C9 | N-1344 | .01 MFD 400V. 20% | R14 | N-4022 | 33 OHM .5W. 20% |
| C10 | N-3658 | 40 MFD 150 W.V. ELECTRO- | R15 | N-4628 | 33 OHM 1.W. 10% |
| C11 |  | 40 MFD 150 W.V. LYTIC | R16 | N-4026 | 220,000 OHM .5W. 20% |
| C12 | N-1346 | .05 MFD 400V. 20% | R17 | N-4022 | 33 OHM .5W. 20% |
| C13 | N-5160 | .2 MFD 200V. -10+10% | R18 | N-4066 | 470 OHM .5W. 10% |
| C14 | N-1346 | .05 MFD 400V. 20% |  |  |  |
| C15 | N-1351 | .1 MFD 200V. -10+20% | 1 | N-5374 | LOOP COIL |
| C16 | N-1342 | 50 MMFD MICA 20% | 2 | N-4942 | TONE SWITCH |
|  |  |  | 3 | N-4872 | 1ST I.F. TRANSFORMER |
|  |  |  | 4 | N-5571 | 2ND I.F. TRANSFORMER |
| R1 | N-5351 | 22,000 OHM .5W. INS. 20% | 5 | N-4875 | OUTPUT TRANSFORMER |
| R2 | N-4278 | 4,700 OHM .5W. 10% | 6 | N-4868 | "5 SPEAKER |
| R3 | N-4087 | 47,000 OHM .5W. INS. 20% | 7 | N-5640 | PERMEABILITY TUNER |
| R4 | N-5351 | 22,000 OHM .5W. INS. 20% | 8 | N-5552 | 2 SECTION TRIMMER |
| R5 | N-5624 | 15 MEGOHM .5W. INS. 20% |  |  |  |



TUBE & TRIMMER LOCATIONS

I.F. 455 KC.

6 TUBE A.C.–D.C.
SUPERHETERODYNE
SINGLE BAND

DRAWN BY W.F. APPROVED L.J.

JUNE 1, 1946

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

**NOTE:** IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

## ALIGNMENT PROCEDURE

**GENERAL DATA.** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 1000 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

**I. F. ALIGNMENT.** Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the pointer at right end of dial adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

**PERMEABILITY TUNER ALIGNMENT.** To align the tuner requires four separate steps which must be followed in the order given.

**1. Marking Test Points on Dial Plate.** Use an accurate scale or ruler. Make a pencil mark at 1-13/16 inches and another at 4-3/16 inches from the right hand edge of the dial plate.

**2. Location of Pointer.** Turn right hand knob all the way to the right. This moves the slugs to the left out of the coils.

The pointer should be at the 1-13/16 inch mark. If the pointer is not in this position, slide pointer on string and crimp in place.

**3. Oscillator Alignment.** Connect the test oscillator to the grid of the 12SA7 tube through a .05 or .1 mfd. condenser.

Set test oscillator at 1620 KC, turn right hand knob all the way to the right and adjust oscillator trimmer "B" for maximum signal.

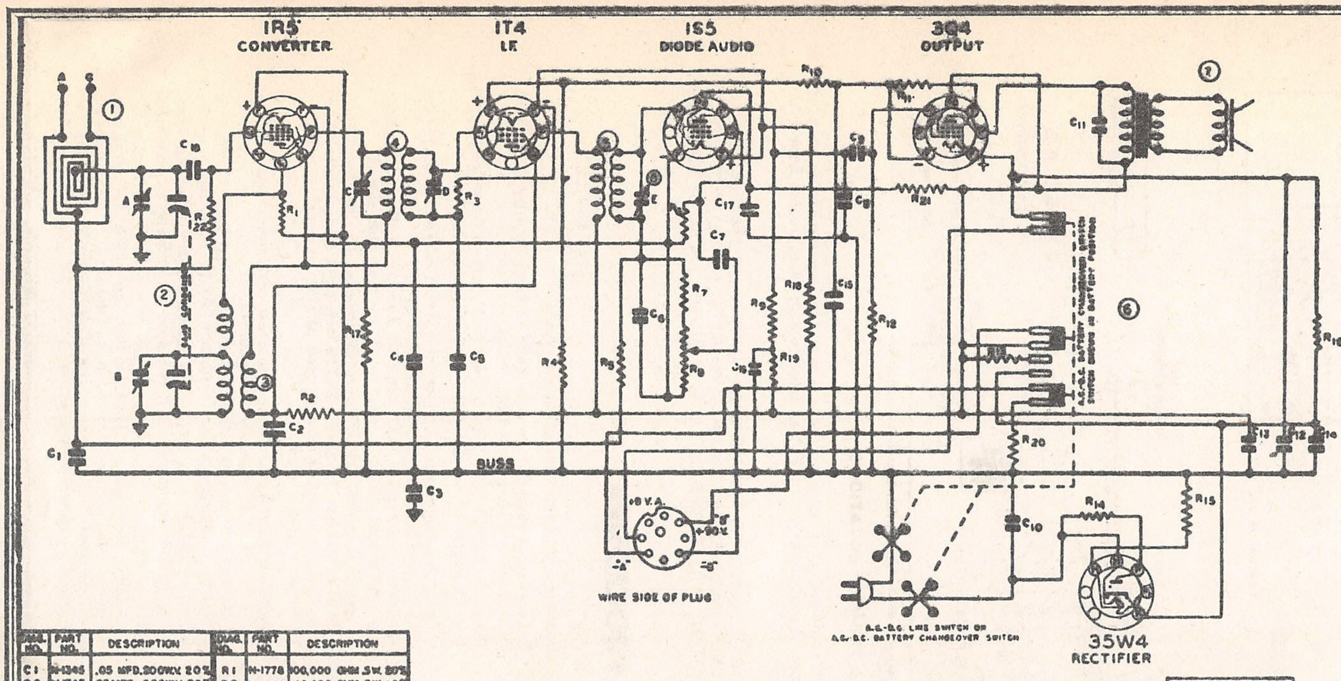
Set test oscillator at 1000 KC, tune in signal using right hand knob. Pointer should now be at the 4-3/16 inch mark in dial plate. If not, adjust oscillator tuning slug (located beneath chassis) so that 1000 KC comes in at this mark.

**4. Antenna Alignment.** Connect the test oscillator to the antenna lead through a 100 mfd (.0001) condenser.

Set the test oscillator at 1620 KC, turn right hand knob all the way to the right and adjust antenna trimmer "A" for maximum signal.

Set the test oscillator at 1000 KC. Tune in signal using right hand knob. Adjust antenna tuning slugs (located above chassis) for maximum signal.

In adjusting these slugs, it is best to turn one core about a half turn, then remove the hand or tool and tune in the signal. Repeat this until the adjustment for maximum signal is reached. Keep the two antenna slugs as even as possible.


IR5
CONVERTER
IT4
I.F.
IS5
DIODE AUDIO
3Q4
OUTPUT
35W4
RECTIFIER
BUSS
WIRE SIDE OF PLUG
+9 V.A.
+90V.
A.C.-D.C. LINE SWITCH OR
A.C.-D.C. BATTERY CHANGEOVER SWITCH
A.C.-D.C. BATTERY CHANGEOVER SWITCH
SWITCH SHOWN IN BATTERY POSITION
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
R1
R2
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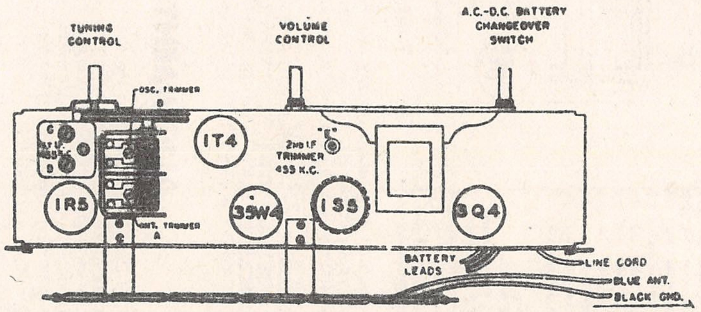
I.F. 455K.C.


TUNING CONTROL
VOLUME CONTROL
A.C.-D.C. BATTERY CHANGEOVER SWITCH
OSC. TRIMMER B
ANT. TRIMMER A
2ND I.F. TRIMMER 455 K.C.
IT4
IR5
35W4
IS5
3Q4
BATTERY LEADS
LINE CORD
BLUE ANT.
BLACK GND.

| DIAG. NO. | PART NO. | DESCRIPTION | DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|---|---|---|
| C1 | N-1346 | .05 MFD. 200W.V. 20% | R1 | N-1778 | 100,000 OHM .5W. 20% |
| C2 | N-1345 | .05 MFD. 200W.V. 20% | R2 | N-4693 | 10,000 OHM .5W. 10% |
| C3 | N-5160 | .2 MFD. 200 W.V. 10% | R3 | N-1263 | 10 MEGOHM .5W. 20% |
| C4 | N-1381 | .1 MFD. 200 W.V. 20% | R4 | N-4280 | 560 OHM .5W. 10% |
| C5 | N-1378 | .02 MFD. 400 W.V. 20% | R5 | N-4277 | 22 MEGOHM .5W. 20% |
| C6 | N-1374 | .0001 MFD. MICA 20% | R6 | N-1263 | 10 MEGOHM .5W. 20% |
| C7 | N-4894 | .005 MFD. 600W.V.-[illegible] | R7 | N-4063 | 47,000 OHM .5W. 20% |
| C8 | N-1374 | .0001 MFD. MICA 20% | R8 | N-3940 | 1 MEG. VOLUME CONT |
| C9 | N-1344 | .01 MFD. 400W.V. 20% | R9 | N-2976 | 1 MEGOHM .5W. 10% |
| C10 | N-1348 | .05 MFD. 400W.V. 20% | R10 | N-5466 | 15 OHM .5W. 10% |
| C11 | N-2063 | .005 MFD. 600W.V. | R11 | N-4420 | 330 OHM .5W. 10% |
|  |  | -15 +40% | R12 | N-4277 | 2.2 MEGOHM .5W. 20% |
| C12 | N-2746 | 100 MFD. 7.5 V. ELECTR- | R13 | N-1776 | 1,500 OHM .5W. 20% |
| C13 |  | 40 MFD. 150V. OLYTIC | R14 | N-5469 | 82 OHM 1W. 10% |
| C14 |  | 40 MFD. 150V. COND. | R15 | N-3342 | 550 OHM 12.5W. 10% |
| C15 | N-3232 | 200 MFD. 7.5 V. ELECT- | R16 | N-3054 | 2,150 OHM 5.5W. 5% |
| C16 | N-1381 | .1 MFD. 200W.V. 20% | R17 | N-1776 | 1,500 OHM .5 20% |
| C17 | N-1344 | .01 MFD. 400W.V. 20% | R18 | N-5082 | 2,200 OHM .5 20% |
| C18 | N-2309 | .0002 MFD. MICA 20% | R19 | N-2973 | 100,000 OHM .5 10% |
| 1 | N-5373 | LOOP ANT. COIL | R20 | N-5053 | 12 OHM .5 10% |
| 2 | N-4812 | TWO GANG COND. | R21 | N-5473 | 3.3 MEGOHM .5 10% |
| 3 | N-5122 | OSCILLATOR COIL | R22 | N-4277 | 2.2 MEGOHM .5 20% |
| 4 | N-5474 | 1ST. I.F. TRANSF. |  |  |  |
| 5 | N-5062 | 2ND. I F TRANSF |  |  |  |
| 6 | N-4148<br>N-5235 | CHANGEOVER SW'CH |  |  |  |
| 7 | N-5166 | 5" P.M. SPKR. & TRANS. |  |  |  |
| 8 | N-2646 | ADJUSTABLE TRIMMER |  |  |  |

**BATTERY.** To install a new battery or replace an old one, remove the screws holding the back in place and lift off the back. Remove the battery and pull out the plug. Insert plug in new battery and place battery in bottom of cabinet. Replace back.

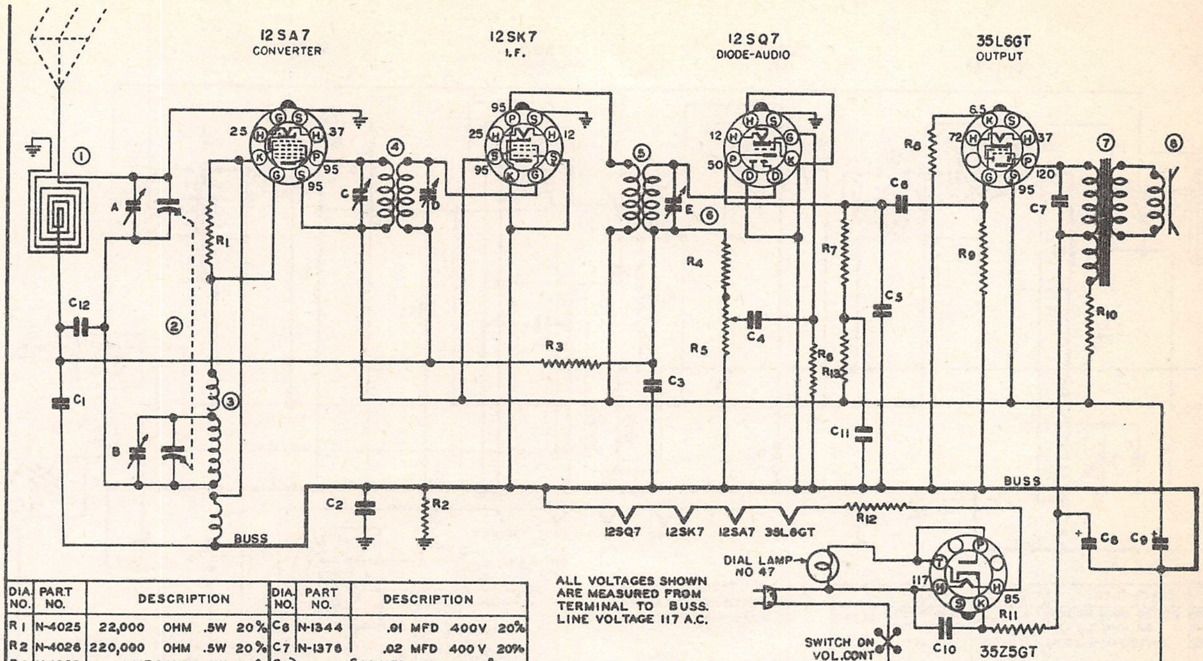
The batteries listed below are satisfactory for service in your receiver. They are combination "A" and "B" packs having 90 volts "B" and 9 and 7½ volts "A".

| Manufacturer | Type Number |
|---|---|
| Burgess | F6A60 |
| Burgess | G6M60 |
| Eveready | 754 |
| General Dry Battery | 60B6F6-5 |
| Ray-O-Vac | AB878 |
| Ray-O-Vac | AB994 |

## ALIGNMENT

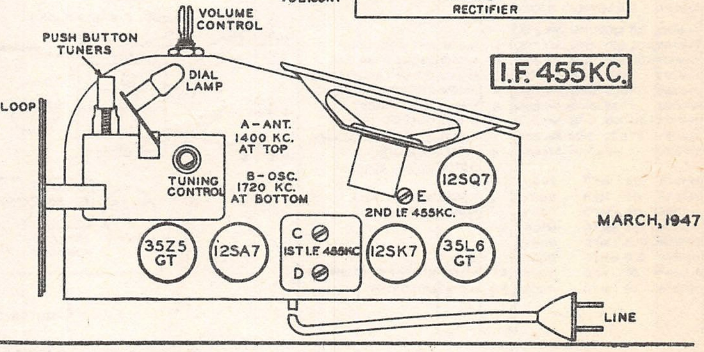
| Oper-ation | Connect Oscillator To: | Dummy Ant. | Set Osc. To: | Set Dial To: | Adjust Trimmers | Purpose |
|---|---|---|---|---|---|---|
| 1 | Converter Grid | .05 MFD. | 455 KC | Min. Cap. | C, D, E | Align IF |
| 2 | Antenna | 100 MMF. | 1620 KC | Min. Cap. | B | Set Oscillator |
| 3 | Antenna | 100 MMF. | 1400 KC | 1400 KC | A | Adjust Ant. |
| 4 | Antenna | 100 MMF. | 600 KC | 600 KC | .... | Check Calibration |

SONORA RADIO & TELEV. CORP.


12SA7
CONVERTER
12SK7
I.F.
12SQ7
DIODE-AUDIO
35L6GT
OUTPUT
BUSS
12SQ7 12SK7 12SA7 35L6GT
DIAL LAMP NO 47
SWITCH ON VOL.CONT
35Z5GT
RECTIFIER
R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12

ALL VOLTAGES SHOWN ARE MEASURED FROM TERMINAL TO BUSS. LINE VOLTAGE 117 A.C.

| DIA. NO. | PART NO. | DESCRIPTION | DIA. NO. | PART NO. | DESCRIPTION |
|---|---|---|---|---|---|
| R1 | N-4025 | 22,000 OHM .5W 20% | C6 | N-1344 | .01 MFD 400V 20% |
| R2 | N-4026 | 220,000 OHM .5W 20% | C7 | N-1376 | .02 MFD 400V 20% |
| R3 | N-1262 | 1. MEGOHM .5W 20% | C8 | N-5051 | 40 MFD 150V ELECTRO- |
| R4 | N-4063 | 47,000 OHM .5W 20% | C9 | | 40 MFD 150V LYTIC |
| R5 | N-2087 | .5 MEG. VOLUME CONTROL | C10 | N-1376 | .05 MFD 400V 20% |
| R6 | N-4028 | 6.8 MEGOHM .5W 20% | C11 | N-1351 | .1 MFD 200V 20% |
| R7 | N-4026 | 220,000 OHM .5W 20% | C12 | N-1345 | .05 MFD 200V 20% |
| R8 | N-4067 | 180 OHM .5W 10% | | | |
| R9 | N-4027 | 470,000 OHM .5W 20% | 1 | N-6188 | LOOP COIL |
| R10 | N-5358 | 1,000 OHM 1.W 10% | 2 | N-6192 | 2 GANG CONDENSER |
| R11 | N-4022 | 33 OHM .5W 20% | 3 | N-4645 | OSC. COIL |
| R12 | N-4023 | 82 OHM 2.W 10% | 4 | N-4813 | 1ST I.F. TRANSFORMER |
| R13 | N-4823 | 56,000 OHM .5W 10% | 5 | N-4646 | 2ND I.F TRANSFORMER |
| | | | 6 | N-4985 | TRIMMER |
| C1 | N-1345 | .05 MFD 200V 20% | 7 | N-6191 | OUTPUT TRANSFORMER |
| C2 | N-1345 | .05 MFD 200V 20% | 8 | N-6187 | 5" SPEAKER |
| C3 | N-6015 | 100 MMFD 500V 20% | | | |
| C4 | N-4894 | .005 MFD 600V -15+40% | | | |
| C5 | N-6135 | 250 MMFD 500V 20% | | | |


VOLUME CONTROL
PUSH BUTTON TUNERS
DIAL LAMP
LOOP
A-ANT. 1400 KC. AT TOP
B-OSC. 1720 KC. AT BOTTOM
TUNING CONTROL
12SQ7
E
2ND I.F. 455KC.
C
1ST I.F. 455KC
D
35Z5 GT
12SA7
12SK7
35L6 GT
LINE

I.F. 455KC.

MARCH, 1947

## AUTOMATIC TUNING

**Automatic tuning is a standard feature on this Model. It provides instantaneous selection of any four favorite stations by simply depressing a button. The automatic unit is wholly mechanical in operation and of rugged construction to assure greater accuracy over a longer period of time.**

**ADJUSTMENT.** All adjustments are simply made from the front of the cabinet using an ordinary screw driver.

To make adjustments remove all four buttons, which pull off readily. The center buttons should be removed first, since by depressing the adjacent buttons with thumb and finger a firm grip may be secured on either center button. The top and bottom buttons can then be easily removed.

Loosen the screw of the desired button and with the manual tuning knob tune to any desired station. Hold the manual tuning knob in position and depress the button shaft as far as possible. With the button fully depressed, tighten the screw firmly.

Be sure the push button knob is held down in position while being tightened.

After the stations are adjusted, it is advisable to check each button to assure sufficient tightening.

To assure accurate adjustment, the volume control should be set at a moderate level and the station tuned in slowly to a point of maximum volume and clarity.

It is not necessary to follow any particular sequence of stations since each button is adjustable to any station.

With each button definitely set and securely tightened to the selected station, the tuner is ready for operation.

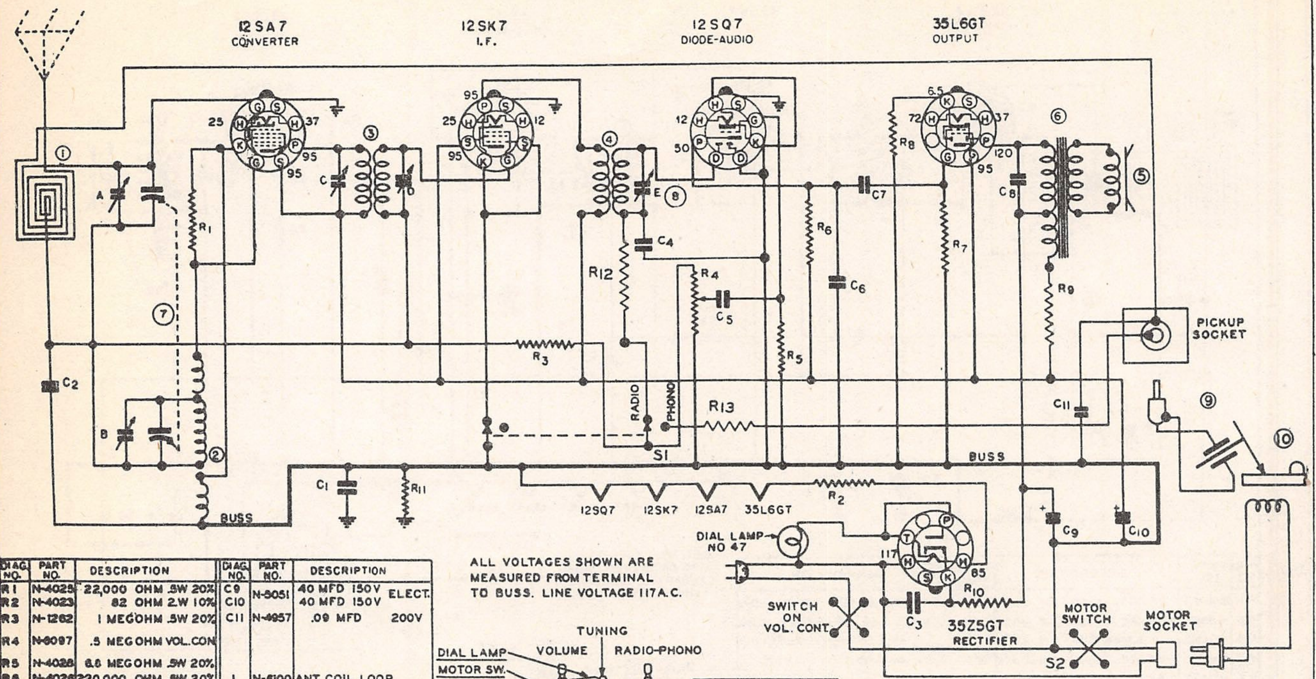
**OPERATION.** With the set turned on to a moderate level of volume, the automatic tuner is operated by merely pressing a button set to the desired station.

Station selection may be made automatically or manually at will, since the manual tuning control functions integrally with the automatic unit.

The station call letter tabs enclosed in the Operating Instruction Sheet envelope should be inserted into the slot of the push-buttons, using designations corresponding to the station selected for each button. After inserting call letter tabs, the buttons may be replaced.

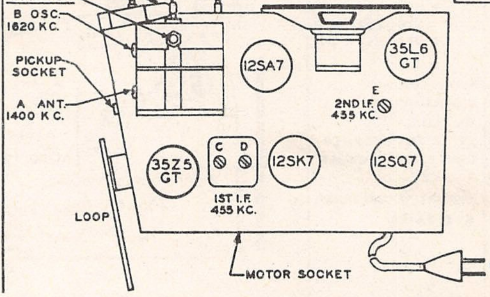
For alignment, see P.16-4

SONORA RADIO & TELEV. CORP.



ALL VOLTAGES SHOWN ARE MEASURED FROM TERMINAL TO BUSS. LINE VOLTAGE 117A.C.

| DIAG. NO. | PART NO. | DESCRIPTION | DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|---|---|---|
| R1 | N-4025 | 22,000 OHM .5W 20% | C9 | N-5051 | 40 MFD 150V ELECT. |
| R2 | N-4023 | 82 OHM 2.W 10% | C10 | | 40 MFD 150V |
| R3 | N-1262 | 1 MEGOHM .5W 20% | C11 | N-4957 | .09 MFD 200V |
| R4 | N-6097 | .5 MEGOHM VOL.CON | | | |
| R5 | N-4028 | 6.8 MEGOHM .5W 20% | | | |
| R6 | N-4026 | 220,000 OHM .5W 20% | 1 | N-6100 | ANT. COIL LOOP |
| R7 | N-4027 | 470 000 OHM .5W 20% | 2 | N-4810 | OSCILLATOR COIL |
| R8 | N-4057 | 180 OHM .5W 10% | 3 | N-4813 | 1ST I.F. TRANSFORMER |
| R9 | N-5358 | 1000 OHM 1.W 10% | 4 | N-4846 | 2ND I.F. TRANSF. |
| R10 | N-4022 | 33 OHM .5W 20% | 5 | N-6102 | 4" SPEAKER |
| R11 | N-4026 | 220 000 OHM .5W 20% | 6 | N-4875 | OUTPUT TRANSF. |
| R12 | N-4063 | 47 000 OHM .5W 20% | 7 | N-6093 | 2 GANG CONDENSER |
| R13 | N-1262 | 1 MEGOHM .5W 20% | 8 | N-4048 | TRIMMER |
| | | | 9 | N-5014<br>N-4987 | PHONO PICKUP |
| C1 | N-1345 | .05 MFD 200V | | | |
| C2 | N-1345 | .05 MFD 200V | 10 | N-3848<br>N-3850 | 8" TURNTABLE & MOTOR |
| C3 | N-1346 | .05 MFD 400V | | | |
| C4 | N-1374 | 100 MMFD MICA | | | |
| C5 | N-4894 | .005 MFD 600V | | | |
| C6 | N-4890 | 500 MMFD 600V | | | |
| C7 | N-1344 | .01 MFD 400V | S1 | N-2877 | RADIO-PHONO SWITCH |
| C8 | N-1376 | .02 MFD 400V | S2 | N-2094 | MOTOR SW. |



I.F. 455 KC.

5 TUBE PHONOGRAPH
SUPERHETERODYNE
SINGLE BAND
DRAWN M.F. APPROVED

FEBRUARY 1947

WGFU

## AERIAL SYSTEM

The receiver has a built-in "loop" aerial. Its excellent design is such as to increase pick-up from stations having wide variations in signal strength. The efficiency and selectivity of the loop provide outstanding reception without the use of an external aerial. The "loop" aerial used on this receiver is somewhat directional so reception from weak stations can be improved by turning the set in the proper direction. In or near metal buildings, iron ore deposits or steel structures or in localities remote from broadcasting stations, reception can be improved by using an outside aerial 50 feet to 100 feet in length including lead-in. Connect the outside aerial to the aerial lead. When using the outside aerial it may be necessary to reverse the power cord plug in wall socket to eliminate hum or distortion.

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

**NOTE:** IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

## ALIGNMENT PROCEDURE

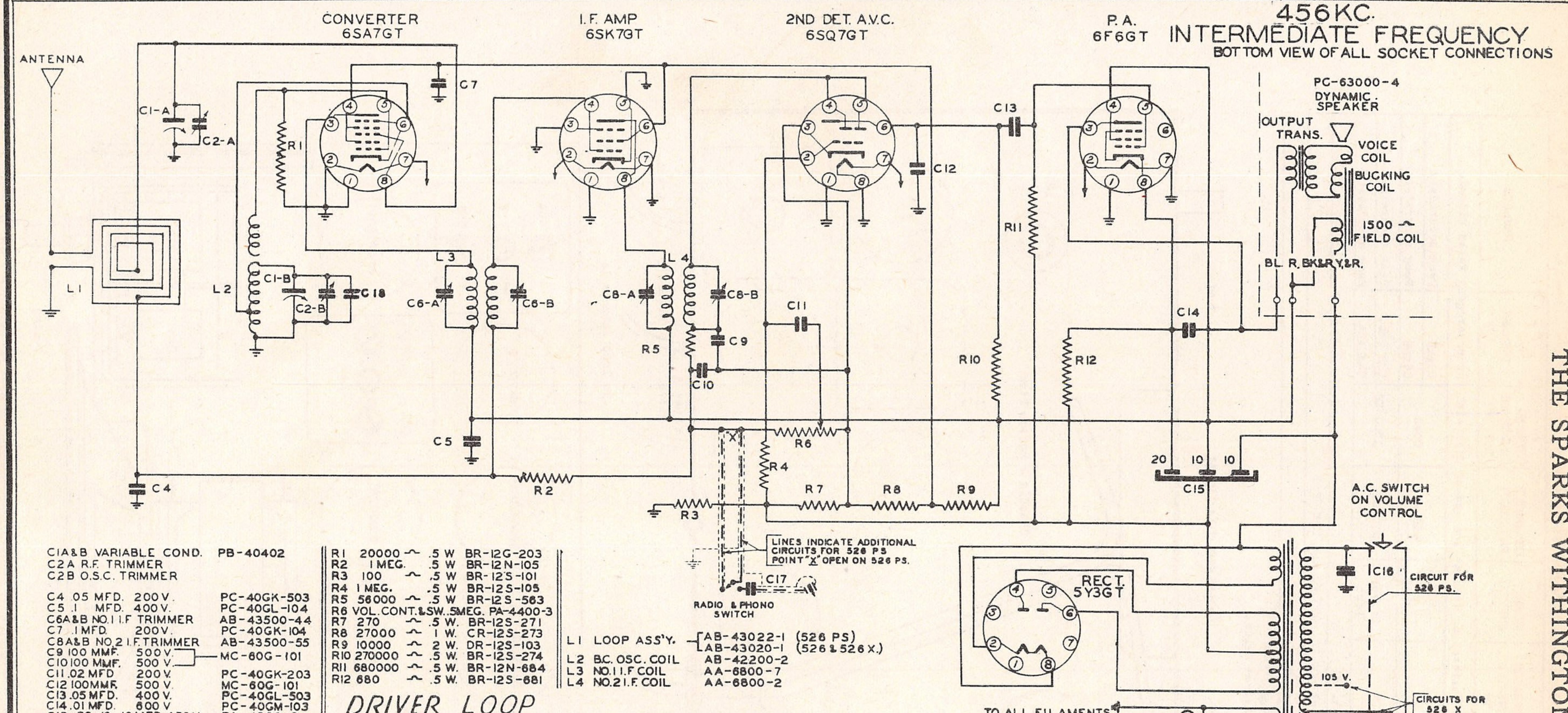
**GENERAL DATA.** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

**I. F. ALIGNMENT.** Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT.** Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

# THE SPARKS WITHINGTON CO.


456KC.
INTERMEDIATE FREQUENCY
BOTTOM VIEW OF ALL SOCKET CONNECTIONS
CONVERTER
6SA7GT
I.F. AMP
6SK7GT
2ND DET. A.V.C.
6SQ7GT
P.A.
6F6GT
RECT.
5Y3GT
ANTENNA
C1-A
C2-A
C1-B
C2-B
C18
C4
C5
C6-A
C6-B
C7
C8-A
C8-B
C9
C10
C11
C12
C13
C14
C15
C16
C17
L1
L2
L3
L4
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
20
10
10
PC-63000-4
DYNAMIC
SPEAKER
OUTPUT
TRANS.
VOICE
COIL
BUCKING
COIL
1500 ~
FIELD COIL
BL. R. BK.&R.Y.&R.
A.C. SWITCH
ON VOLUME
CONTROL
CIRCUIT FOR
526 PS.
CIRCUITS FOR
526 X
105 V.
125 V.
240 V.
TO
PHONO MOTOR
TO ALL FILAMENTS
EXCEPT 5Y3GT
DIAL LIGHT
PA-4100-3
STATIC
SHIELD
INPUT PLUG
AND CORD
PA-4003-1
LINES INDICATE ADDITIONAL
CIRCUITS FOR 526 PS
POINT "X" OPEN ON 526 PS.
RADIO & PHONO
SWITCH
X

DOMESTIC TRANS. AB44007-1
EXPORT TRANS. AB44008-1

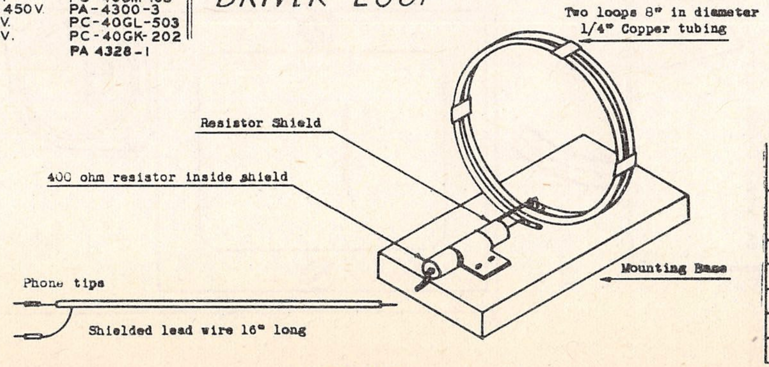
C1A&B VARIABLE COND. PB-40402
C2A R.F. TRIMMER
C2B O.S.C. TRIMMER

C4 .05 MFD. 200V. PC-40GK-503
C5 .1 MFD. 400V. PC-40GL-104
C6A&B NO.1 I.F TRIMMER AB-43500-44
C7 .1 MFD. 200V. PC-40GK-104
C8A&B NO.2 I.F. TRIMMER AB-43500-55
C9 100 MMF. 500 V. } MC-60G-101
C10 100 MMF. 500 V. }
C11 .02 MFD 200V. PC-40GK-203
C12 100MMF. 500 V. MC-60G-101
C13 .05 MFD. 400 V. PC-40GL-503
C14 .01 MFD. 600 V PC-40GM-103
C15 20-10-10 MFD. 450V. PA-4300-3
C16 .05 MFD. 400V. PC-40GL-503
C17 .002 MFD. 200V. PC-40GK-202
C18 15 MMF. PA 4328-1

R1 20000 ~ .5 W BR-12G-203
R2 1 MEG. .5 W BR-12N-105
R3 100 ~ .5 W BR-12S-101
R4 1 MEG. .5 W BR-12S-105
R5 56000 ~ .5 W BR-12S-563
R6 VOL. CONT.&SW. .5MEG. PA-4400-3
R7 270 ~ .5 W. BR-12S-271
R8 27000 ~ 1 W. CR-12S-273
R9 10000 ~ 2 W. DR-12S-103
R10 270000 ~ .5 W. BR-12S-274
R11 680000 ~ .5 W. BR-12N-684
R12 680 ~ .5 W. BR-12S-681

L1 LOOP ASS'Y. AB-43022-1 (526 PS)
AB-43020-1 (526 & 526 X.)
L2 B.C. OSC. COIL AB-42200-2
L3 NO.1 I.F. COIL AA-6800-7
L4 NO.2 I.F. COIL AA-6800-2

## DRIVER LOOP


Two loops 8" in diameter
1/4" Copper tubing
Resistor Shield
400 ohm resistor inside shield
Mounting Base
Phone tips
Shielded lead wire 16" long

SPECIFICATIONS

Two loops of 1/4" copper tubing 8" in diameter spaced 1/4" apart with 400 ohms resistor in series. Connecting cable and resistor must be shielded.
The loop should be spaced twice the diameter of the loop from the receiver being aligned to prevent an over modulated signal and poor alignment of the receiver.

## VOLTAGE CHART

Line Voltage: 117 Volts AC

Position of volume control: Full with set tunned to quiet channel
Position of Band Switch: Broadcast

| TUBE | FUNCTION | Voltage of Socket Prongs to Ground see prong nos. on schematic | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 |
| 6SA7GT | Converter | 0 | 0 | 230 | 85 | * * | * * | 6.2* | -.45 |
| 6SK7GT | I.F. Amp. | 0 | 6.2* | 0 | -.45 | 0 | 85 | 0 | 230 |
| 6SQ7GT | 2nd. Det. A.V.C. | 0 | -.95 | -.9 | -1.2 | -1.2 | 125 | 6.2* | 0 |
| 6F6GT | P.A. | 0 | 6.2* | 215 | 230 | * * | -1.9 | 0 | 15 |
| 5Y3GT | Rect. | 0 | 290 | 0 | 280 | 0 | 280 | 0 | 290 |

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% ≠ or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are ≠ DC voltages.
*AC volts.
**Cannot be measured with 20,000 Ohms per volt voltmeter.

**MODELS 5-26, 5-26X, 5-26PS**

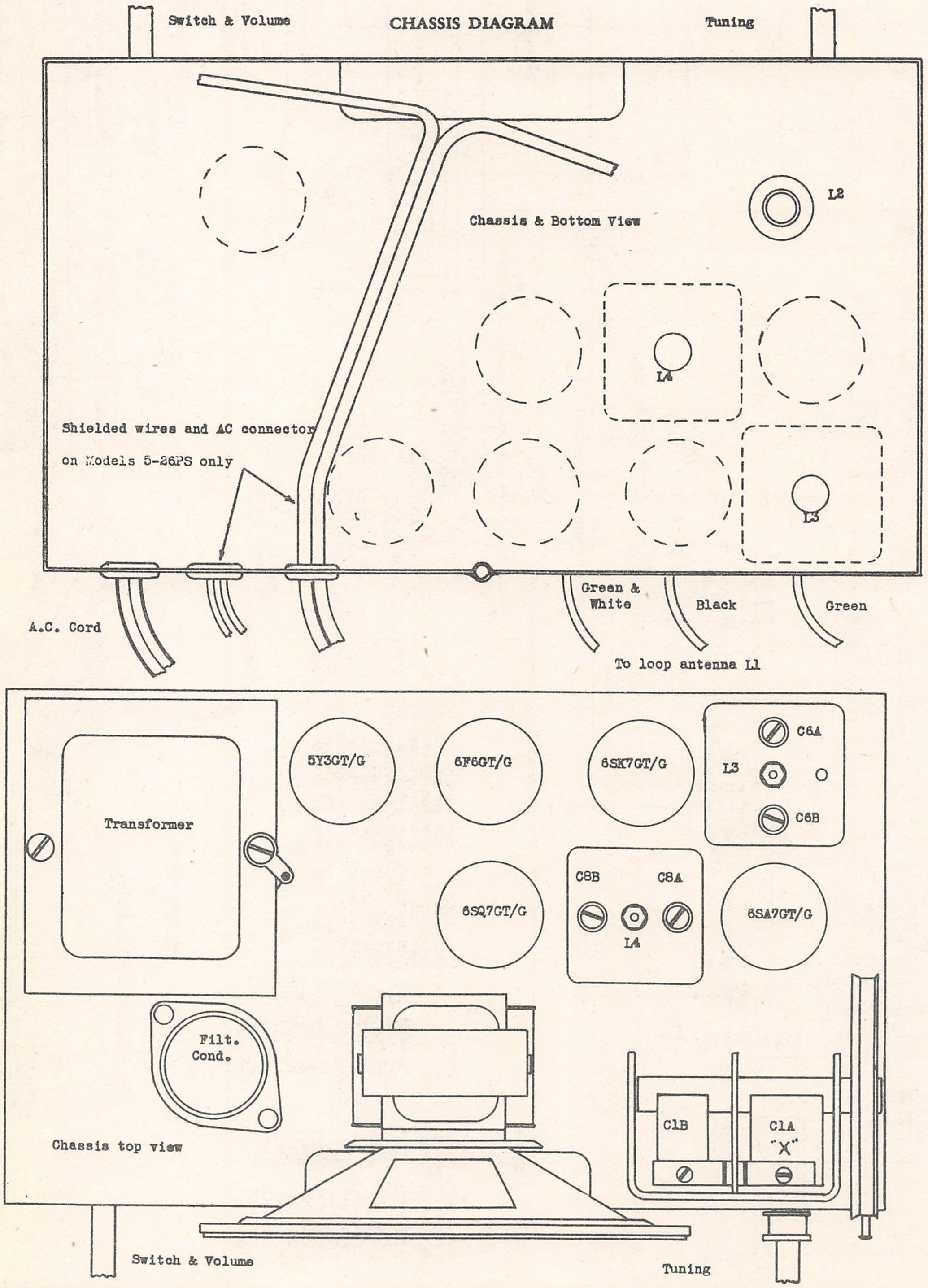
# THE SPARKS WITHINGTON CO.

## ALIGNMENT DATA

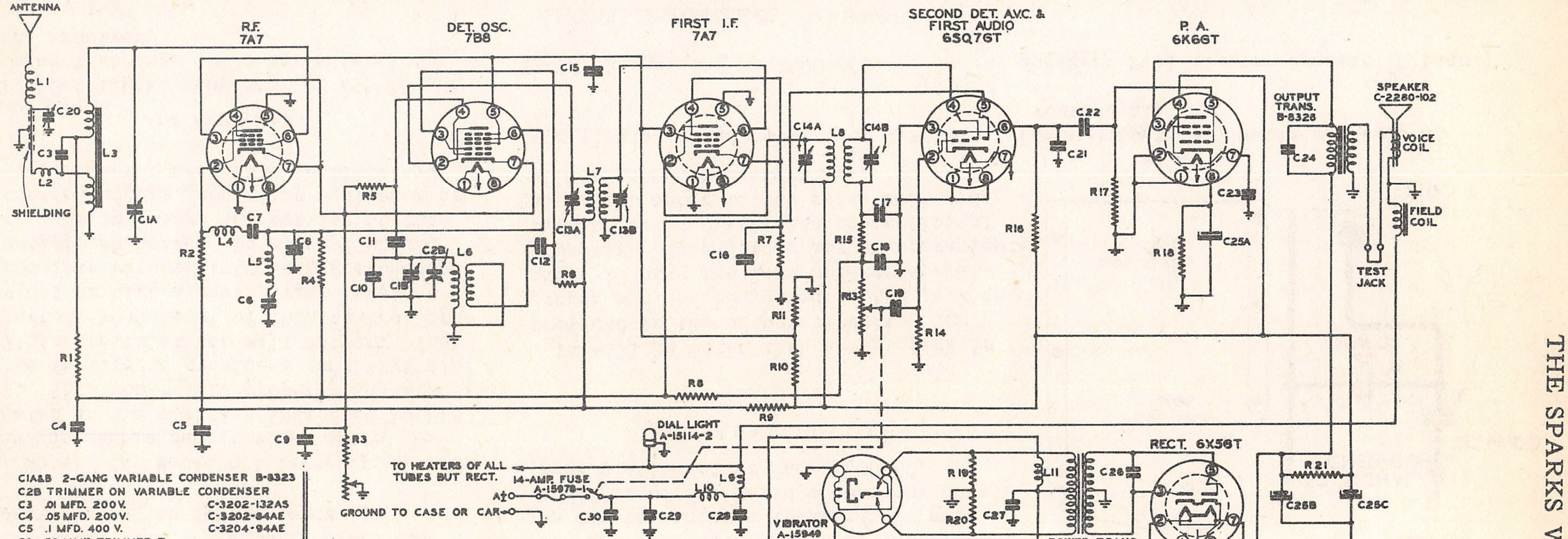
| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | TUNING CONDENSER SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | Set pointer to last calibration mark at low end of dial with condenser gang fully closed. | | | | | | |
| 2 | I.F. | * | .02MFD | 456 KC | Open | C8A&B | Peak accurately |
| | | | | | | C6A&B | Peak accurately |
| 3 | Broadcast | * * | Driver Loop | 1500 KC | 1500 KC | C2B Osc. | Peak accurately |
| | | | | | | C2A Ant. | Peak accurately |
| 4 | (Repeat operation No. 3) | | | | | | |
| 5 | (Check calibration at 600 KC, 900 KC and 1500 KC) | | | | | | |
| 6 | (Check operations 1 to 5 inclusive) | | | | | | |

Notes: * X on chassis diagram.
** Driver loop see diagram below.

## CHASSIS DIAGRAM


Switch & Volume
Tuning
Chassis & Bottom View
L2
L4
L3
Shielded wires and AC connector on Models 5-26PS only
A.C. Cord
Green & White
Black
Green
To loop antenna L1
5Y3GT/G
6F6GT/G
6SK7GT/G
L3
C6A
C6B
Transformer
6SQ7GT/G
C8B
C8A
L4
6SA7GT/G
Filt. Cond.
C1B
C1A
"X"
Chassis top view
Switch & Volume
Tuning

# THE SPARKS WITHINGTON CO.


ANTENNA
L1
C20
C3
L2
SHIELDING
L3
C1A
R.F.
7A7
DET. OSC.
7B8
FIRST I.F.
7A7
SECOND DET. A.V.C. &
FIRST AUDIO
6SQ7GT
P. A.
6K6GT
OUTPUT
TRANS.
B-8326
SPEAKER
C-2280-102
VOICE
COIL
FIELD
COIL
TEST
JACK
C15
C14A
L8
C14B
C22
C21
C24
C23
C25A
R17
R18
R2
L4
C7
L5
C8
R4
C6
R5
C11
C2B
L6
C10
C1B
C12
R6
L7
C13A
C13B
C16
R7
R11
R10
R8
R9
C17
R15
C18
R13
C19
R14
R16
R1
C4
C5
C9
R3
DIAL LIGHT
A-15114-2
TO HEATERS OF ALL
TUBES BUT RECT.
14-AMP. FUSE
A-15978-1
A
GROUND TO CASE OR CAR
C30
C29
C28
L9
L10
VIBRATOR
A-15949
R19
R20
C27
L11
C26
POWER TRANS.
B-8311
RECT. 6X5GT
R21
C25B
C25C

| | | |
|---|---|---|
| C1A&B | 2-GANG VARIABLE CONDENSER | B-8323 |
| C2B | TRIMMER ON VARIABLE CONDENSER | |
| C3 | .01 MFD. 200V. | C-3202-132AS |
| C4 | .05 MFD. 200V. | C-3202-84AE |
| C5 | .1 MFD. 400 V. | C-3204-94AE |
| C6 | 50 MMF. TRIMMER | B-7200-BD |
| C7 | 100 MMF. TRIMMER | |
| C8 | 15 MMF. MICA | C-720-390 |
| C9 | .05 MFD. 200V. | C-3202-84AE |
| C10 | 14 MMF. CERAMICON | A-14922-2 |
| C11 | 250 MMF. MICA | C-720-324 |
| C12 | 250 MMF. MICA | C-720-324 |
| C13A&B | NO. 1. I.F. TRIMMER | B-7200-GG |
| C14A&B | NO. 2 I.F. TRIMMER | B-7200-GG |
| C15 | .05 MFD. 200V. | C-3202-84AE |
| C16 | .05 MFD. 200V. | C-3202-84AE |
| C17 | 250 MFD. MICA | C-720-324 |
| C18 | 250 MFD. MICA | C-720-324 |
| C19 | .01 MFD. 200V. | C-3202-76AS |
| C20 | ANTENNA TRIMMER | A-20046 |

| | | |
|---|---|---|
| C21 | 250 MMF. MICA | C-720-324 |
| C22 | .02 MFD. 400V. | C-3204-78AE |
| C23 | 250 MMF. MICA | C-720-324 |
| C24 | .005 MFD. 600V. | C-3206-66AE |
| C25A | 20 MFD. 25 V. | ELECT. A-15946 |
| C25B | 10 MFD. 350 V. | |
| C25C | 15 MFD. 350V. | |
| C26 | .003 MFD. 1600 V. | C-3216-62AS. |
| C27 | .5 MFD. 120 V. | C-3203-102AE |
| C28 | .5 MFD. 120V. | C-3203-102AE |
| C29 | 100 MMF. MICA | C-720-325 |
| C30 | .5 MFD. 120 V. | C-3203-102AE |

| | | | |
|---|---|---|---|
| R1 | 330,000 Ω | .25 W. | C-2795-92B |
| R2 | 15,000 Ω | .5W. | C-2796-76C |
| R3 | SENSITIVITY CONTROL | | A-15962 |
| R4 | 1 MEG. | .25W. | C-2795-98B |
| R5 | 100,000 Ω | .5W. | C-2796-86C |
| R6 | 27,000 Ω | .5W. | C-2796-79C |
| R7 | 470 Ω | .25W. | C-2795-58B |
| R8 | 1 MEG. | .25W. | C-2795-98B |
| R9 | 3300 Ω | 1 W. | C-2797-68B |
| R10 | 27,000 Ω | 1 W. | C-2797-79B |
| R11 | 22,000 Ω | .5 W. | C-2796-78C |

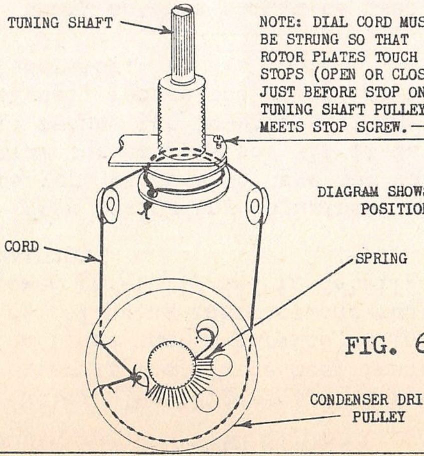
| | | | |
|---|---|---|---|
| R13 | 350,000 Ω | VOL. CONTROL | A-15144 |
| R14 | 6.8 MEG. | .25 W. | C-2795-108B |
| R15 | 27,000 Ω | .25W. | C-2795-79B |
| R16 | 270,000 Ω | .25 W. | C-2795-91B |
| R17 | 470,000 Ω | .25 W. | C-2795-94B |
| R18 | 560 Ω | 1. W. | C-2797-59B |
| R19 | 56 Ω | .5 W. | C-2796-47C |
| R20 | 56 Ω | .5 W. | C-2796-47C |
| R21 | 1800 Ω | 2 W. | A-20029 |

| | | |
|---|---|---|
| L1 | ANT. SPARK CHOKE | A-20000 |
| L2 | ANT. SPARK CHOKE | A-20000 |
| L3 | ANTENNA COIL | A-15997-1 |
| L4 | R.F. COIL | A-15992-1 |
| L5 | R.F. COIL | |
| L6 | OSCILLATING COIL | A-20001-1 |

| | | |
|---|---|---|
| L7 | NO. 1 I.F. COIL | A-15995 |
| L8 | NO. 2 I.F. COIL | A-15995-1 |
| L9 | HEATER HASH CHOKE | A-20002 |
| L10 | MOTOR NOISE CHOKE | A-20007 |
| L11 | HASH CHOKE | A-20002-1 |

## 455 K.C.
## INTERMEDIATE FREQUENCY

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS


TUNING SHAFT
CORD
SPRING
CONDENSER DRIVE
PULLEY

NOTE: DIAL CORD MUST BE STRUNG SO THAT ROTOR PLATES TOUCH STOPS (OPEN OR CLOSED) JUST BEFORE STOP ON TUNING SHAFT PULLEY MEETS STOP SCREW.

DIAGRAM SHOWS PULLEYS AND DIAL CORD IN CORRECT POSITION WITH CONDENSER FULLY CLOSED

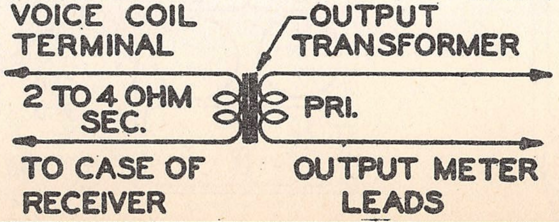
DIAL CORD

FIG. 6

Fig. 6 shows the correct way to string the dial cord. Unless the dial cord is strung properly it may have a tendency to jump off the pulley or otherwise operate improperly.

In case it is desired to use the type of output meter which usually is connected to the plate circuit of an output tube the diagram shown in Fig. 7 should be noted. The output transformer in this circuit is identical to the regular output transformer part No. B-8326 used in the Model 6F1 receiver.

FIG. 7


VOICE COIL
TERMINAL
OUTPUT
TRANSFORMER
2 TO 4 OHM
SEC.
PRI.
TO CASE OF
RECEIVER
OUTPUT METER
LEADS

MODEL 6F1

THE SPARKS WITHINGTON CO.

## ALIGNMENT INSTRUCTIONS

Note: The alignment of a radio receiver is one of the most important functions that a service man performs. The following instructions must be followed carefully and in detail.

### CAUTION

When making any adjustment on the receiver, be sure to have the volume control turned full on. If it is necessary to reduce the intensity of the test signal, reduce the volume at the signal generator.

Dummy antenna should be used through out the entire alignment procedure. The correct dummy antenna is composed of two 20 mmf. condensers (SPARTON Part C-720-389). The condenser should be connected in the line between the test oscillator or signal generator and the receiver as shown in Fig. 3. These capacities are identical with the actual capacities provided by the Ford antenna.

Note: The Model 6F1 is equipped with an adjustable sensitivity control located in the position indicated in Fig. 4. This control is properly adjusted at the factory to provide a sensitivity of 7 microvolts at one watt output. The factory adjustment of this control provides as high a sensitivity level as possible without introducing excessive background noise. No attempt should be made to change the setting of the control unless laboratory equipment is available for measuring sensitivity.

### I-F ALIGNMENT

1. Set signal generator at 455 KC and connect through the dummy antenna to the receiver.

2. Adjust trimmers C-14 A&B and C-13 A&B to maximum response. (See Fig. 2)

3. Adjust code rejector trimmer C-6 for minimum response. (See Fig. 2).

### R-F ALIGNMENT

1. Turn the manual tuning knob until the variable condenser plates are completely out of mesh (1600 KC).

2. Set signal generator 1600 KC.

3. Adjust oscillator trimmers C-2B for maximum response. (See Fig. 4).

4. Set signal generator to 1400 KC and rotate the manual tuning control until a signal is heard.

5. Adjust the antenna trimmer C-20 (See Fig. 5) for maximum response.

6. After receiver has been installed in car the antenna trimmer (C-20) must be adjusted for maximum response on a weak station at or near 1400 KC.

## MISCELLANEOUS DATA

### TEST JACK

It will be noted that a test jack is provided in the output circuit. The jumper must be connected to the jack in order to have the loud speaker operate properly. This jumper may be conveniently removed to permit the connection of an output meter to the voice coil side of the output transformer.

**Sensitivity:** 7 microvolts at 1 watt output.

**Tuning Range:** 540 to 1600 KC.

**Current Consumption:** 8.5 amps.

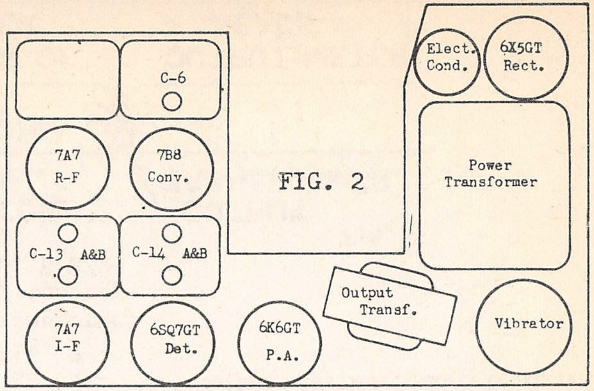


FIG. 2

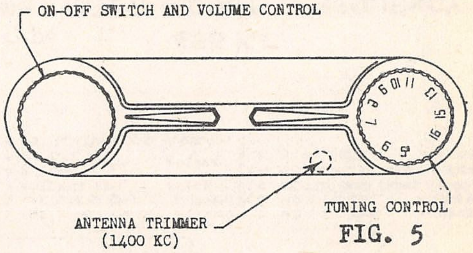


FIG. 5

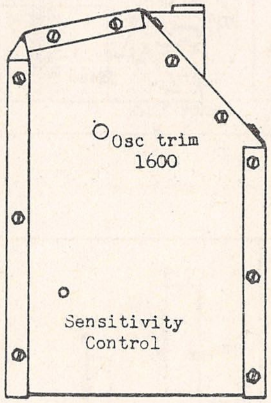


FIG. 4

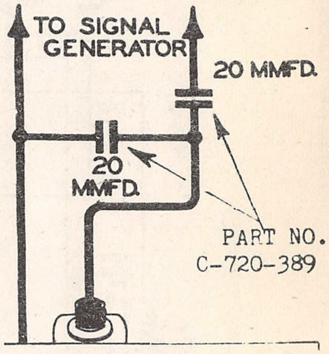


FIG. 3

**Power Output:** 3.5 watts measured at voice coil.

**Speaker:** Full electro dynamic (5 inch.)

**MODEL 6F1**

## VOLTAGE CHART

Input Voltage: 6.6 volts at panel. Volume Control Full On with Antenna Disconnected

| TUBE | FUNCTION | Voltage of Socket Prongs to Gnd. (See Schematic Diagram) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 |
| 7A7 | R-F Amplifier | H<br>0 | P<br>187 | Gs<br>68 | Gsu<br>3.8 | S<br>0 | G<br>0 | K<br>3.8 | H<br>6.4 |
| 7B8 | Osc - Converter | H<br>0 | P<br>225 | Ga<br>137 | Go<br>-10 | Gs<br>68 | G<br>0 | K<br>3.8 | H<br>6.4 |
| 7A7 | I-F Amplifier | H<br>0 | P<br>244 | Gs<br>68 | Gsu<br>2.6 | S<br>0 | G<br>0 | K<br>2.6 | H<br>6.4 |
| 6SQ7 GT | Det - AVC - 1st A-F | S<br>0 | G<br>0 | K<br>0 | Dp<br>0 | Dp<br>0 | P<br>98 | H<br>6.4 | H<br>0 |
| 6K6GT | Power Amplifier | S<br>0 | H<br>0 | P<br>255 | Gs<br>242 | G<br>0 | - | H<br>6.4 | K<br>18. |
| 6X5GT | Rectifier | S<br>0 | H<br>0 | P<br>320* | - | P<br>320* | - | H<br>6.5 | K<br>275 |

Notes: Voltage readings are for schematic diagram on page 3. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All D-c measurements made with 20000 ohms per volt voltmeter. All A-c voltages measured with rectifier type meter. Unless otherwise designated, voltages in table are - D-c volts. *Indicates AC volts.

Explanation of Symbols: H - Heater, P - Plate, Ga - Oscillator Anode, Go - Oscillator Grid, Gs - Screen Grid, Gsu - Suppressor Grid, S - Shield, Dp - Diode Plate, K - Cathode.

**MODEL 6F1D**

## VOLTAGE CHART

Input Voltage: 6.6 volts at panel. Volume Control Full On with Antenna Disconnected

| TUBE | FUNCTION | Voltage of Socket Prongs to Gnd. (See Schematic Diagram) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 |
| 7A7 | R-F Amplifier | H<br>0 | P<br>153 | Gs<br>72 | Gsu<br>3.5 | S<br>0 | G<br>-.1 | K<br>3.5 | H<br>6.3* |
| 7B8 | Osc - Converter | H<br>0 | P<br>205 | Ga<br>130 | Go<br>-7 | Gs<br>72 | G<br>-.1 | K<br>3.5 | H<br>6.3* |
| 7A7 | I-F Amplifier | H<br>0 | P<br>227 | Gs<br>72 | Gsu<br>2.6 | S<br>0 | G<br>0 | K<br>2.6 | H<br>6.3* |
| 7B6 | Det-AVC-1st A-F | H<br>0 | P<br>94. | G<br>-.5 | K<br>0 | Dp<br>0 | Dp<br>-.1 | K<br>0 | H<br>6.3* |
| 7C5 | Power Amplifier | H<br>0 | P<br>250 | Gs<br>230 | - | - | G<br>0 | K<br>12 | H<br>6.3* |
| 7Y4 | Rectifier | H<br>0 | - | P<br>275* | - | - | P<br>275* | K<br>255* | H<br>6.4* |

Notes: Voltage readings are for schematic diagram on page  . Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All D-c measurements made with 20000 ohms per volt voltmeter. All A-c voltages measured with rectifier type meter. Unless otherwise designated, voltages in table are + D-c volts. *Indicates AC volts.

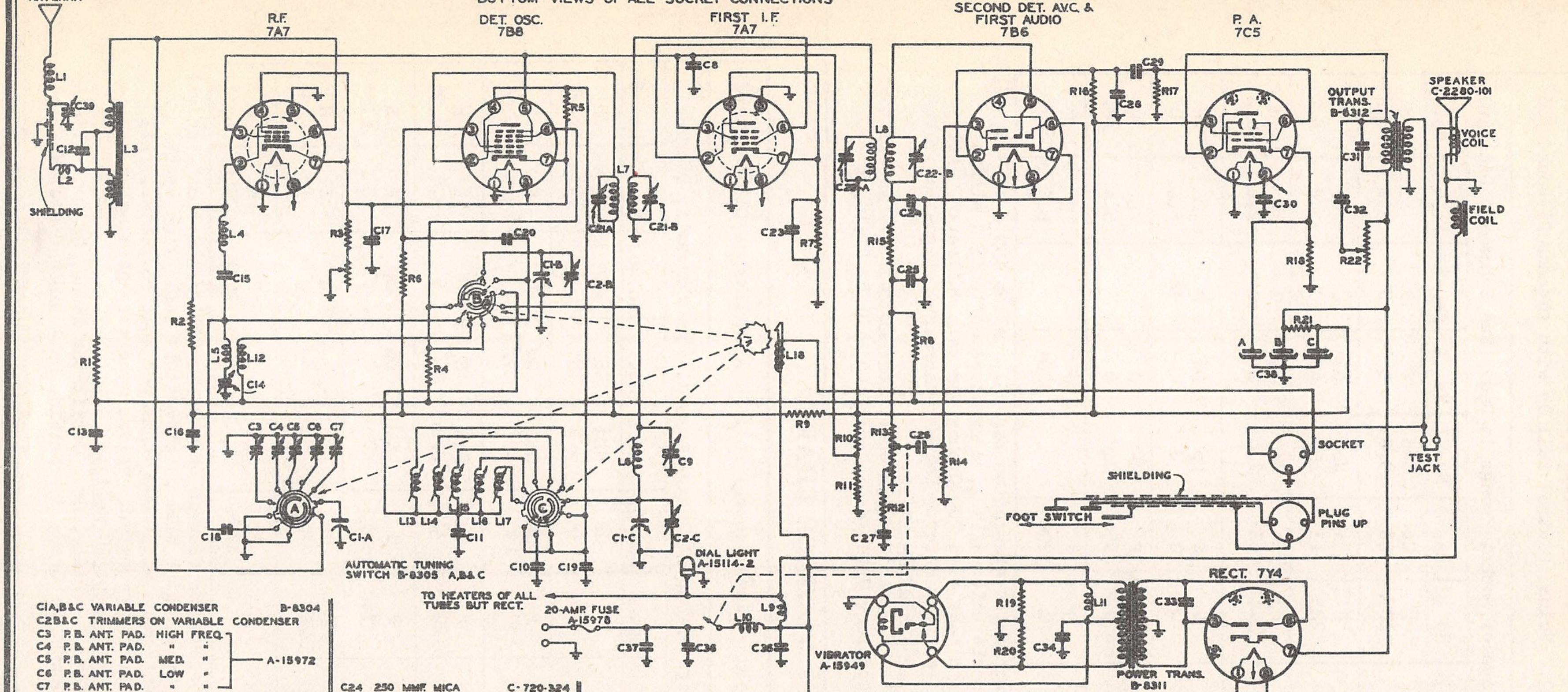
Explanation of Symbols: H - Heater, P - Plate, Ga - Oscillator Anode, Go - Oscillator Grid, Gs - Screen Grid, Gsu - Suppressor Grid, S - Shield, Dp - Diode Plate, K - Cathode.

MODEL 6F1D

# THE SPARKS WITHINGTON CO.

## INTERMEDIATE FREQUENCY 455 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS


ANTENNA
L1
C39
C12
L2
L3
SHIELDING
R1
C13
R.F.
7A7
L4
C15
R2
R3
C17
C16
L5
L12
C14
C3 C4 C5 C6 C7
A
C18
C1-A
DET. OSC.
7B8
R5
R6
C20
C1-B
C2-B
B
R4
L13 L14
L15
L16 L17
C11
C
C10
C19
AUTOMATIC TUNING
SWITCH B-8305 A,B,& C
L6
C9
C1-C
C2-C
FIRST I.F.
7A7
C8
L7
C21A
C21-B
C23
R7
L18
R9
DIAL LIGHT
A-15114-2
TO HEATERS OF ALL
TUBES BUT RECT.
20-AMP. FUSE
A-15978
L10
L9
C37
C36
C35
SECOND DET. A.V.C. &
FIRST AUDIO
7B6
L8
C22-A
C22-B
C24
R15
C25
R8
R10
R11
R13
C26
R12
C27
R14
VIBRATOR
A-15949
R19
R20
C34
L11
POWER TRANS.
B-8311
C33
RECT. 7Y4
R16
C28
C29
R17
P.A.
7C5
C30
R18
R21
A
B
C
C38
OUTPUT
TRANS.
B-8312
C31
C32
R22
SPEAKER
C-2280-101
VOICE
COIL
FIELD
COIL
SOCKET
TEST
JACK
SHIELDING
FOOT SWITCH
PLUG
PINS UP

| | | |
|---|---|---|
| C1A,B&C | VARIABLE CONDENSER | B-8304 |
| C2B&C | TRIMMERS ON VARIABLE CONDENSER | |
| C3 | P.B. ANT. PAD. HIGH FREQ. | A-15972 |
| C4 | P.B. ANT. PAD. " " | |
| C5 | P.B. ANT. PAD. MED. " | |
| C6 | P.B. ANT. PAD. LOW " | |
| C7 | P.B. ANT. PAD. " " | |
| C8 | .05 MFD. 200 V. | C-3202-84AE |
| C9 | 445 MMF. OSC. PADDER | A-15969 |
| C10 | 300 MMF. MICA | B-8265-2 |
| C11 | 390 MMF. MICA | B-8265-3 |
| C12 | .05 MFD. 200 V. | C-3202-84AS |
| C13 | .05 MFD. 200 V. | C-3202-84AE |
| C14 | 50 MMF. R.F. TRIMMER | B-7200-BD |
| C15 | 100 MMF. R.F. TRIMMER | |
| C16 | .1 MFD. 400 V. | C-3204-94AE |
| C17 | .05 MFD. 200 V. | C-3202-84AE |
| C18 | 20 MMF. MICA | C-720-389 |
| C19 | 20 MMF. CERAMICON | A-14922-1 |
| C20 | 250 MMF. MICA | C-720-324 |
| C21A&B | NO. 1 I.F. TRIMMER | B-7200-GG |
| C22A&B | NO. 2 I.F. TRIMMER | B-7200-GG |
| C23 | .05 MFD. 200 V. | C-3202-84AE |

| | | |
|---|---|---|
| C24 | 250 MMF. MICA | C-720-324 |
| C25 | 250 MMF. MICA | C-720-324 |
| C26 | .01 MFD. 200 V. | C-3202-76AS |
| C27 | .03 MFD. 200 V. | C-3202-80AE |
| C28 | 250 MMF. MICA | C-720-324 |
| C29 | .02 MFD. 400 V. | C-3204-78A3 |
| C30 | 250 MMF. MICA | C-720-324 |
| C31 | .01 MFD. 600 V. | C-3206-76AE |
| C32 | .03 MFD. 600 V. | C-3206-80AE |
| C33 | .003 MFD. 1600 V. | C-3216-62AS |
| C34 | .5 MFD. 120 V. | C-3203-102AE |
| C35 | .5 MFD. 120 V. | C-3203-102AE |
| C36 | 100 MMF. MICA | C-720-325 |
| C37 | .5 MFD. 120 V. | C-3203-102AE |
| C38-A | 20 MFD. 25 V. ELECT. | A-15946 |
| C38-B | 10 MFD. 350 V. | |
| C38-C | 15 MFD. 350 V. | |
| C39 | ANTENNA TRIMMER | A-20021 |

| | | |
|---|---|---|
| R1 | 330,000 Ω .25 W. | C-2795-92B |
| R2 | 15,000 Ω .5 W. | C-2796-76C |
| R3 | 1M Ω SENSITIVITY CONTROL | A-15962 |
| R4 | 330,000 Ω .25 W. | C-2795-92B |
| R5 | 100,000 Ω .5 W. | C-2796-88C |
| R6 | 27,000 Ω .5 W. | C-2796-79C |
| R7 | 470 Ω .25 W. | C-2795-58B |
| R8 | 1 MEGOHM .25 W. | C-2795-98B |
| R9 | 3,300 Ω 1 W. | C-2797-68B |
| R10 | 27,000 Ω 1 W. | C-2797-79B |
| R11 | 22,000 Ω .5 W. | C-2796-78C |
| R12 | 10,000 Ω .25 W. | C-2795-74B |
| R13 | 350 M Ω VOL. CONTROL | A-15142 |

| | | |
|---|---|---|
| R14 | 6.8 MEG. .25 W. | C-2795-108B |
| R15 | 27,000 Ω .25 W. | C-2795-79B |
| R16 | 270,000 Ω .25 W. | C-2795-91B |
| R17 | 470,000 Ω .25 W. | C-2795-94B |
| R18 | 330 Ω 1 W. | C-2797-56B |
| R19 | 56 Ω .5 W. | C-2796-47C |
| R20 | 56 Ω .5 W. | C-2796-47C |
| R21 | 1,800 Ω 2 W. | A-15987 |
| R22 | .5 MEG. TONE CONTROL | A-15143 |

| | | |
|---|---|---|
| L1 | ANT. SPARK CHOKE | A-20000 |
| L2 | ANT. SPARK CHOKE | A-20000 |
| L3 | ANTENNA COIL | A-15997 |
| L4 | R.F. COIL | A-15992 |
| L5 | R.F. COIL | |
| L6 | OSCILLATOR COIL | A-20001 |
| L7 | NO. 1 I.F. COIL | A-15995 |
| L8 | NO. 2 I.F. COIL | A-15995-1 |
| L9 | HEATER HASH CHOKE | A-20002 |
| L10 | MOTOR NOISE CHOKE | A-20007 |
| L11 | HASH CHOKE | A-20002-1 |
| L12 | TUNED R.F. COIL | A-15993 |

| | | |
|---|---|---|
| L13 | P.B. OSC. HI FREQ. | A-15971 |
| L14 | P.B. OSC " " | |
| L15 | P.B. OSC. MED. " | |
| L16 | P.B. OSC. LOW " | |
| L17 | P.B. OSC. LOW " | |
| L18 | SOLENOID | B-8315 |

### OUTPUT METER

In case it is desired to use the type of output meter which usually is connected to the plate circuit of an output tube the diagram shown in Fig. 7 should be noted. The output transformer in this circuit is identical to the regular output transformer part No. B-8312 used in the Model 6F1D receiver.

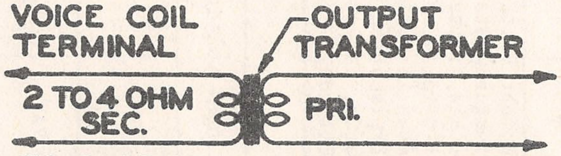

VOICE COIL
TERMINAL
OUTPUT
TRANSFORMER
2 TO 4 OHM
SEC.
PRI.
TO CASE OF
RECEIVER
OUTPUT METER
LEADS

FIG. 7

### TEST JACK

It will be noted that a test jack is provided in the output circuit. The jumper must be connected to the jack in order to have the loud speaker operate properly. This jumper may be conveniently removed to permit the connection of an output meter to the voice coil side of the output transformer.

For voltage, see P.16-5

## ALIGNMENT INSTRUCTIONS

Note: The alignment of a radio receiver is one of the most important functions that a service man performs. The following instructions must be followed carefully and in detail.

CAUTION

When making any adjustment on the receiver, be sure to have the volume control turned full on. If it is necessary to reduce the intensity of the test signal, reduce the volume at the signal generator.

Dummy antenna should be used through out the entire alignment procedure. The correct dummy antenna is composed of two 20 mmf. condensers (SPARTON Part C-720-389). The condenser should be connected in the line between the test oscillator or signal generator and the receiver as shown in Fig. 3. These capacities are identical with the actual capacities provided by the Ford antenna.

Note: The Model 6F1D is equipped with an adjustable sensitivity control located in the position indicated in Fig. 4. This control is properly adjusted at the factory to provide a sensitivity of 7 microvolts at one watt output. The factory adjustment of this control provides as high a sensitivity level as possible without introducing excessive background noise. No attempt should be made to change the setting of the control unless laboratory equipment is available for measuring sensitivity.

### I-F ALIGNMENT

1. Turn selector switch to the No. 1 (Automatic) position (580 KC).

2. Set signal generator at 455 KC and connect through the dummy antenna to the receiver.

3. Adjust trimmers C-22 A&B and C-21 A&B to maximum response. (See Fig. 2).

4. Adjust code rejector trimmer C-14 for minimum response. (See Fig. 2).

### R-F ALIGNMENT

1. Turn selector switch to "Manual Tuning" (D).

2. Turn the manual tuning knob until the variable condenser plates are completely cut of mesh (1600 KC).

3. Set signal generator 1600 KC.

4. Adjust oscillator trimmer C-2C for maximum response. (See Fig. 4).

5. Set signal generator to 1400 KC and rotate the manual tuning control until a signal is heard.

6. Adjust R-F trimmer C-2B (See Fig. 4) and the antenna trimmer C-39 (See.Fig. or maximum response.

7. Set the signal generator to 600 KC and rotate the manual tuning control until a signal is heard.

8. The variable condenser should then be rocked slightly while adjusting the oscillator padder condenser C-9. (See Fig. 5).

9. Repeat adjustments described in step 6 to make sure that condensers C-2B and C-39 are peaked for maximum response.

10. After receiver has been installed in car the antenna trimmer (C-39) must be adjusted for maximum response on a weak station at or near 1400 KC.

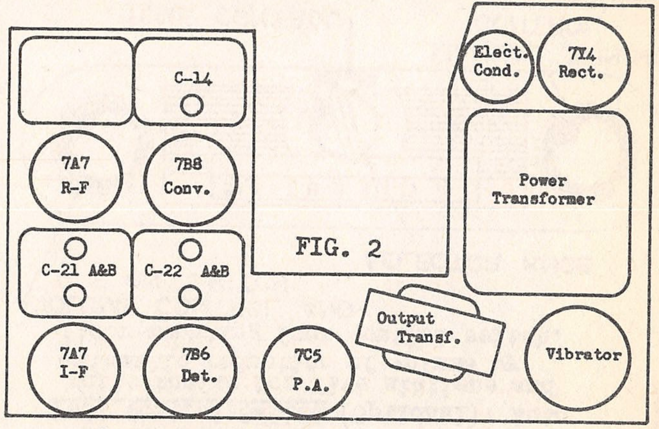


FIG. 2

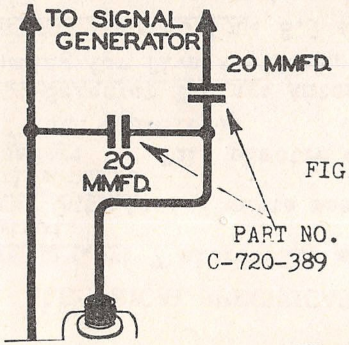


FIG. 3

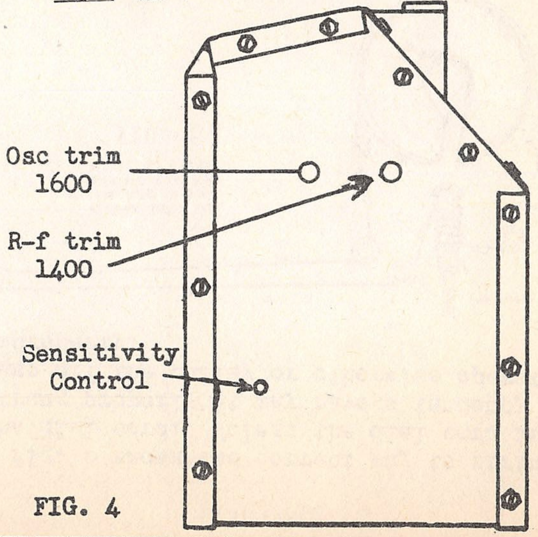


FIG. 4

MODEL 6F1D

THE SPARKS WITHINGTON CO.

## SETTING THE ROTO-SELECTOR

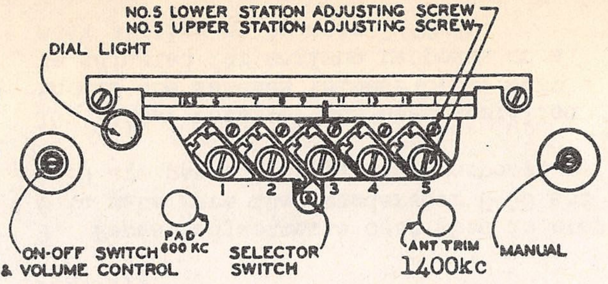
1. Turn receiver on and allow it to operate for approximately ½ hour. (This is necessary in order that the operating temperature may reach normal and to be assured of accurate adjustment).

2. Remove the plastic escutcheon over the tuning control by first pulling off the three (3) knobs and removing the lock nuts on the tuning and volume control shafts. With the escutcheon removed, the automatic adjusting screws become accessible as shown in Fig. 5. The adjustments are easily made by means of a small screw driver.

3. Select five stations within the frequency range shown under each set of adjustment screws in Fig. 5.

4. With the selector switch in the "D" position, tune in manually the broadcast station to be set up on position No. 1 and identify the program. Note: Due to the net-work programs broadcast by many stations, it is advisable to wait until the station announces its call letters before completing the adjustments.

5. With the desired station accurately tuned in turn selector switch to the No. 1 position. Now using the screw driver turn the top screw at position No. 1 until the station selected is brought in with the loudest volume, then adjust the larger screw at the bottom until maximum volume is obtained. Note: Stations of the higher frequencies are tuned in by turning the screws to the left (counter-clockwise). Lower frequency stations are tuned by turning the screws to the right (clockwise).


NO.5 LOWER STATION ADJUSTING SCREW
NO.5 UPPER STATION ADJUSTING SCREW
DIAL LIGHT
1
2
3
4
5
PAD 600 KC
ON-OFF SWITCH & VOLUME CONTROL
SELECTOR SWITCH
ANT TRIM 1400kc
MANUAL

| TUNING RANGES | |
|---|---|
| 1 | 540-950 K. C. |
| 2 | 540-950 K. C. |
| 3 | 650-1300 K. C. |
| 4 | 850-1600 K. C. |
| 5 | 950-1600 K. C. |

| WHEN SHIPPED, THE AUTOMATICS ARE ADJUSTED TO THESE FREQUENCIES: | |
|---|---|
| 1 | 580 K.C. |
| 2 | 780 K.C. |
| 3 | 1000 K.C. |
| 4 | 1200 K.C. |
| 5 | 1380 K.C. |

FIG. 5

6. Proceed with setting up the remaining four stations in the same manner as described under paragraphs 4 and 5.

7. Recheck the screws for each station to make sure that each one of the selected stations is tuned in as accurately as possible. It is advisable for the final rechecking of adjustments to be made in an area of low signal strength or in some known "dead spot", where radio signals are difficult to receive.

### SOLENOID PLUNGER

The solenoid plunger is fully lubricated at the factory and normally no special lubrication service will be required. However, it is good practice to place one or two drops of lubricant on the plunger at such times as the receiver may be in the service shop. Use only Super Pyroil "B" as a plunger lubricant. It is readily obtainable from any auto supply house or from the factory.

### DIAL CORD

Fig. 6 shows the correct way to string the dial cord. Unless the dial cord is strung properly it may have a tendency to jump off the pulley or otherwise operate improperly.

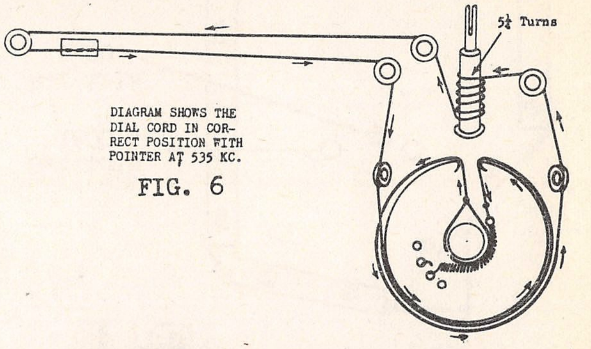


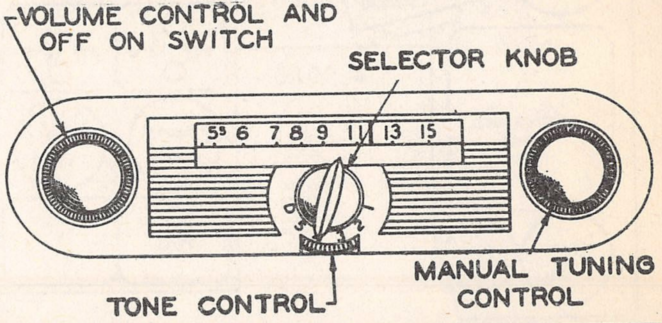
DIAGRAM SHOWS THE DIAL CORD IN CORRECT POSITION WITH POINTER AT 535 KC.

FIG. 6

### ELECTRICAL SPECIFICATIONS

**Sensitivity:** 7 microvolts at 1 watt output.
**Power Output:** 4.5 watts measured at voice coil.
**Speaker:** Full electro dynamic (7 inch diameter).
**Roto-Selector Tuning:** Automatic tuning for five stations.
**Current Consumption:** 8.5 amps.

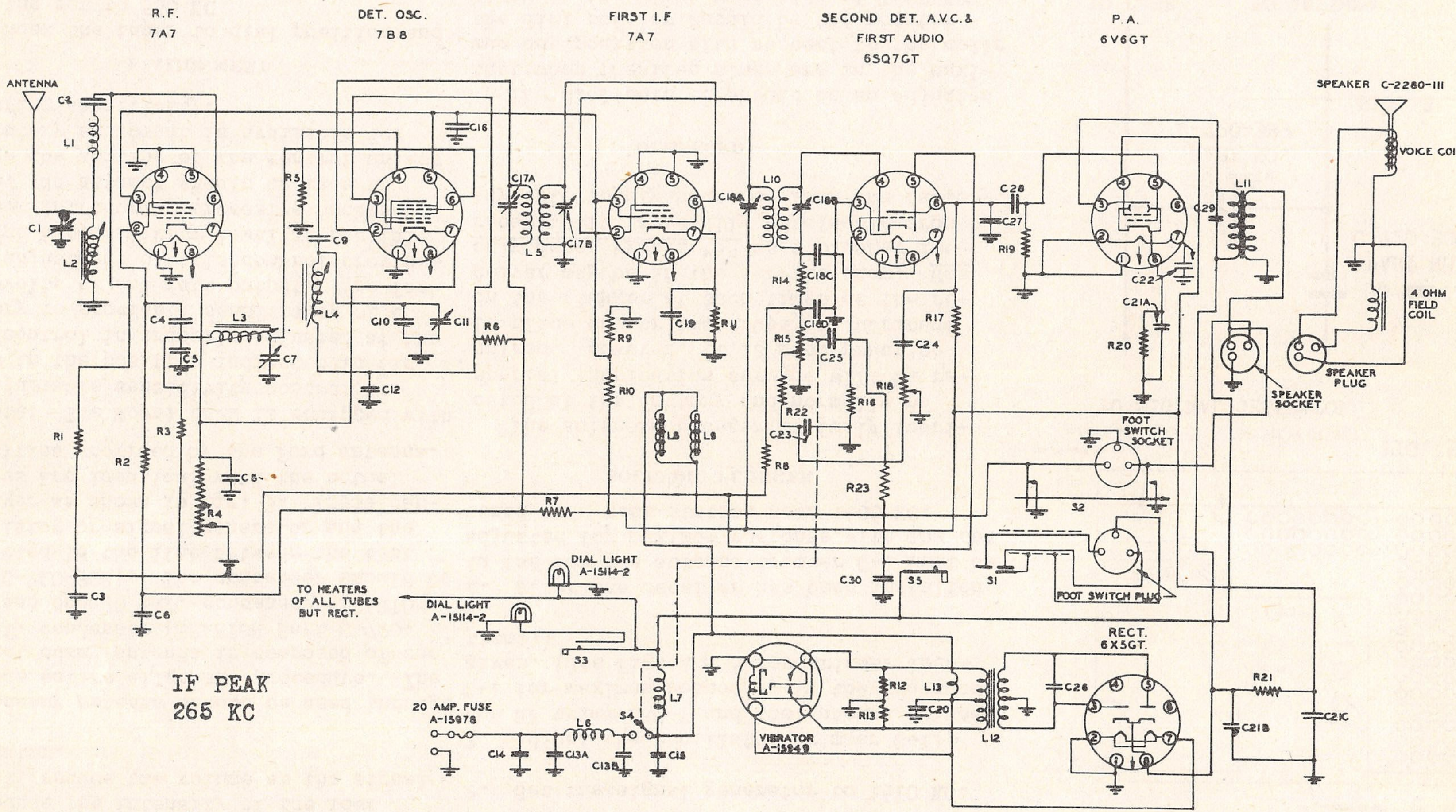
**Foot Control Switch** (Optional): Automatic tuning for five stations and automatic reduction of volume by floor-mounting foot control switch.



©John F. Rider

# THE SPARKS WITHINGTON CO.

## MODEL 6F2D


R.F.
7A7
DET. OSC.
7B8
FIRST I.F
7A7
SECOND DET. A.V.C.&
FIRST AUDIO
6SQ7GT
P.A.
6V6GT
SPEAKER C-2280-111
VOICE COIL
4 OHM FIELD COIL
SPEAKER PLUG
SPEAKER SOCKET
FOOT SWITCH SOCKET
FOOT SWITCH PLUG
ANTENNA
TO HEATERS OF ALL TUBES BUT RECT.
DIAL LIGHT A-15114-2
DIAL LIGHT A-15114-2
20 AMP. FUSE A-15978
VIBRATOR A-15949
RECT. 6X5GT.
IF PEAK
265 KC
C1
C2
C3
C4
C5
C6
C7
C8
C9
C10
C11
C12
C13A
C13B
C14
C15
C16
C17A
C17B
C18A
C18B
C18C
C18D
C19
C20
C21A
C21B
C21C
C22
C23
C24
C25
C26
C27
C28
C29
C30
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
S1
S2
S3
S4
S5

| | | |
|---|---|---|
| S1 | FOOT SWITCH | A-20566 |
| S2 | ACTUATOR & MUTING SWITCH | A-20465 |
| S3 | DIAL LIGHT SWITCH | A-20536 |
| S4 | OFF-ON SWITCH | |
| S5 | DELAY MUTING SWITCH | A-20536 |
| L1 | ANTENNA SPARK CHOKE | A-20496 |
| L2 | ANTENNA COIL | A-20527 |
| L3 | R.F. COIL | A-20527-1 |
| L4 | OSCILLATOR COIL | A-20528 |
| L5 | NO.1 I.F. COIL ASSEMBLY | A-15995-2 |
| L6 | A LEAD SPARK CHOKE | A-20482 |
| L7 | HEATER HASH CHOKE | A-20481 |
| L8 | TUNER SOLENOID ASSEMBLY | B-8456 |
| L9 | INDEXING SOLENOID ASSEMBLY | B-8457 |
| L10 | NO.2 I.F. COIL ASSEMBLY | A-15995-3 |

| | | |
|---|---|---|
| L11 | OUTPUT TRANSFORMER | B-8312-1 |
| L12 | POWER TRANSFORMER | B-8460 |
| L13 | TRANSFORMER HASH CHOKE | A-20002-1 |
| C1 | ANTENNA TRIMMER | A-20465 |
| C2 | .01 200V. | C-3202-76AE |
| C3 | .05 200V. | C-3202-84AE |
| C4 | 25 MMFD. MICA | C-720-369 |
| C5 | 850 MMFD | C-720-395 |
| C6 | .1 400V. | C-3204-94AE |
| C7 | R.F. TRIMMER | A-20522-1 |
| C8 | .1 200 V. | C-3202-94AE |
| C9 | 50 MMFD MICA | C-720-315 |
| C10 | 350 MMFD. COMPENSATOR | A-20463-1 |
| C11 | OSCILLATOR TRIMMER | A-20522 |

| | | | |
|---|---|---|---|
| C12 | 300 MMFD. SILVER MICA | | B-8265-2 |
| C13A<br>C13B | DUAL 200 MMFD MICA | | A-20458 |
| C14 | .5 100 V. | | C-3201-102AE |
| C15 | .5 100 V. | | C-3201-102AE |
| C16 | .05 200V. | | C 3202-84AE |
| C17A<br>C17B | I.F. TRIMMER ASSEMBLY | | A-20023-2 |
| C18A<br>C18B<br>C18C<br>C18D | NO.2 I.F. TRIMMER ASSEMBLY | | A-20096 |
| C19 | .05 200 V. | | C-3202-84AE |
| C20 | .5 100 V. | | C-3201-102AE |
| C21A<br>C21B<br>C21C | 20 MFD. 25V.<br>10 MFD. 350V.<br>15 MFD. 300V. | ELECTROLYTIC CONDENSER | A-20092 |
| C22 | 250 MMFD. MICA | | C-720-324 |

| | | | |
|---|---|---|---|
| C23 | .03 200 V. | | C-3202-88AE |
| C24 | .005 600V. | | C-3206-66AE |
| C25 | .01 200 V. | | C-3202-76AE |
| C26 | .004 1600V. | | C-3216-64AS |
| C27 | 250 MMFD. MICA | | C-720-324 |
| C28 | .02 400 V. | | C-3204-78AE |
| C29 | .005 600 V. | | C-3206-66AE |
| C30 | .02 400 V. | | C-3204-78AE |
| R1 | 330,000 Ω | 1/2 W | C-2796-92C |
| R2 | 33,000 Ω | 1/2 W | C-2796-80C |
| R3 | 330,000 Ω | 1/2 W | C-2796-92C |
| R4 | SENSITIVITY CONTROL 1000 Ω | | A-15962 |
| R5 | 100,000 Ω | 1/2 W | C-2796-86C |
| R6 | 27,000 Ω | 1/2 W | C-2796-79C |

| | | | |
|---|---|---|---|
| R7 | 3300 Ω | 1 W. | C-2797-68C |
| R8 | 1,000,000 Ω | 1/2 W. | C-2796-98C |
| R9 | 22,000 Ω | 1/2 W. | C-2796-78C |
| R10 | 27,000 Ω | 1 W. | C-2797-79C |
| R11 | 470 Ω | 1/2 W. | C-2796-58C |
| R12 | 56 Ω | 1/2 W. | C-2796-47C |
| R13 | 56 Ω | 1/2 W. | C-2796-47C |
| R14 | 27,000 Ω | 1/2 W. | C-2796-79C |
| R15 | 330,000 Ω | VOLUME CONTROL | A-15146 |
| R16 | 10,000,000 Ω | 1/2 W. | C-2796-110C |
| R17 | 270,000 Ω | 1/2 W. | C-2796-91C |
| R18 | 1 MEG. | TONE CONTROL | A-15146 |
| R19 | 470,000 Ω | 1/2 W. | C-2796-94C |
| R20 | 330 Ω | 1 W. | C-2797-56C |
| R21 | 1800 Ω | 2 W. | A-20029 |
| R22 | 10,000 Ω | 1/2 W. | C-2796-74C |
| R23 | 1,000,000 | 1/2 W. | C-2796-98C |

MODEL 6F2D

THE SPARKS WITHINGTON CO.

## ALIGNMENT INSTRUCTIONS

Note: The alignment of a radio receiver is one of the most important functions that a service man performs. The following instructions must be followed carefully and in detail.

### CAUTION

When making any adjustment on the receiver, be sure to have the volume control turned full on. If it is necessary to reduce the intensity of the test signal, reduce the volume at the signal generator.

A dummy antenna should be used through out the entire alignment procedure. The correct dummy antenna is composed of one 20 mmf. condenser (SPARTON Part C-720-389) and one 30 mmf. condenser (SPARTON Part C-720-308). The condenser should be connected in the line between the test oscillator or signal generator and the receiver as shown in Fig. 3. These capacities are identical with the actual capacities provided by the Ford antenna.

Note: The Model 6F2D is equipped with an adjustable sensitivity control located in the position indicated in Fig. 4. This control is properly adjusted at the factory to provide a sensitivity of 6 microvolts at one watt output. The factory adjustment of this control provides as high a sensitivity level as possible without introducing excessive background noise. No attempt should be made to change the setting of the control unless laboratory equipment is available for measuring sensitivity.

### I-F ALIGNMENT

1. Index the tuner to dial position and tune the set to 550 KC.

2. Set the signal generator at 265 KC and connect through the dummy antenna to the receiver.

3. Adjust trimmers C-18 A&B and C-17 A&B for maximum response. (See Fig. 5.)

### R-F ALIGNMENT

1. Tune the set to 1610 KC by rotating the tuning knob as far as it will go clockwise.

2. Set the signal generator to 1610 KC.

3. Adjust the oscillator trimmer C-11, the RF trimmer C-7 and the antenna trimmer C-1 for maximum response, in the sequence given. (See Fig. 4 & 5 for trimmer locations.)

4. After the receiver has been installed in the car the antenna trimmer C-1 must be adjusted for maximum response with the set tuned to a weak station near 1600 KC.

### SOLENOID PLUNGER

The solenoid plunger is fully lubricated at the factory and normally no special lubrication service will be required. However, it is good practice to place one or two drops of lubricant on the plunger at such times as the receiver may be in the service shop. Use only Super Pyroil "B" as a plunger lubricant. It is readily obtainable from any auto supply house or from the factory.

### DIAL CORD

The dial pointer should be so adjusted that when the iron slugs are in the maximum out position with respect to the coils the dial pointer should be the pointer width to the right hand side of 1600 KC on the dial scale.

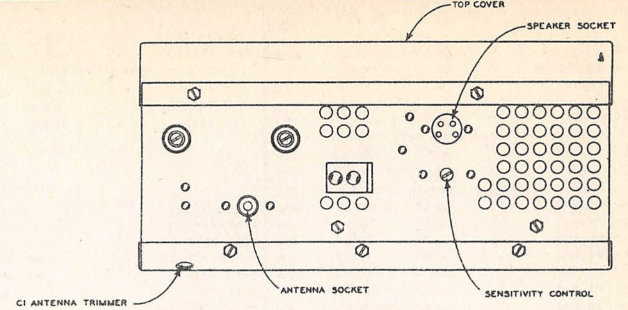
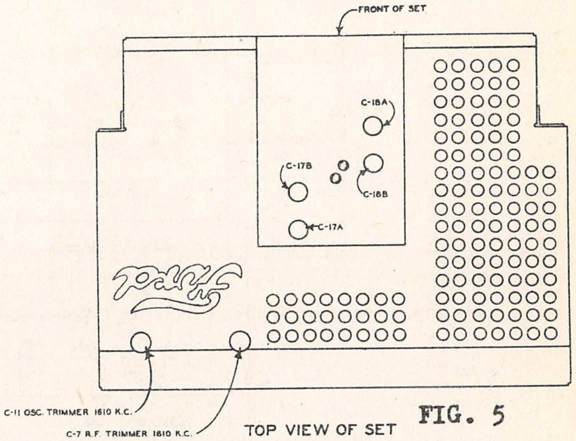


FIG. 4 BACK VIEW OF SET



TOP VIEW OF SET

FIG. 5

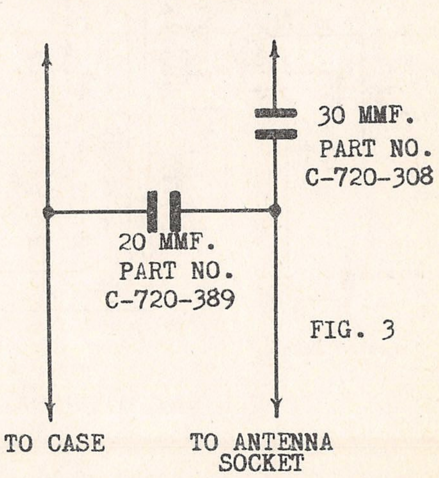


FIG. 3

## SETTING THE ADJUST-O-MATIC TUNER

1. Turn receiver on and allow it to operate for approximately ½ hour. (This is necessary in order that the operating temperature may reach normal and to be assured of accurate adjustment).

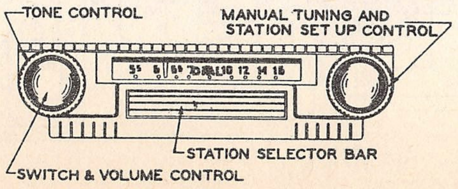
2. With the tuning knob in its normal position and the tuner indexed so that the word DIAL in the pointer background is illuminated, the set is ready for manual operation.

3. By indexing the tuner with the push bar the first automatic position is ready for setting up. The station is tuned in by retracting the manual knob and tuning to the desired station as indicated by the dial pointer.

4. The manual knob should then be pushed back to its normal position.
5. The next automatic position may then be indexed and the desired station set up in the same manner as mentioned in paragraph 3 and 4.

6. After all five automatic positions are set up the manual knob should be returned to its normal position. If desired, the manual position may also be set up and used as an automatic position. Any station may be set up in any desired automatic position.

Note: Due to the net-work programs broadcast by many stations, it is rather difficult to determine the station until the station call letters have been announced.


TONE CONTROL
MANUAL TUNING AND STATION SET UP CONTROL
STATION SELECTOR BAR
SWITCH & VOLUME CONTROL

Input Voltage: 6.6 Volts. Volume Control Full on with Antenna Disconnected

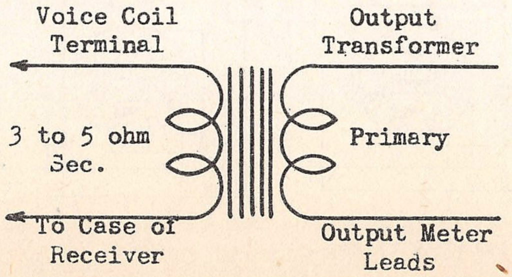
| TUBE | FUNCTION | Voltage of socket prongs to gnd.(See schematic dia.) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 |
| 7A7 | R-F Amplifier | H<br>0 | P<br>132 | Gs<br>112 | Gsu<br>0 | S<br>0 | G<br>-.03 | K<br>2.9 | H<br>6.25 |
| 7B8 | Osc-Converter | H<br>0 | P<br>208 | Ga<br>142 | Go<br>-.75 | Gs<br>60 | G<br>-.03 | K<br>2.9 | H<br>6.25 |
| 7A7 | I-F Amplifier | H<br>0 | P<br>223 | Gs<br>62 | Gsu<br>0 | S<br>0 | G<br>0 | K<br>2.1 | H<br>6.25 |
| 6SQ7GT | Det-AVC-1st AF | S<br>0 | G<br>-.22 | K<br>0 | Dp<br>-.3 | Dp<br>-.3 | P<br>95 | H<br>6.25 | H<br>0 |
| 6V6GT | Power Amplifier | - | H<br>0 | P<br>235 | Gs<br>225 | G<br>0 | - | H<br>6.25 | K<br>12 |
| 6X5GT | Rectifier | - | H<br>0 | P<br>230* | - | P<br>230* | - | H<br>6.2 | K<br>250 |

Notes: Voltage readings are for schematic diagram on page 3. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages measured with rectifier type meter. Unless otherwise designated, voltages in table are + DC volts. *Indicates AC volts.
Explanation of Symbols: H-Heater, P-Plate, Ga-Oscillator Anode, Go-Oscillator Grid, Gs-Screen Grid, Gsu-Suppressor Grid, S-Shield, Dp-Diode Plate, K-Cathode.

### OUTPUT METER

In case it is desired to use the type of output meter which usually is connected to the plate circuit of an output tube the diagram shown in Fig. 6 should be noted.

The output transformer in this circuit is identical to the regular output transformer part No. B-8312-1 used in the Model 6F2D receiver.


Voice Coil Terminal
Output Transformer
3 to 5 ohm Sec.
Primary
To Case of Receiver
Output Meter Leads

**Sensitivity:** 6 microvolts at 1 watt output.

**Power Output:** 4.5 watts measured at voice coil.

**Current Consumption:** 8.5 Amps.

**Speaker:** Full electro dynamic (6 x 9 inch oval).

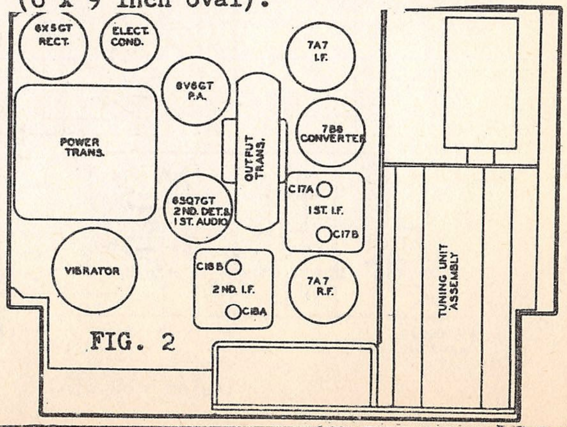
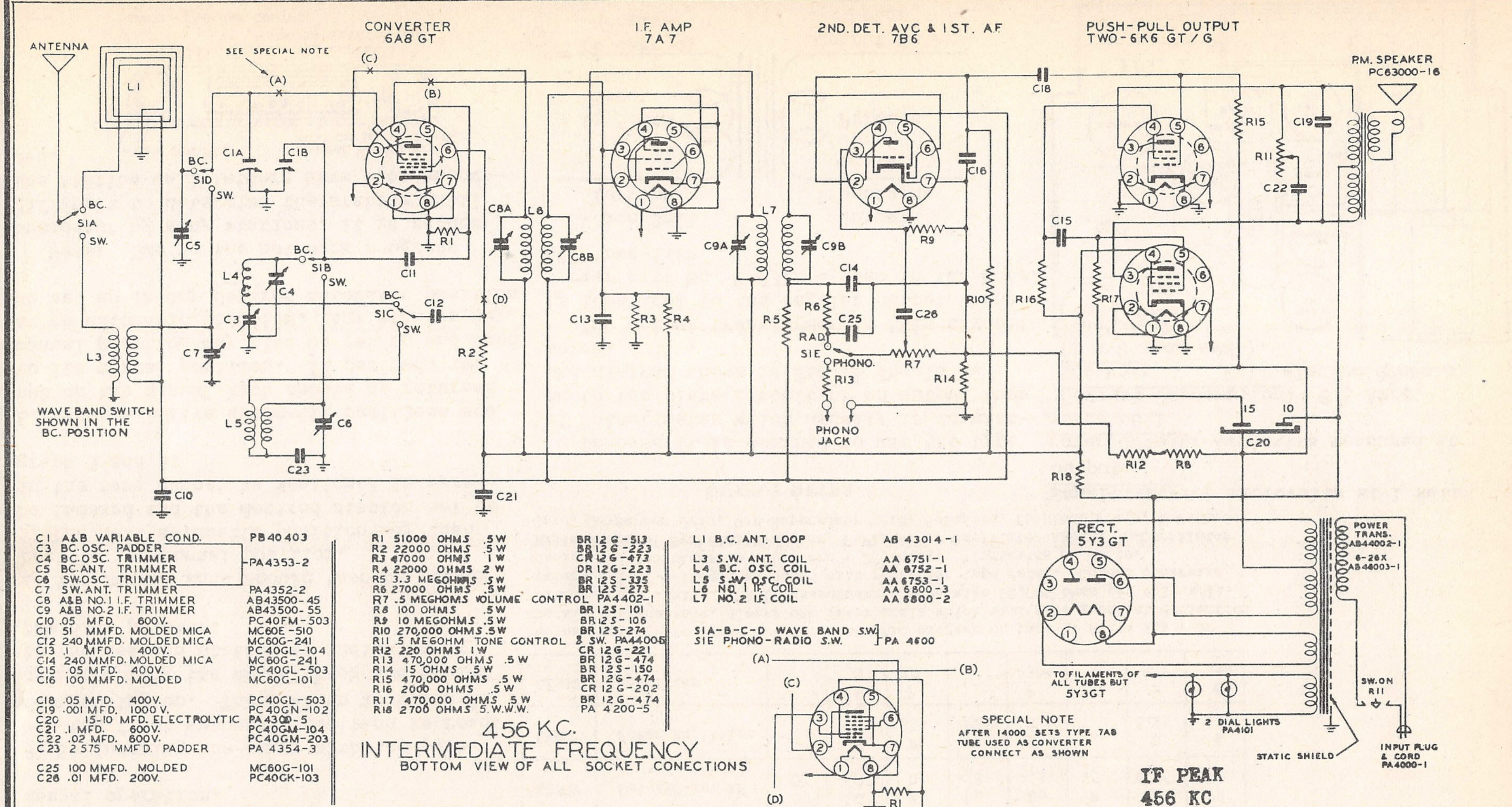

6X5GT RECT.
ELECT. COND.
7A7 I.F.
6V6GT P.A.
OUTPUT TRANS.
7B8 CONVERTER
POWER TRANS.
6SQ7GT 2ND. DET.& 1ST. AUDIO
C17A
1ST. I.F.
C17B
VIBRATOR
C18B
2ND. I.F.
C18A
7A7 R.F.
TUNING UNIT ASSEMBLY

FIG. 2

**MODELS 6-26,6-26PA**

# THE SPARKS WITHINGTON CO.


ANTENNA
L1
SEE SPECIAL NOTE
(A)
(B)
(C)
(D)
CONVERTER
6A8 GT
I.F. AMP
7A7
2ND. DET. AVC & 1 ST. AF
7B6
PUSH-PULL OUTPUT
TWO-6K6 GT/G
P.M. SPEAKER
PC63000-16
BC.
S1D
SW.
BC.
S1A
SW.
C1A
C1B
C5
BC.
S1B
SW.
L4
C4
C3
C7
BC.
S1C
SW.
C11
C12
R1
R2
L3
WAVE BAND SWITCH SHOWN IN THE BC. POSITION
L5
C6
C23
C10
C21
C8A
L8
C8B
C13
R3
R4
C9A
L7
C9B
C14
R6
C25
RAD.
S1E
PHONO.
R13
PHONO JACK
R5
C26
R7
R14
R9
R10
C16
C18
C15
R16
R17
R15
R11
C19
C22
15
10
C20
R12
R8
R18
RECT.
5Y3GT
POWER TRANS.
AB44002-1
6-26X
AB44003-1
TO FILAMENTS OF ALL TUBES BUT 5Y3GT
2 DIAL LIGHTS
PA4101
SW. ON
R11
STATIC SHIELD
INPUT PLUG & CORD
PA4000-1
7A8
TO C11

| | | |
|---|---|---|
| C1 | A&B VARIABLE COND. | PB40403 |
| C3 | BC. OSC. PADDER | PA4353-2 |
| C4 | BC. OSC. TRIMMER | |
| C5 | BC. ANT. TRIMMER | |
| C6 | SW. OSC. TRIMMER | |
| C7 | SW. ANT. TRIMMER | PA4352-2 |
| C8 | A&B NO. 1 I.F. TRIMMER | AB43500-45 |
| C9 | A&B NO. 2 I.F. TRIMMER | AB43500-55 |
| C10 | .05 MFD. 600V. | PC40FM-503 |
| C11 | 51 MMFD. MOLDED MICA | MC60E-510 |
| C12 | 240 MMFD. MOLDED MICA | MC60G-241 |
| C13 | .1 MFD. 400V. | PC40GL-104 |
| C14 | 240 MMFD. MOLDED MICA | MC60G-241 |
| C15 | .05 MFD. 400V. | PC40GL-503 |
| C16 | 100 MMFD. MOLDED | MC60G-101 |
| C18 | .05 MFD. 400V. | PC40GL-503 |
| C19 | .001 MFD. 1000 V. | PC40GN-102 |
| C20 | 15-10 MFD. ELECTROLYTIC | PA4300-5 |
| C21 | .1 MFD. 600V. | PC40GM-104 |
| C22 | .02 MFD. 600V. | PC40GM-203 |
| C23 | 2 575 MMFD. PADDER | PA 4354-3 |
| C25 | 100 MMFD. MOLDED | MC60G-101 |
| C26 | .01 MFD. 200V. | PC40GK-103 |

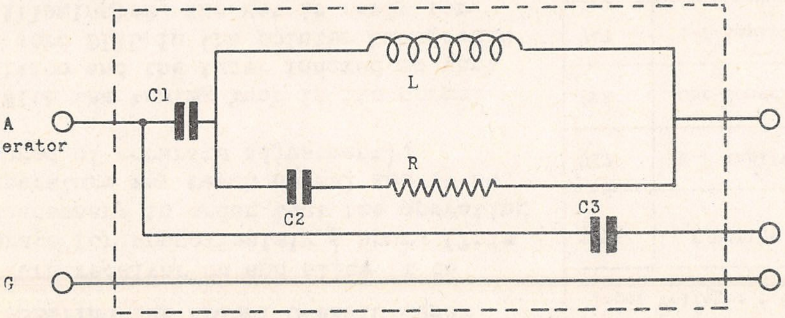
| | | |
|---|---|---|
| R1 | 51000 OHMS .5 W | BR 12 G-513 |
| R2 | 22000 OHMS .5 W | BR 12 G-223 |
| R3 | 47000 OHMS 1 W | CR 12 G-473 |
| R4 | 22000 OHMS 2 W | DR 12 G-223 |
| R5 | 3.3 MEGOHMS .5 W | BR 12 S-335 |
| R6 | 27000 OHMS .5 W | BR 12 S-273 |
| R7 | .5 MEGHOMS VOLUME CONTROL | PA4402-1 |
| R8 | 100 OHMS .5 W | BR 12 S-101 |
| R9 | 10 MEGOHMS .5 W | BR 12 S-106 |
| R10 | 270,000 OHMS .5 W | BR 12 S-274 |
| R11 | .5 MEGOHM TONE CONTROL & SW. | PA44005 |
| R12 | 220 OHMS 1 W | CR 12 G-221 |
| R13 | 470,000 OHMS .5 W | BR 12 G-474 |
| R14 | 15 OHMS .5 W | BR 12 S-150 |
| R15 | 470,000 OHMS .5 W | BR 12 G-474 |
| R16 | 2000 OHMS .5 W | CR 12 G-202 |
| R17 | 470,000 OHMS .5 W | BR 12 G-474 |
| R18 | 2700 OHMS 5. W.W.W. | PA 4200-5 |

| | | |
|---|---|---|
| L1 | B.C. ANT. LOOP | AB 43014-1 |
| L3 | S.W. ANT. COIL | AA 6751-1 |
| L4 | B.C. OSC. COIL | AA 6752-1 |
| L5 | S.W. OSC. COIL | AA 6753-1 |
| L6 | NO. 1 I.F. COIL | AA 6800-3 |
| L7 | NO. 2 I.F. COIL | AA 6800-2 |
| S1A-B-C-D | WAVE BAND S.W. | PA 4600 |
| S1E | PHONO-RADIO S.W. | |

456 KC.
INTERMEDIATE FREQUENCY
BOTTOM VIEW OF ALL SOCKET CONECTIONS

SPECIAL NOTE
AFTER 14000 SETS TYPE 7A8 TUBE USED AS CONVERTER CONNECT AS SHOWN

**IF PEAK**
**456 KC**


A
Generator
C1
L
R
C2
C3
A
Receiver
A
G
G

C1 - 200 mmf. Condenser 400 V.D.C.
C2 - 400 mmf. Condenser 400 V.D.C.
C3 - .02 mmf. Condenser 400 V.D.C.
R - 100 Ohms Resistor 1/4 Watt
L - Choke Coil

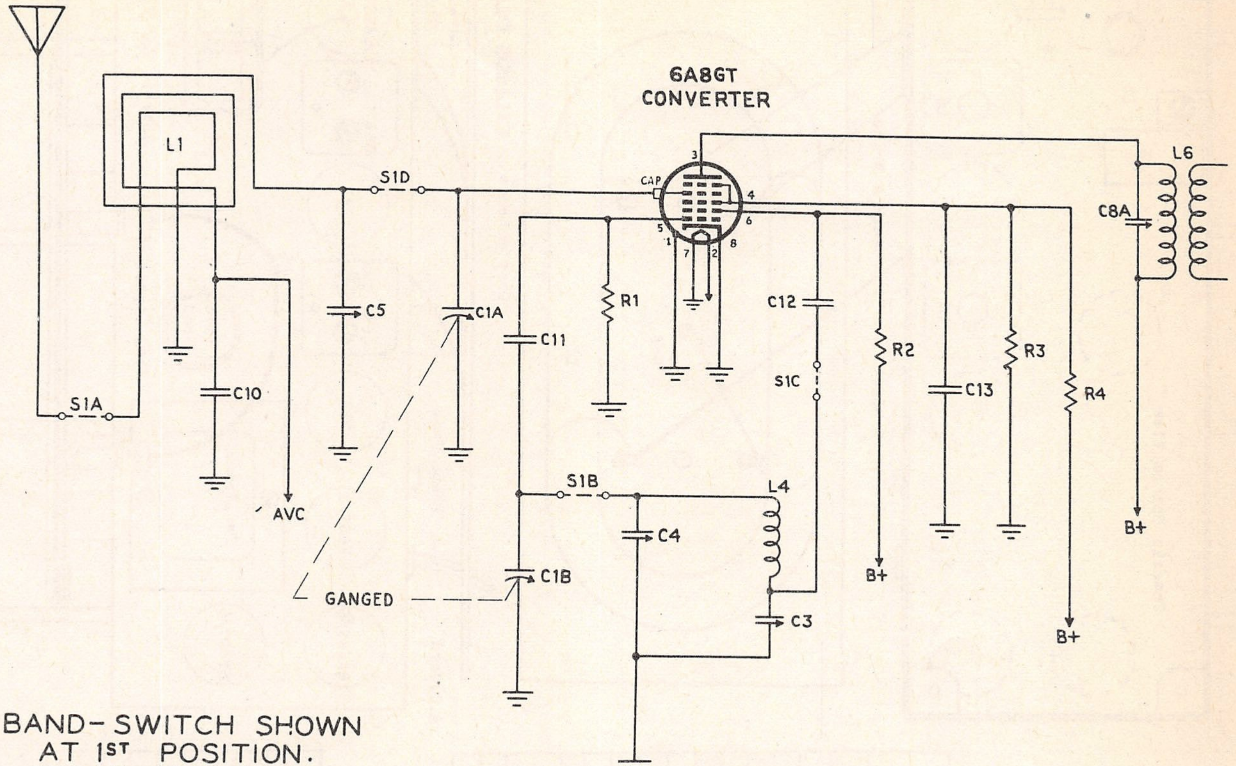
---- Case Shield

Choke Coil Specification
Tubing - 3/8" Diameter Bakelite
Wire - No. 38 Enameled
Turns - 59 closely wound (Impregnated)

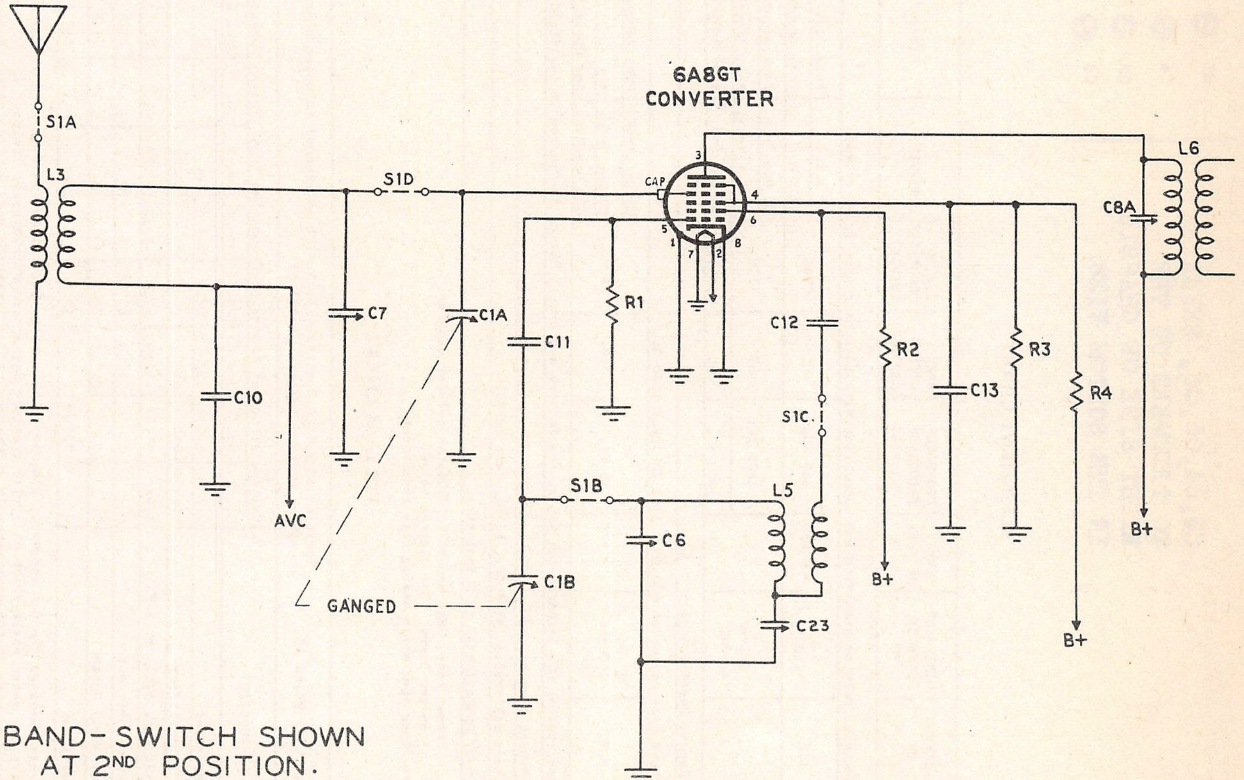
NOTE: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

**MODELS 6-26,6-26PA**

# THE SPARKS WITHINGTON CO.


6A8GT
CONVERTER
L1
S1D
CAP
3
4
5
6
1
7
2
8
L6
C8A
C5
C1A
C11
R1
C12
S1C
R2
C13
R3
R4
C10
S1A
AVC
S1B
L4
C4
B+
GANGED
C1B
C3
B+
B+

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND

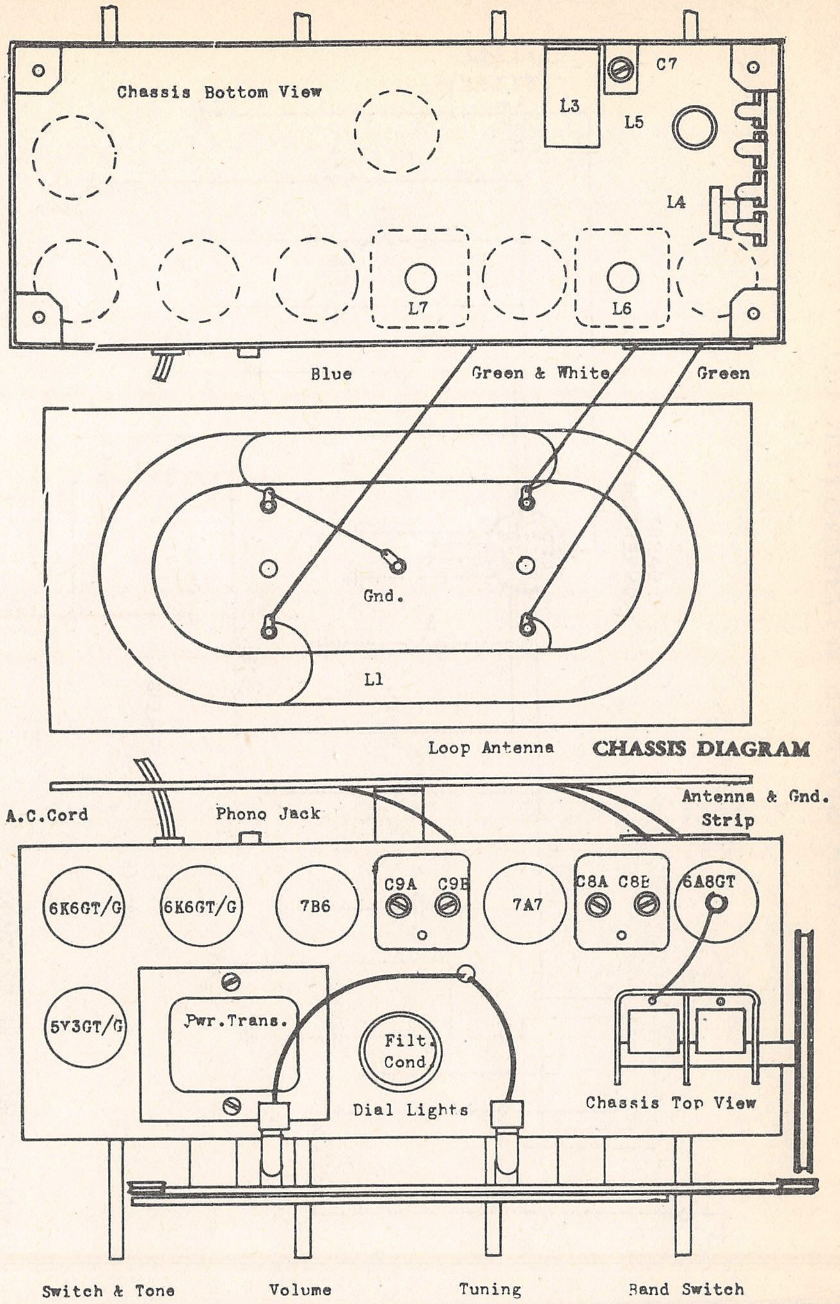

S1A
L3
6A8GT
CONVERTER
S1D
CAP
3
4
5
6
1
7
2
8
L6
C8A
C7
C1A
C11
R1
C12
R2
C13
R3
R4
C10
S1C
AVC
S1B
L5
C6
B+
GANGED
C1B
C23
B+
B+

BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND

**MODELS 6-26,6-26PA**

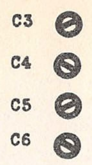
# THE SPARKS WITHINGTON CO.

## CHASSIS DIAGRAM



Chassis Bottom View
C7
L3
L5
L4
L7
L6
Blue
Green & White
Green
Gnd.
L1
Loop Antenna
A.C.Cord
Phono Jack
Antenna & Gnd. Strip
6K6GT/G
6K6GT/G
7B6
C9A C9B
7A7
C8A C8B
6A8GT
5Y3GT/G
Pwr.Trans.
Filt. Cond.
Dial Lights
Chassis Top View
Switch & Tone
Volume
Tuning
Band Switch

**C3,C4,C5,C6, REFER TO TRIMMERS ON THE RIGHT SIDE OF CHASSIS IN THE BOTTOM VIEW.**



## ALIGNMENT CHART

| OPER-ATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING CONDENSER SETTING | TRIMMERS | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | Set dial pointer even with L.H. stop line with condenser gang fully closed. | | | | | | | |
| 2 | I.F. | G.C. 6A8GT | .02 MFD. | 456 KC. | BC | OPEN | C9 A & B | Peak Accurately |
| | | | | | | | C8 A & B | Peak Accurately |
| 3 | BC | Driver Loop | * | 1500 KC. | BC | 1500 KC. | C4 Osc.Trim. | Peak Accurately |
| | | | | | | | C5 Ant.Trim. | Peak Accurately |
| | | | | 600 KC. | BC | 600 KC. | C3 Osc.Pad. | Peak Accurately |
| 4 | (Repeat Operation #3) | | | | | | | |
| 5 | Check Calibration at 600 KC., 1000 KC., and 1500 KC. | | | | | | | |
| 6 | S.W. | "A" on Antenna Strip | * * | 18 MC. | S.W. | 18 MC. | C6 Osc.Trim. | Peak Accurately |
| | | | | | | | C7 Ant.Trim. | * * * |
| | | | | | | | C23 Osc.Pad. | See Operation #7 |
| 7 | Osc. padder C23 is percision set at the factory and should not be readjusted in the field. | | | | | | | |
| 8 | (Repeat Operation #6) | | | | | | | |
| 9 | Check calibration at 6 MC., 11 MC., and 18 MC. | | | | | | | |
| 10 | Check Operations 1 to 6 inclusive. | | | | | | | |

NOTES:
- * Driver Loop. See manual 5, Bulletin 1-1 for diagram.
- ** Standard Dummy. See diagram below.
- *** Rock dial while making this adjustment.

## VOLTAGE CHART

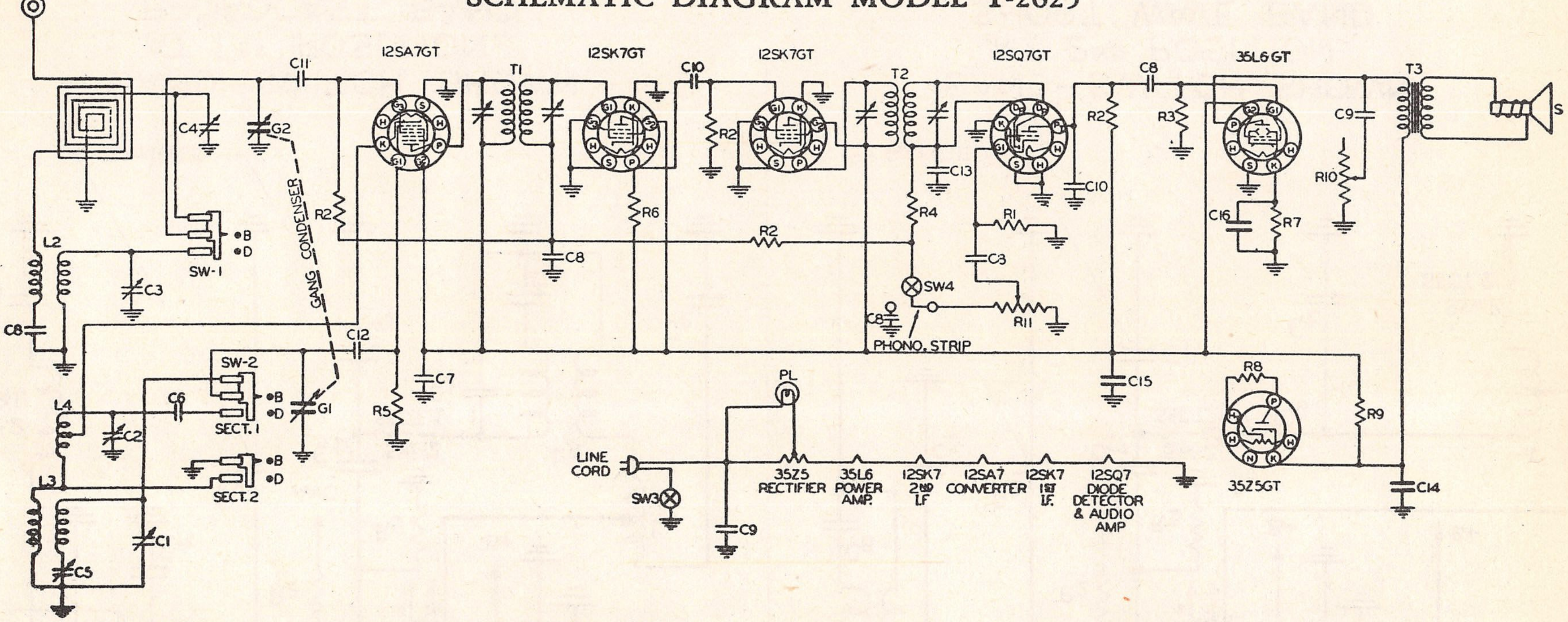
Line Voltage: 117 Volts AC

Position of Volume Control: Full with set tunned to quiet channel.
Position of Band Switch: Broadcast

| TUBE | FUNCTION | Voltage of Socket Prongs to Ground See Prong Nos.on Schematic. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | G.Cap. |
| 6A8GT/G | Converter | 0 | 6.4* | 233 | 87.5 | 6.6 | 150 | 0 | 0 | -.98 |
| 7A7 | I.F. Amplifier | 6.4* | 230 | 85 | 0 | 0 | -1.03 | 0 | 0 | - |
| 7B6 | 2nd. Det. AVC. 1st A.F. | 6.4* | 97.5 | -1.15 | -1.0 | -1.15 | -1.23 | -1.0 | 0 | - |
| 6K6GT/G | Phase Invt. output | 0 | 0 | 217.5 | 217.5 | ** | 0 | 6.4* | 13.5 | - |
| 6K6GT/G | Push-Pull Output | 0 | 0 | 217.5 | 230 | ** | 0 | 6.4* | 13.5 | - |
| 5Y3GT/G | Rectifier | 0 | 237.5 | 0 | 320 | 0 | 320 | 0 | 237.5 | - |

NOTES: Voltage readings are for schematic diagram in this bulletin. Allow 15% ≠ or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.
- * AC volts.
- ** Cannot be measured with 20,000 ohms/volt voltmeter.

# SCHEMATIC DIAGRAM MODEL T-2625


A
C11
12SA7GT
T1
12SK7GT
C10
12SK7GT
T2
12SQ7GT
C8
35L6 GT
T3
S
C4
G2
GANG CONDENSER
R2
R2
R2
R2
R3
C9
R10
C16
R7
R6
R4
C13
C10
R1
C3
SW4
R11
C8
PHONO. STRIP
L2
SW-1
•B
•D
C3
C8
C12
C7
C8
SW-2
•B
•D
G1
R5
SECT. 1
C6
L4
C2
•B
•D
SECT. 2
L3
C1
C5
PL
LINE CORD
SW3
C9
35Z5 RECTIFIER
35L6 POWER AMP.
12SK7 2ND I.F.
12SA7 CONVERTER
12SK7 1ST I.F.
12SQ7 DIODE DETECTOR & AUDIO AMP
C15
R8
R9
35Z5GT
C14

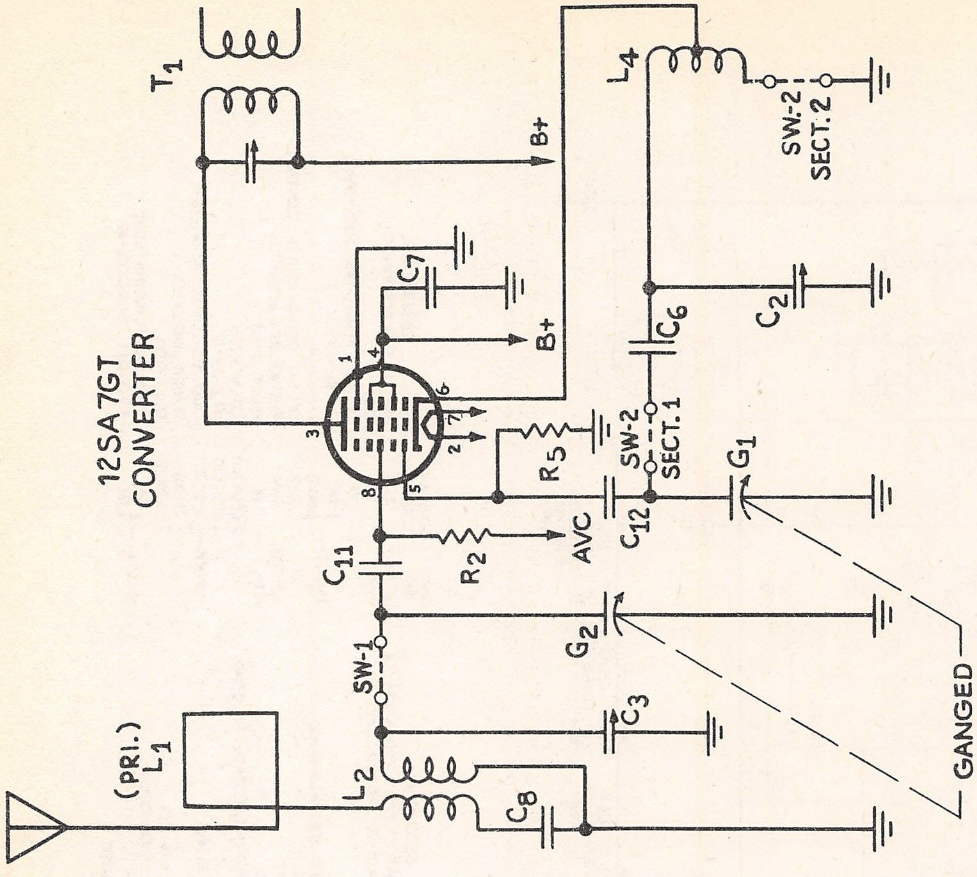
| PART NO | SCHEMATIC LOCATION | DESCRIPTION |
|---|---|---|
| 3-2 | R1 | 2 MEG~ ½W 20% RESISTOR |
| 3-6 | R2 | 1MEG~ " " " |
| 3-1 | R3 | 500M~ " " " |
| 3-4 | R4 | 50M~ " " " |
| 3-116 | R5 | 30M~ " " " |
| 3-321 | R6 | 1700~ " 10% " |
| 3-34 | R7 | 100~ " 20% " |
| 3-174 | R8 | 50~ " " " |
| 3-37 | R9 | 2500~ " " " |
| 5-311 | R10 | 25M~ TONE CONTROL |
| 5-310 | R11 | 1MEG~ VOLUME CONTROL |
| 9-305 | C1 | BC. OSC. TRIMMER COND. |
|  | C2 | SW. OSC. TRIMMER COND. |
|  | C3 | SW. ANT. TRIMMER COND. |
| 9-47 | C4 | BC. ANT. TRIMMER COND. |
| 9-27 | C5 | BC. OSC. PADDER COND. |

| PART NO | SCHEMATIC LOCATION | DESCRIPTION |
|---|---|---|
|  | C6 | SW. OSC. PADDER COND. 250WV (ON COIL) |
| 6-26 | C7 | 0.1 MFD. 400VDC PAPER COND. |
| 6-3 | C8 | .01 MFD. " " " |
| 6-14 | C9 | .05 MFD. " " " |
| 8-10 | C10 | .00025 MFD. 20% MICA COND. |
| 8-43 | C11 | .0005 MFD. " " " |
| 8-13 | C12 | .00005 MFD. " " " |
| 8-8 | C13 | .0001 MFD. " " " |
| A7-302 | C14 | 80 MFD. 150WV ELECTROLYTIC COND. |
|  | C15 | 10 MFD. " " " |
|  | C16 | 10 MFD. 25WV " " |
| 15-315 | L1 | BC. LOOP |
| 15-316 | L2 | SW. ANTENNA COIL |
| 15-317 | L3 | BC OSCILLATOR COIL |
|  | L4 | SW. " " |
| 43-301 | S | PM SPEAKER |

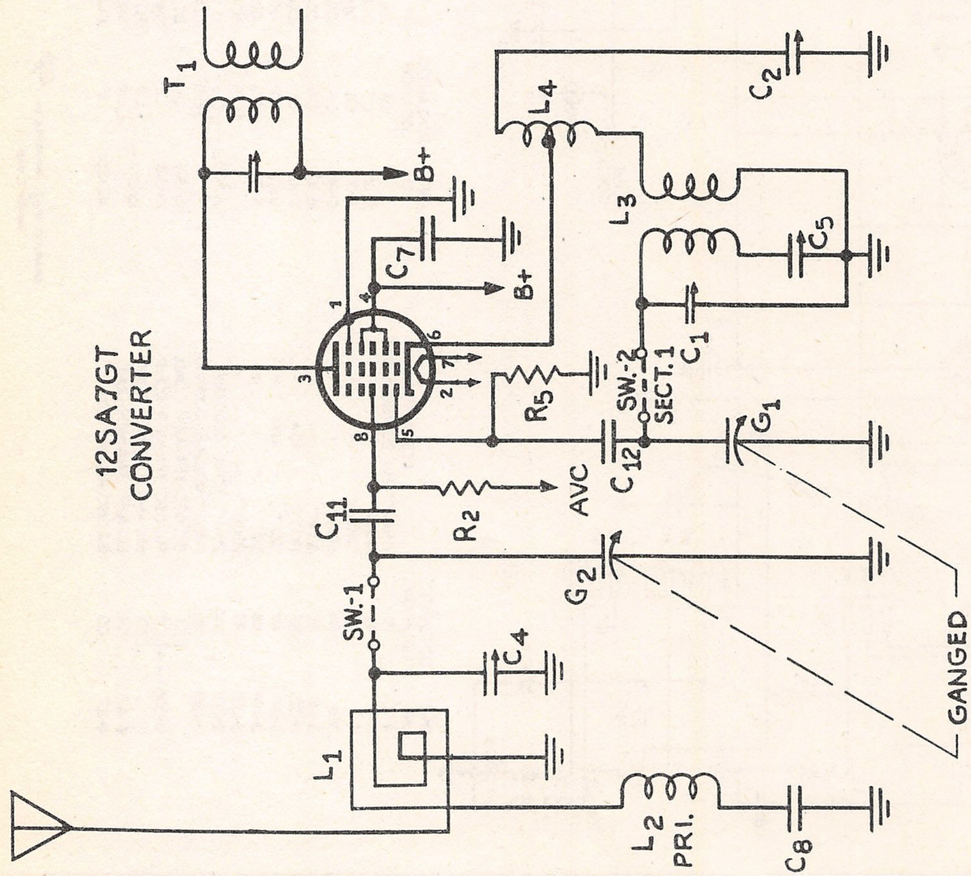
| PART NO | SCHEMATIC LOCATION | DESCRIPTION |
|---|---|---|
| 16-39 | T1 | INPUT IF TRANSFORMER |
| 16-40 | T2 | OUTPUT IF " |
|  | T3 | OUTPUT TRANSFORMER (ON SPKR) |
| 14-307 | SW1 | BAND SWITCH |
|  | SW2 | " " |
|  | SW3 | ON-OFF SWITCH ON VOL. CONTROL |
| 28-303 | SW4 | PHONO. JACK & SWITCH |
| 47 | PL | PILOT LIGHT |
| 40-306 | 12SA7GT | CONVERTER |
|  | 12SK7GT | 1ST & 2ND IF |
|  | 12SQ7GT | DIODE DETECTOR & AUDIO AMP. |
|  | 35L6GT | POWER AMPLIFIER |
|  | 35Z5GT | RECTIFIER |
| 10-304 | G1 | OSCILLATOR TUNING COND. |
|  | G2 | ANTENNA TUNING COND. |

DRAWN BY [illegible] APPROVED BY [illegible]
MARCH 2, 1942

# SPIEGEL


T1
12SA7GT
CONVERTER
B+
B+
C7
1
3
4
5
6
7
2
8
L4
SW-2
SECT.2
C6
C2
SW-2
SECT.1
R5
G1
C12
AVC
R2
C11
G2
SW-1
C3
(PRI.)
L1
L2
C8
GANGED

BAND-SWITCH SHOWN AT 2ND POSITION. SHORT WAVE BAND


T1
12SA7GT
CONVERTER
B+
B+
C7
C2
L4
L3
C5
C1
1
3
4
5
6
7
2
8
SW-2
SECT.1
R5
G1
C12
AVC
R2
C11
G2
SW-1
C4
L1
L2
PRI.
C8
GANGED

BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND

SPIEGEL

MODEL T-2625
MODEL 5020

## ALIGNMENT AND SERVICE DATA

MODEL T-2625

Remove the chassis from the cabinet for alignment.

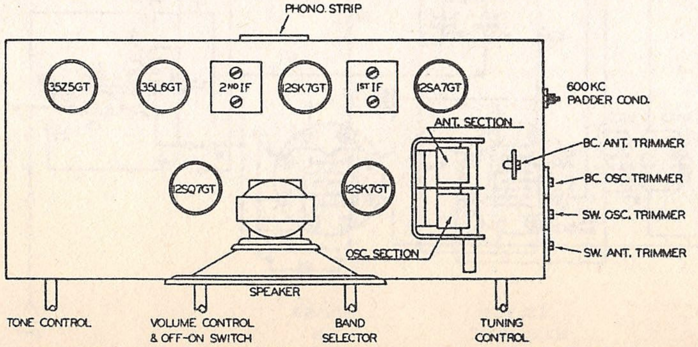
A signal generator is required having the following frequencies: 456KC, 1400KC, 1720KC, 6MC, 16MC, 18.3MC. An output meter should be connected across the speaker.

*I. F. Alignment:* Connect the generator lead through a .1MFD condenser to the terminal lug on the "Antenna" section of the gang condenser. The ground lead from the generator should be connected to the chassis base. Set the generator at 456KC. Adjust the trimmer screws in the 1st and 2nd I. F. cans (see Fig. No. 1) until a maximum reading is noted on the output meter.

The receiver volume control should be turned to maximum during the I F and all subsequent alignments, to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

*BC or Broadcast Alignment:* With the generator leads still connected as in I. F. Alignment, rotate the tuning condenser to complete minimum capacity. Set the generator to 1720KC. Adjust the BC oscillator trimmer until the signal is tuned in. Next, remove the generator leads and connect them to the antenna lead of the loop antenna, through a 100 MMFD condenser. Set the generator to 1400KC and rotate the tuning condenser until the signal is tuned in. Adjust the BC antenna trimmer until a maximum reading is noted on the output meter. Set the generator to 600KC and turn the tuning condenser until the signal is tuned in. Rock the tuning control back and forth slowly until a maximum reading is noted on the output meter. It is advisable to return to the 1720KC adjustment and recheck that setting to make sure it has not changed while padding at 600KC.

*SW or Short Wave Alignment:* Set the generator at 18.3MC. Turn the receiver band switch to short wave position. Turn the tuning condenser to complete minimum capacity. The generator leads should be connected to the antenna lead of the loop through a 400 Ohm resistor. Adjust the S. W. oscillator trimmer slowly until the 18.3MC signal is tuned in. At this point, it will be well to make sure that the fundamental signal is tuned in. Turn up the generator output and tune the receiver to approximately 17.3MC. At this point, the 18.3MC signal will be heard again but much weaker. This is the image frequency. If the image is not heard, then turn the tuning condenser back to complete minimum and readjust the SW oscillator trimmer. Remember the image must always be heard (at 2 times the IF frequency in KC) lower in frequency than the fundamental signal. After the oscillator has been properly set, tune the signal generator to 16MC and rotate the tuning control until the signal is tuned in. Adjust the SW antenna trimmer until a maximum reading is noted on the output meter. It is advisable to rock the gang slowly while adjusting the antenna trimmer. Set the generator to 6MC and tune the signal in on the receiver. Check the alignment at this frequency. No adjustment should be necessary, as the coils have been carefully checked before leaving the factory. A fixed oscillator padding condenser is used at 6MC.



## INSTRUCTIONS FOR CONNECTING F.M. TELEVISION OR PHONOGRAPH CONVERTOR

A shielded lead wire is usually provided with the aforementioned instruments. To connect them to this receiver, plug the insulated wire into the hole on the connector strip which is marked with red paint. The shield or bare wire is plugged into the unmarked hole. When the wires are plugged in, the radio portion of the receiver is automatically cut off. It is only necessary to turn the volume control to increase or decrease volume.

When you desire to use the receiver for radio reception, it is necessary to pull out the external plugs.

## MODEL 5020 BATTERY SUPPLIERS

The batteries for this receiver may be purchased from any reliable radio dealer.

For proper operation of this receiver, you must use, two (2) 4½ Volt "A" batteries, and two (2) 45 Volt "B" batteries.

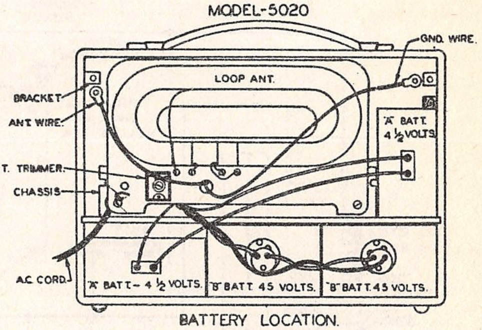
The following is a table of manufacturers and their battery type number:

"B" BATTERIES
(2 Required)

| Mfgr. | Volts | Type No. |
|---|---|---|
| Burgess | 45 "B" | M30 |
| General | 45 "B" | W30B |
| Bright Star | 45 "B" | 3033 |
| Usalite | 45 "B" | 640 |
| Rayovac | 45 "B" | P7830 |
| Eveready | 45 "B" | 482 |

"A" BATTERIES
(2 Required)

| | | |
|---|---|---|
| Burgess | 4½ "A" | G3 |
| General | 4½ "A" | 3H3 |
| Bright Star | 4½ "A" | 361 |
| Usalite | 4½ "A" | 683 |
| Rayovac | 4½ "A" | P83A |
| Eveready | 4½ "A" | 746 |



BATTERY LOCATION.
FIGURE-1

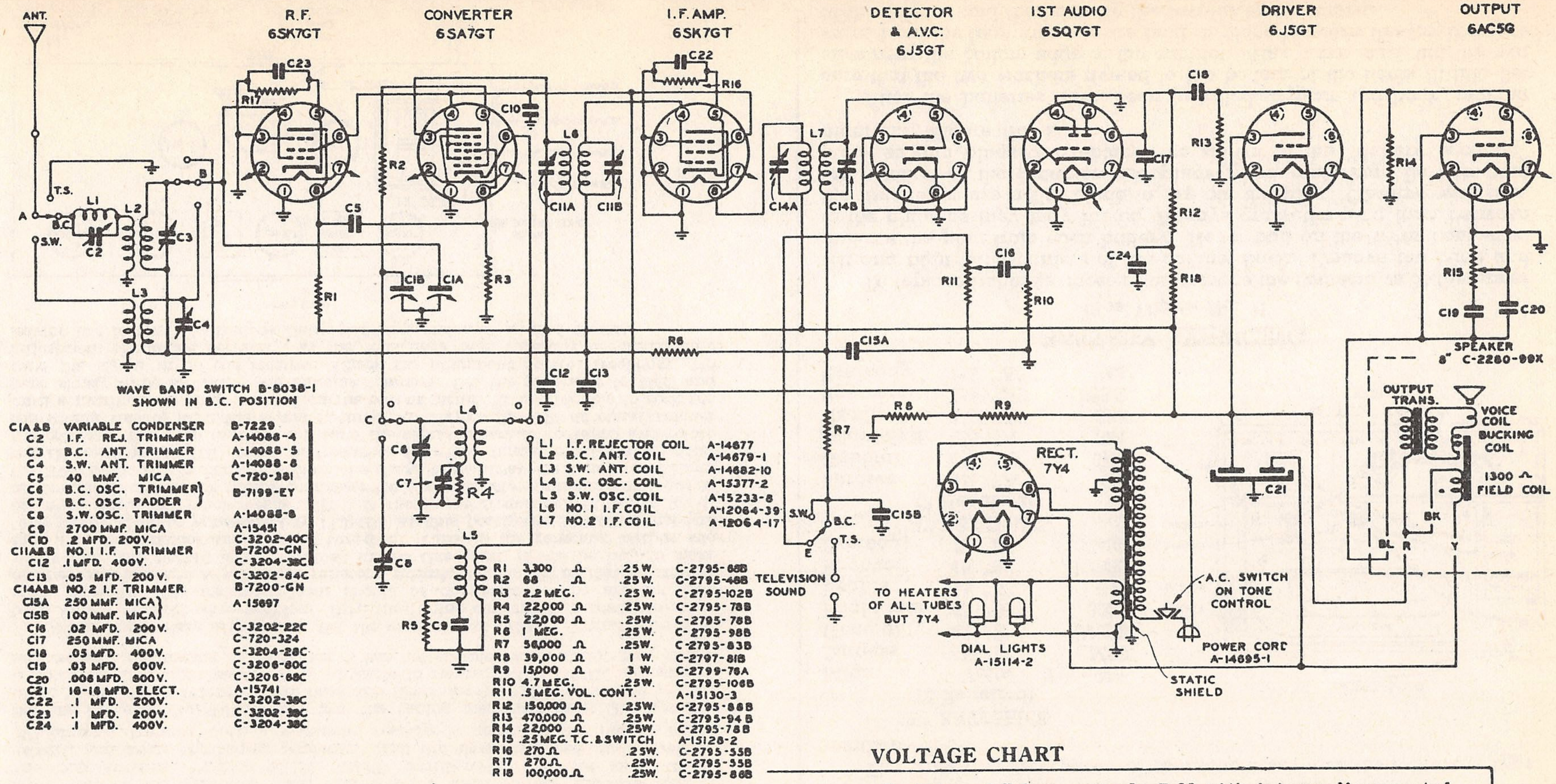
## BATTERY SERVICING

(See Figure No. 1)

Te replace batteries, loosen and remove the two screws at the upper left and right hand corners of the cabinet back. Remove the back and pull out the plug from each battery. Never pull on the wires connected to the plugs as they may break. Always grasp the plug form between the fingers, or use a flat blade to pry out the plug. Observe with care the position of the batteries and plugs when replacing. Be sure that batteries and plugs are replaced as shown in the "Battery Location" diagram. (Figure No. 1)

After the batteries have been installed, replace the back, making sure that the two washers riveted to the bottom of the back, fit into the slots near the bottom edge of the cabinet. Also make sure that the two wires from the loop antenna are held in place between the top brackets of the cabinet and the back by the two fastening screws.

# SPIEGEL


ANT.
R.F. 6SK7GT
CONVERTER 6SA7GT
I.F. AMP. 6SK7GT
DETECTOR & A.V.C. 6J5GT
1ST AUDIO 6SQ7GT
DRIVER 6J5GT
OUTPUT 6AC5G
RECT. 7Y4
SPEAKER 8" C-2280-99X
OUTPUT TRANS.
VOICE COIL
BUCKING COIL
1300 Ω FIELD COIL
BK
BL
R
Y
A.C. SWITCH ON TONE CONTROL
POWER CORD A-14695-1
STATIC SHIELD
TO HEATERS OF ALL TUBES BUT 7Y4
DIAL LIGHTS A-15114-2
TELEVISION SOUND
S.W.
B.C.
T.S.
E
A
B
C
D
WAVE BAND SWITCH B-8038-1 SHOWN IN B.C. POSITION

| | | |
|---|---|---|
| C1A&B | VARIABLE CONDENSER | B-7229 |
| C2 | I.F. REJ. TRIMMER | A-14088-4 |
| C3 | B.C. ANT. TRIMMER | A-14088-5 |
| C4 | S.W. ANT. TRIMMER | A-14088-8 |
| C5 | 40 MMF. MICA | C-720-381 |
| C6 | B.C. OSC. TRIMMER | B-7199-EY |
| C7 | B.C. OSC. PADDER | |
| C8 | S.W. OSC. TRIMMER | A-14088-8 |
| C9 | 2700 MMF. MICA | A-15451 |
| C10 | .2 MFD. 200V. | C-3202-40C |
| C11A&B | NO. 1 I.F. TRIMMER | B-7200-GN |
| C12 | .1 MFD. 400V. | C-3204-38C |
| C13 | .05 MFD. 200 V. | C-3202-84C |
| C14A&B | NO. 2 I.F. TRIMMER | B-7200-GN |
| C15A | 250 MMF. MICA | A-15697 |
| C15B | 100 MMF. MICA | |
| C16 | .02 MFD. 200 V. | C-3202-22C |
| C17 | 250 MMF. MICA | C-720-324 |
| C18 | .05 MFD. 400V. | C-3204-28C |
| C19 | .03 MFD. 600V. | C-3206-80C |
| C20 | .006 MFD. 600 V. | C-3206-68C |
| C21 | 16-16 MFD. ELECT. | A-15741 |
| C22 | .1 MFD. 200V. | C-3202-38C |
| C23 | .1 MFD. 200V. | C-3202-38C |
| C24 | .1 MFD. 400V. | C-3204-38C |

| | | |
|---|---|---|
| L1 | I.F. REJECTOR COIL | A-14677 |
| L2 | B.C. ANT. COIL | A-14679-1 |
| L3 | S.W. ANT. COIL | A-14682-10 |
| L4 | B.C. OSC. COIL | A-15377-2 |
| L5 | S.W. OSC. COIL | A-15233-8 |
| L6 | NO. 1 I.F. COIL | A-12064-39 |
| L7 | NO. 2 I.F. COIL | A-12064-17 |

| | | | |
|---|---|---|---|
| R1 | 3,300 Ω | .25 W. | C-2795-68B |
| R2 | 68 Ω | .25 W. | C-2795-48B |
| R3 | 2.2 MEG. | .25 W. | C-2795-102B |
| R4 | 22,000 Ω | .25 W. | C-2795-78B |
| R5 | 22,000 Ω | .25W. | C-2795-78B |
| R6 | 1 MEG. | .25 W. | C-2795-98B |
| R7 | 56,000 Ω | .25W. | C-2795-83B |
| R8 | 39,000 Ω | 1 W. | C-2797-81B |
| R9 | 15,000 Ω | 3 W. | C-2799-76A |
| R10 | 4.7 MEG. | .25W. | C-2795-106B |
| R11 | .5 MEG. VOL. CONT. | | A-15130-3 |
| R12 | 150,000 Ω | .25W. | C-2795-88B |
| R13 | 470,000 Ω | .25W. | C-2795-94B |
| R14 | 22,000 Ω | .25W. | C-2795-78B |
| R15 | .25 MEG. T.C. & SWITCH | | A-15128-2 |
| R16 | 270 Ω | .25W. | C-2795-55B |
| R17 | 270 Ω | .25W. | C-2795-55B |
| R18 | 100,000 Ω | .25W. | C-2795-86B |

Line voltage: 117 volts

## MODEL 831

## INTERMEDIATE FREQUENCY 456 K.C

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

## VOLTAGE CHART

Position of Volume control: Full with Antenna disconnected

Position of Band Switch: Broadcast

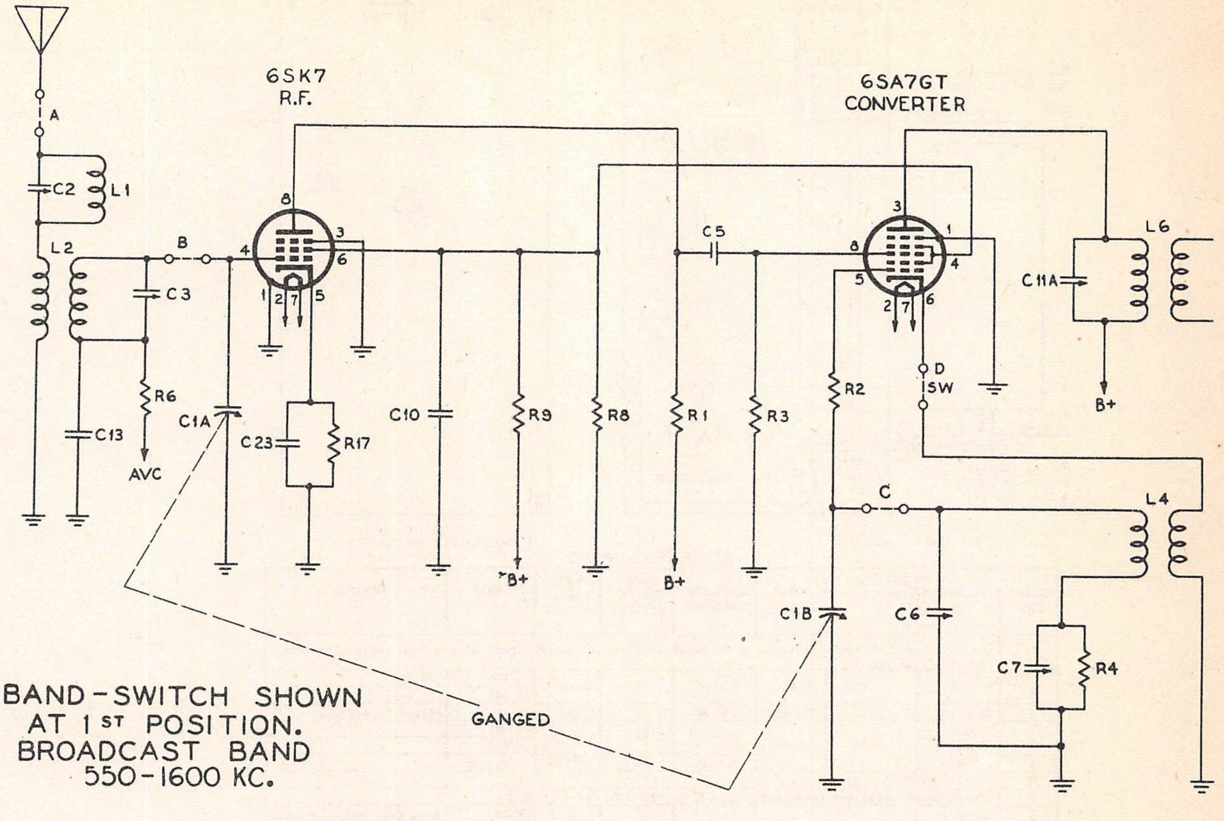
| Tube | Function | Voltage of socket prongs to Gnd. (Prong no's. on Schematic) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | No 1 | No 2 | No 3 | No 4 | No 5 | No 6 | No 7 | No 8 |
| 6SK7GT | R-f Amplifier | 0 | 0 | 0 | ** | 1.6 | 76 | 6.2* | 237 |
| 6SA7GT | Oscillator-Converter | 0 | 0 | 245 | 76 | 0 | ** | 6.2* | 0 |
| 6SK7GT | I-f Amplifier | 0 | 0 | 0 | ** | 1.6 | 76 | 6.2* | 245 |
| 6J5GT | Detector-AVC | 0 | 0 | 0 | 0 | ** | 155 | 6.2* | 0 |
| 6SQ7GT | 1st Audio Amplifier | 0 | ** | 0 | 0 | 0 | 60 | 6.2* | 0 |
| 6J5GT | Audio Driver | 0 | 0 | 255 | 77 | 0 | 0 | 6.2* | 11 |
| 6AC5G | Power Amplifier | 0 | 0 | 240 | 0 | 11 | 0 | 6.2* | 0 |
| 7Y4 | Rectifier *** | 0 | 0 | 300* | 0 | 0 | 300* | 0 | 0 |

* AC volts
** Cannot be measured with 1000 ohms/volt voltmeter.
*** Tube removed from socket to enable test prods to reach socket prongs.

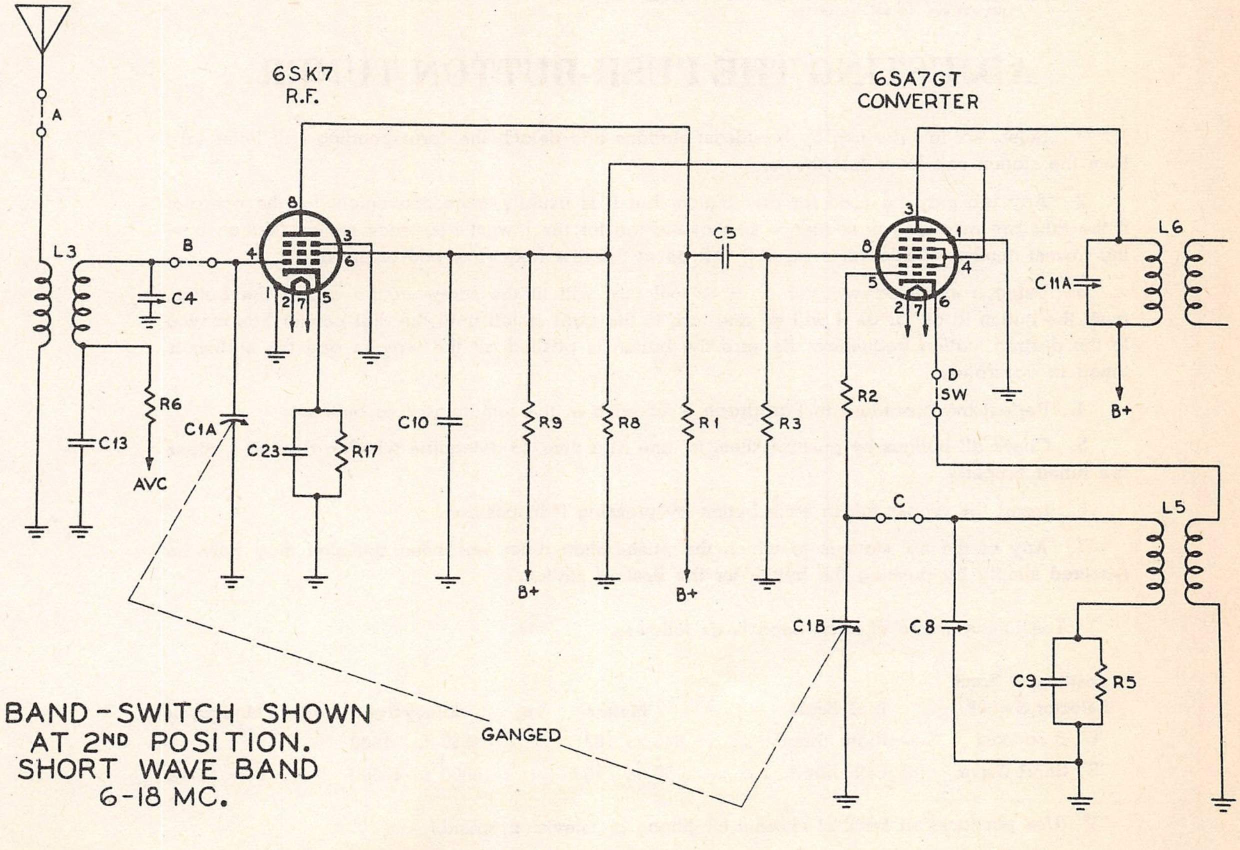
August 1, 1940

# SPIEGEL

MODEL 831

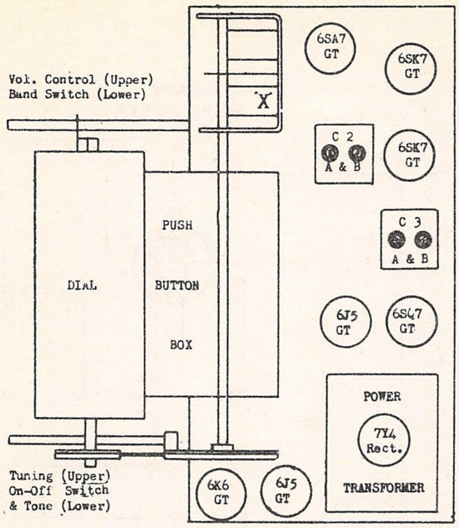

6SK7
R.F.
6SA7GT
CONVERTER
A
C2
L1
L2
B
C3
R6
AVC
C13
C1A
C23
R17
C10
R9
R8
R1
R3
B+
B+
C5
R2
D
SW
C
L4
L6
C11A
B+
C1B
C6
C7
R4
GANGED
1
2
3
4
5
6
7
8

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
550-1600 KC.

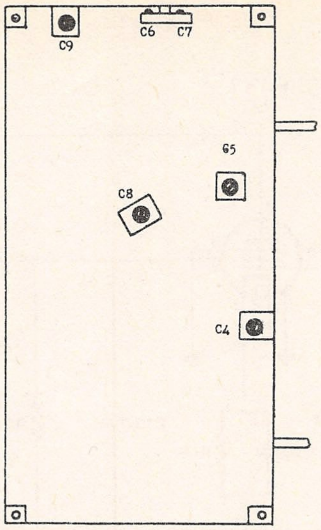

6SK7
R.F.
6SA7GT
CONVERTER
A
L3
B
C4
R6
AVC
C13
C1A
C23
R17
C10
R9
R8
R1
R3
B+
B+
C5
R2
D
SW
C
L5
L6
C11A
B+
C1B
C8
C9
R5
GANGED
1
2
3
4
5
6
7
8

BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND
6-18 MC.

# SPIEGEL



TOP VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS

## ALIGNMENT CHART

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | (Set dial drum so that last mark on BC scale is directly toward front of set when condenser plates are fully meshed.) | | | | | | | |
| 2 | I.F. | * | .1 mf. | 456 KC | BC | Open | C3 A&B<br>C2 A&B | 2nd I-F<br>1st I-F |
| 3 | Rejector | Ant. | 200 mmf. | 456 KC | BC | Closed | C4 | Adjust to minimum |
| 4 | Broad-cast Band | Ant. | 200 mmf. | 1500 KC | BC | 1500 KC | C6 Osc.<br>C5 Ant. | |
| 5 | | | | 600 KC | BC | 600 KC | C7 Pad. | |
| 6 | (Repeat operation 4) | | | | | | | |
| 7 | (Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC) | | | | | | | |
| 8 | Shortwave Band | Ant. | * | 18 MC | SW | 18 MC | C9 Osc.<br>C8 Ant. | Rock dial while adjusting for maximum output |
| 9 | (Check calibration and sensitivity at 6 MC and 18 MC) | | | | | | | |
| 10 | (Check operations 1 to 9 inclusive) | | | | | | | |

Notes: *Connect to point "X" on Variable Condenser. See drawing below.
**100 ohm and 200 mmf. in series

# ADJUSTING THE PUSH-BUTTON TUNER

1. Select six favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.

2. Any tab may be used for any button, but it is usually more convenient for the operator if the tabs are arranged in sequence so that the tab for the lowest frequency station (station having lowest number of kilocycles [K. C.]) will be at the low frequency end of the dial.

3. Using a small screwdriver or other tool that will fit the screw in the end of the button, push the button in as far as it will go and turn to the right or left until the dial pointer has moved to the desired station frequency. Be sure the button is pushed all the way in and the station is tuned in accurately.

4. Repeat the procedure in Paragraph 3 for each of the remaining five buttons.

5. Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned properly.

6. Insert the proper tab in each button by pressing it in position.

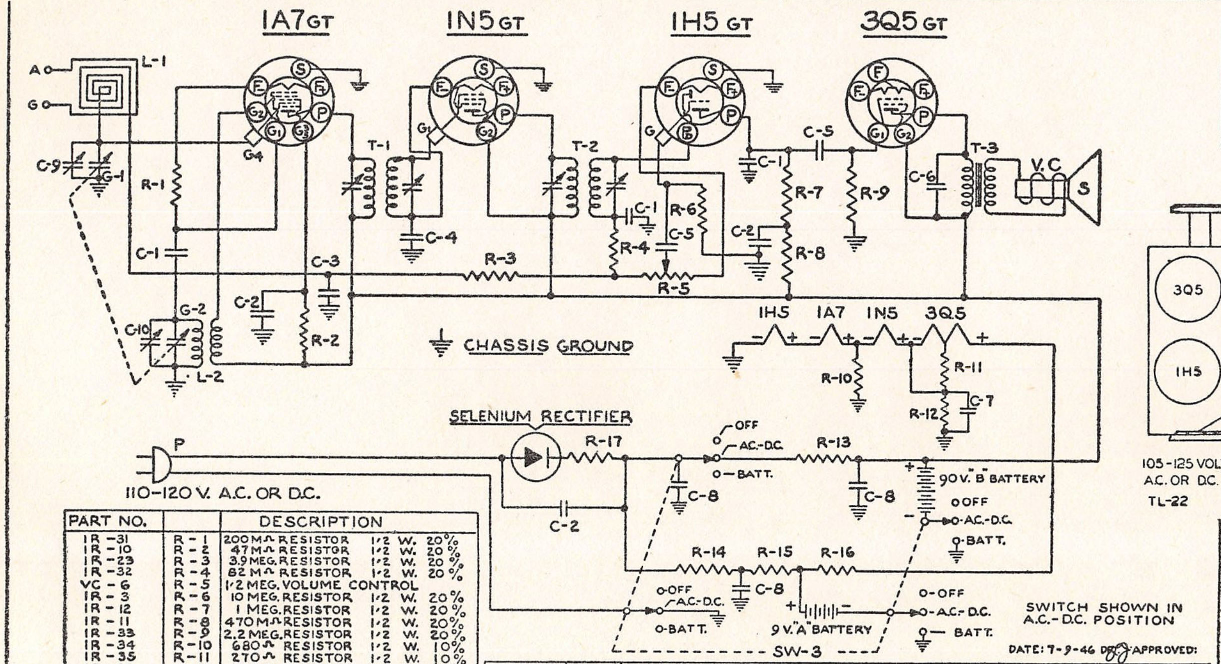
7. Any of the six stations to which the push-button tuner has been adjusted may now be received simply by pushing the button for the desired station.

The tuning range of each band is as follows.

| Position of Band Selector Switch | Dial Scale | Meters | or | Kilocycles | or | Megacycles |
|---|---|---|---|---|---|---|
| "B" Broadcast | Right hand | 545 to 187 | | **550** to **1600** | | .55 to 1.6 |
| "S" Short-Wave | Left hand | 50 to 16.6 | | 6000 to 18000 | | **6.** to **18** |

"T" (Use pin jacks at back of chassis for phono or television sound.)

# SPIEGEL


1A7GT
1N5GT
1H5GT
3Q5GT
A
G
L-1
C-9
G-1
R-1
C-1
G-2
C-10
L-2
C-2
R-2
C-3
G4
T-1
C-4
R-3
T-2
C-1
R-6
C-5
R-4
R-5
C-5
C-1
R-7
C-2
R-8
R-9
C-6
T-3
V.C
S
CHASSIS GROUND
1H5 1A7 1N5 3Q5
R-10
R-11
R-12
C-7
SELENIUM RECTIFIER
R-17
P
C-2
OFF
A.C.-D.C.
BATT.
R-13
C-8
C-8
90V."B" BATTERY
OFF
A.C.-D.C.
BATT.
R-14 R-15 R-16
C-8
9 V."A" BATTERY
SW-3
OFF
A.C.-D.C.
BATT.

110-120 V. A.C. OR D.C.

SWITCH SHOWN IN A.C.-D.C. POSITION

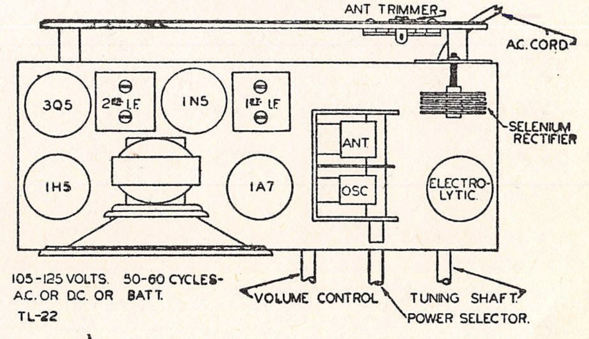
DATE: 7-9-46 APPROVED:

| PART NO. | | DESCRIPTION |
|---|---|---|
| IR-31 | R-1 | 200M Ω RESISTOR 1/2 W. 20% |
| IR-10 | R-2 | 47M Ω RESISTOR 1/2 W. 20% |
| IR-23 | R-3 | 3.9 MEG. RESISTOR 1/2 W. 20% |
| IR-32 | R-4 | 82 M Ω RESISTOR 1/2 W. 20% |
| VC-6 | R-5 | 1/2 MEG. VOLUME CONTROL |
| IR-3 | R-6 | 10 MEG. RESISTOR 1/2 W. 20% |
| IR-12 | R-7 | 1 MEG. RESISTOR 1/2 W. 20% |
| IR-11 | R-8 | 470M Ω RESISTOR 1/2 W. 20% |
| IR-33 | R-9 | 2.2 MEG. RESISTOR 1/2 W. 20% |
| IR-34 | R-10 | 680 Ω RESISTOR 1/2 W. 10% |
| IR-35 | R-11 | 270 Ω RESISTOR 1/2 W. 10% |
| IR-21 | R-12 | 330 Ω RESISTOR 1/2 W. 10% |
| IR-36 | R-13 | 1200 Ω RESISTOR 1/2 W. 10% |
| WR-3 | R-14<br>R-15<br>R-16 | 1050 Ω<br>1050 Ω<br>55 Ω } CANDOHM RESISTOR |
| WR-4 | R-17 | 75 Ω WIRE WOUND RESISTOR 2W. 5% |
| MC-2 | C-1 | 100 MMFD. MICA CONDENSER |
| PC-5 | C-2 | .05 MFD. CONDENSER - 400 V. |
| PC-2 | C-3 | .05 MFD. CONDENSER - 200 V. |
| PC-3 | C-4 | .1 MFD. CONDENSER - 200 V. |
| PC-10 | C-5 | .005 MFD. CONDENSER - 400 V. |
| PC-12 | C-6 | .0025 MFD. CONDENSER - 400 V. |

| PART NO. | | DESCRIPTION |
|---|---|---|
| EC-10 | C-7 | 70 MFD. 10V. ELECTROLYTIC |
| EC-4 | C-8 | 40-40-40 150 V. ELECTROLYTIC |
| TC-7 | C-9 | ANTENNA TRIMMER COND. |
| TC-6 | C-10 | OSC. TRIMMER COND. |
| GC-2 | G-1<br>G-2 | GANG CONDENSER |
| LL-5 | L-1 | LOOP ANTENNA |
| LO-8 | L-2 | OSC. COIL |
| LI-3 | T-1 | INPUT I.F. TRANSFORMER |
| LI-4 | T-2 | OUTPUT I.F. TRANSFORMER |
| CO-1 | P | LINE CORD |

| PART NO. | | DESCRIPTION |
|---|---|---|
| SPK-5 | T-3<br>VC<br>S | OUTPUT SPEAKER TRANSFORMER<br>VOICE COIL<br>P.M. SPEAKER |
| SW-3 | SW-3 | 4 POLE 3-POSITION SW. |
| SR-1 | — | SELENIUM RECTIFIER |
| TU-11 | — | 1A7GT 1N5GT 1H5GT 3Q5GT |
| "A" BATTERY | | 9 VOLTS |
| "B" BATTERY | | 90 VOLTS |

MODEL-5020
TUBE AND TRIMMER LOCATION


ANT TRIMMER
A.C. CORD
3Q5
2nd I.F.
1N5
1st I.F.
SELENIUM RECTIFIER
ANT
OSC
1H5
1A7
ELECTRO-LYTIC
VOLUME CONTROL
TUNING SHAFT
POWER SELECTOR.

105-125 VOLTS. 50-60 CYCLES-
A.C. OR D.C. OR BATT.
TL-22

## ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

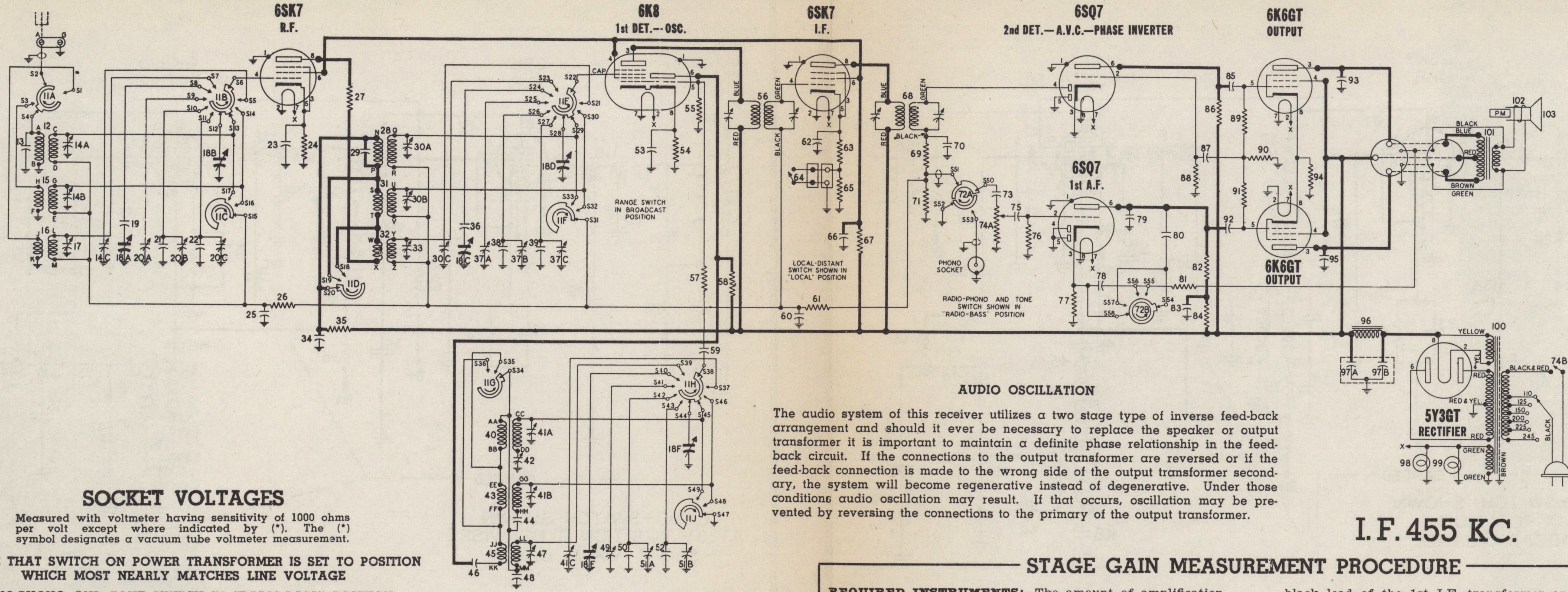
**FIRST STEP:** Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the metal frame of the gang condenser. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

**SECOND STEP:** With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the top of the oscillator section of the gang condenser. Adjust this trimmer until the 1720 KC signal is tuned in.

**THIRD STEP:** Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the antenna lead wire that projects from the back of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

**CAUTION:** When the receiver is not in use, the power selector knob must be turned to "OFF." If the knob is allowed to remain in "BATT" position, the batteries will be in use constantly. The volume control does not control the batteries and they are still in operation even though the volume control is turned all the way off.

# STEWART WARNER CORP.


6SK7
R.F.
6K8
1st DET.—OSC.
6SK7
I.F.
6SQ7
2nd DET.—A.V.C.—PHASE INVERTER
6K6GT
OUTPUT
6SQ7
1st A.F.
6K6GT
OUTPUT
5Y3GT
RECTIFIER
RANGE SWITCH IN BROADCAST POSITION
LOCAL-DISTANT SWITCH SHOWN IN "LOCAL" POSITION
PHONO SOCKET
RADIO-PHONO AND TONE SWITCH SHOWN IN "RADIO-BASS" POSITION
BLUE
GREEN
RED
BLACK
P.M.
BROWN
YELLOW
BLACK & RED
RED & YEL.
110
125
150
200
225
245

### AUDIO OSCILLATION

The audio system of this receiver utilizes a two stage type of inverse feed-back arrangement and should it ever be necessary to replace the speaker or output transformer it is important to maintain a definite phase relationship in the feed-back circuit. If the connections to the output transformer are reversed or if the feed-back connection is made to the wrong side of the output transformer secondary, the system will become regenerative instead of degenerative. Under those conditions audio oscillation may result. If that occurs, oscillation may be prevented by reversing the connections to the primary of the output transformer.

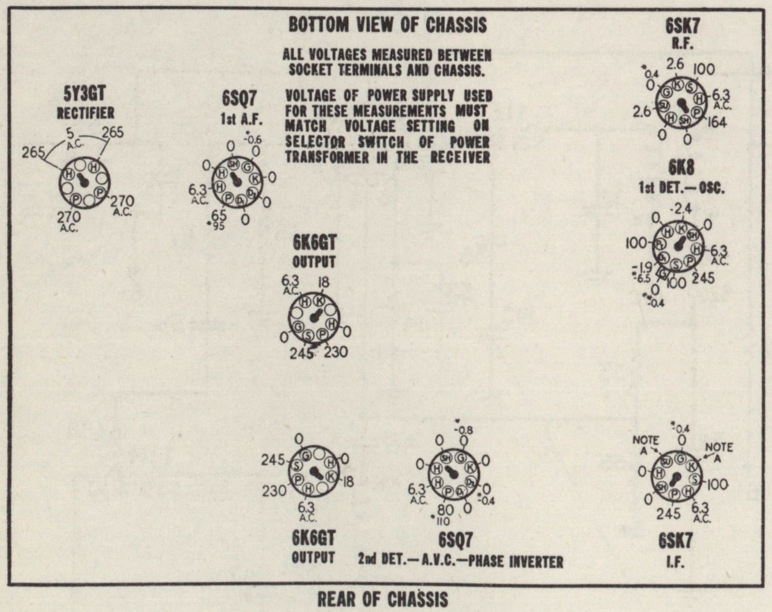
## I. F. 455 KC.

## SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.

**BE SURE THAT SWITCH ON POWER TRANSFORMER IS SET TO POSITION WHICH MOST NEARLY MATCHES LINE VOLTAGE**

**RADIO-PHONO AND TONE SWITCH IN "RADIO-BASS" POSITION**
**VOLUME ON FULL WITH NO SIGNAL DIAL TUNED TO 540 KC**
**BAND SWITCH IN BROADCAST POSITION**


BOTTOM VIEW OF CHASSIS
ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.
VOLTAGE OF POWER SUPPLY USED FOR THESE MEASUREMENTS MUST MATCH VOLTAGE SETTING ON SELECTOR SWITCH OF POWER TRANSFORMER IN THE RECEIVER
5Y3GT
RECTIFIER
5 A.C.
265
265
270 A.C.
270 A.C.
6SQ7
1st A.F.
*-0.6
0
0
0
6.3 A.C.
65
*95
0
0
6K6GT
OUTPUT
6.3 A.C.
18
0
0
245
230
6SK7
R.F.
*0.4
0
2.6
100
6.3 A.C.
164
2.6
0
0
6K8
1st DET.—OSC.
-2.4
0
0
100
6.3 A.C.
-1.9
*-6.5
100
245
0
*-0.4
6K6GT
OUTPUT
0
245
0
230
18
6.3 A.C.
6SQ7
2nd DET.—A.V.C.—PHASE INVERTER
*-0.8
0
0
0
0
6.3 A.C.
80
*110
0
*-0.4
6SK7
I.F.
*0.4
NOTE A
0
NOTE A
0
100
0
245
6.3 A.C.
REAR OF CHASSIS

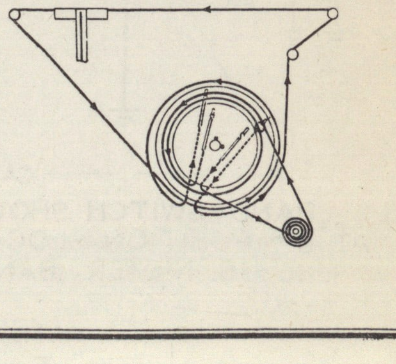
NOTE A: The voltage at the cathode or suppressor terminals of this tube is 13 volts when Local-Distant switch is in "Local" position and 2.4 volts when switch is set to "Distant" position.

**Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.**

### DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

| | |
|---|---|
| 113177 | Tension Spring |
| 114955 | Clip on end of cord |
| 119087 | Ring |
| 502773 | Cord (8 feet) |
| | 4½ ft. for pointer drive |
| | 3½ ft. for tuning drive |

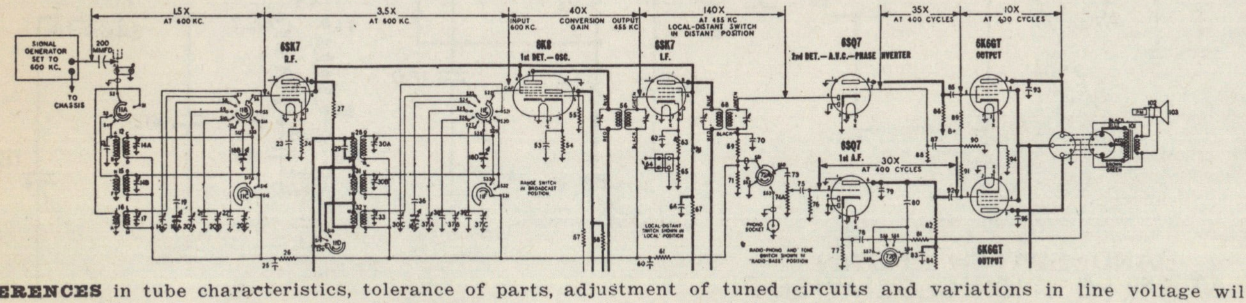


## STAGE GAIN MEASUREMENT PROCEDURE

**REQUIRED INSTRUMENTS:** The amount of amplification or "gain" of each of the stages of this receiver may be measured with an A.C. Vacuum Tube Voltmeter or a "channel" type instrument containing a tuned and calibrated amplifier.

**PROCEDURE:** It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

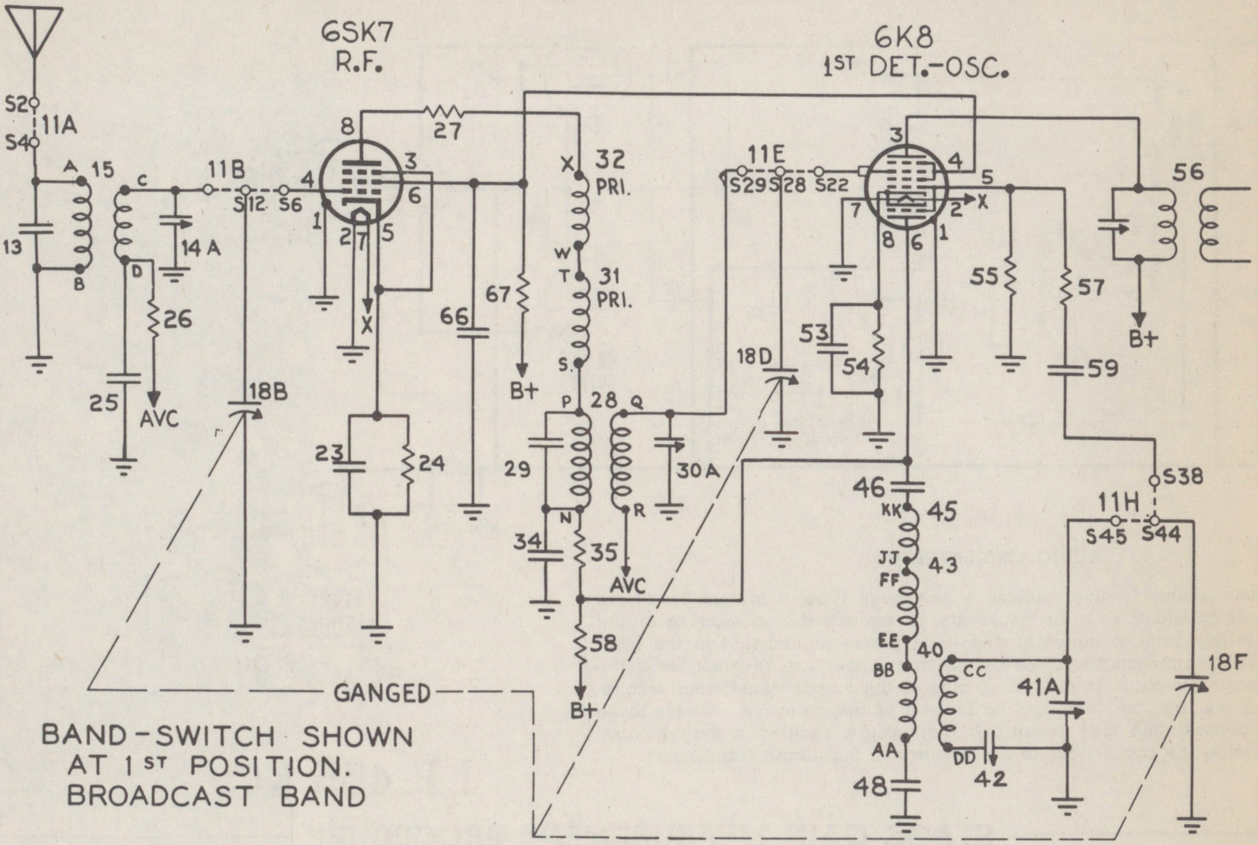
1. Be sure that R.F. and I.F. stages are carefully and accurately aligned by utilizing the alignment procedure given above.
2. Connect Signal Generator as shown below.
3. The values of stage gain which are given here were measured with a fixed bias of 3 volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. circuit. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 3 volt battery to A.V.C. at the black lead of the 1st I.F. transformer and connect the positive battery lead to the receiver chassis.
4. Set Signal Generator for operation at 600 Kc with 400 cycle modulation and carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
5. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.
6. When using a "channel" type instrument, carefully tune it for maximum output at desired frequency before making measurements.


SIGNAL GENERATOR SET TO 600 KC.
TO CHASSIS
200 MMFD.
1.5X AT 600 KC.
3.5X AT 600 KC.
INPUT 600 KC.
40X CONVERSION GAIN
OUTPUT 455 KC
140X AT 455 KC LOCAL-DISTANT SWITCH IN DISTANT POSITION
35X AT 400 CYCLES
10X AT 400 CYCLES
30X AT 400 CYCLES
6SK7 R.F.
6K8 1st DET.—OSC.
6SK7 I.F.
6SQ7 2nd DET.—A.V.C.—PHASE INVERTER
6K6GT OUTPUT
6SQ7 1st A.F.
6K6GT OUTPUT

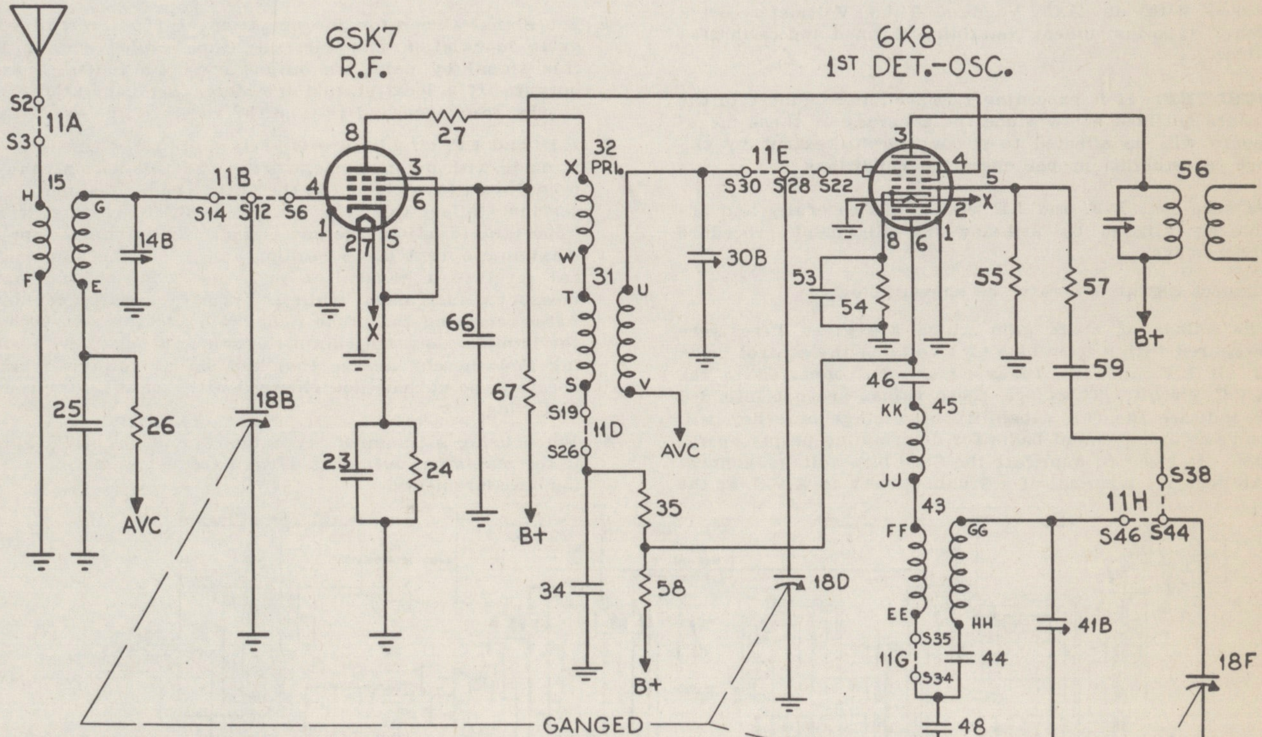
**DIFFERENCES** in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

## STEWART WARNER CORP.

MODEL 9010-A

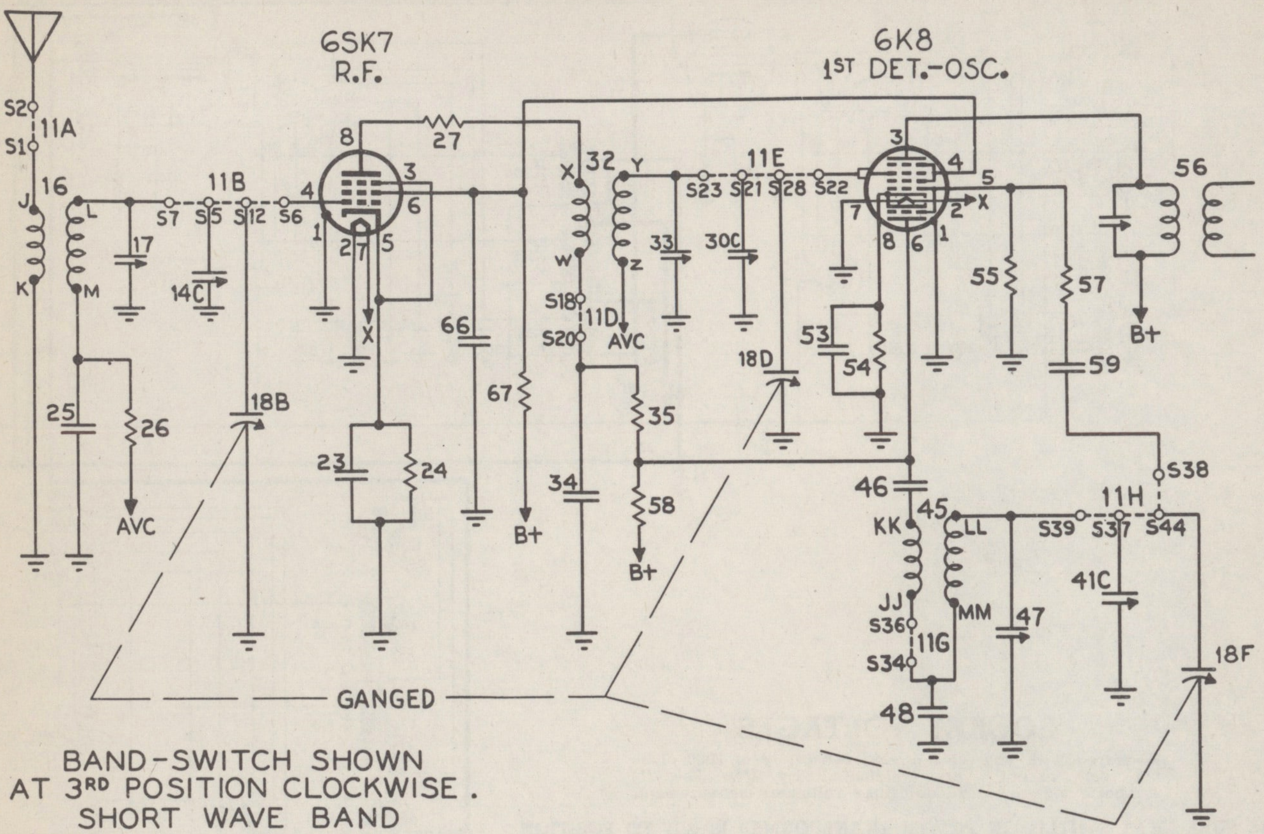

6SK7
R.F.
6K8
1ST DET.-OSC.
S2
11A
S4
A
15
B
13
C
D
14 A
11B
S12
S6
4
8
3
6
1
2
7
5
X
26
25
AVC
18B
23
24
27
66
67
B+
32
PRI.
W
T
31
PRI.
S.
P
28
Q
29
30A
N
R
34
35
AVC
58
B+
GANGED
11E
S29
S28
S22
18D
53
54
55
57
56
B+
59
46
KK
45
JJ
43
FF
EE
40
BB
CC
41A
18F
AA
DD
42
48
S38
11H
S45
S44

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND

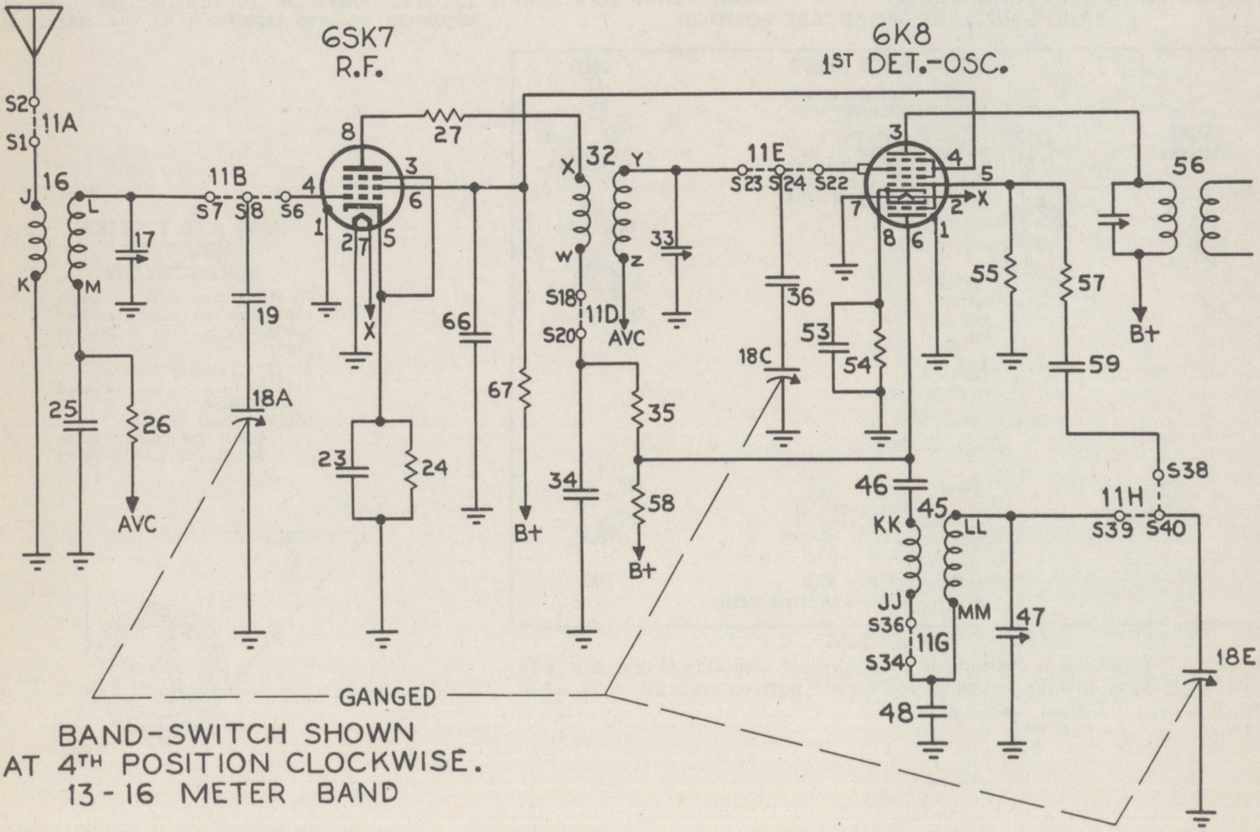

6SK7
R.F.
6K8
1ST DET.-OSC.
S2
11A
S3
H
15
F
G
E
14B
11B
S14
S12
S6
4
8
3
6
1
2
7
5
X
25
26
AVC
18B
23
24
27
66
67
B+
32
PRI.
W
31
T
S
U
V
S19
11D
S26
AVC
35
58
34
B+
GANGED
11E
S30
S28
S22
30B
18D
53
54
55
57
56
B+
59
46
KK
45
JJ
43
FF
GG
EE
HH
S35
11G
S34
44
48
41B
S38
11H
S46
S44
18F

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
INTERMEDIATE BAND

## STEWART WARNER CORP.


6SK7
R.F.
6K8
1ST DET.-OSC.
S2
11A
S1
16
J
K
L
M
17
S7
S5
S12
S6
11B
14C
25
26
AVC
18B
8
27
4
3
6
1
2
7
5
X
23
24
66
67
B+
32
X
W
Y
Z
S18
11D
S20
AVC
33
30C
S23
S21
11E
S28
S22
18D
35
34
58
B+
3
4
5
7
2
X
8
6
1
53
54
55
57
59
56
B+
46
45
KK
LL
JJ
MM
S36
11G
S34
48
47
S39
S37
11H
S44
S38
41C
18F
GANGED

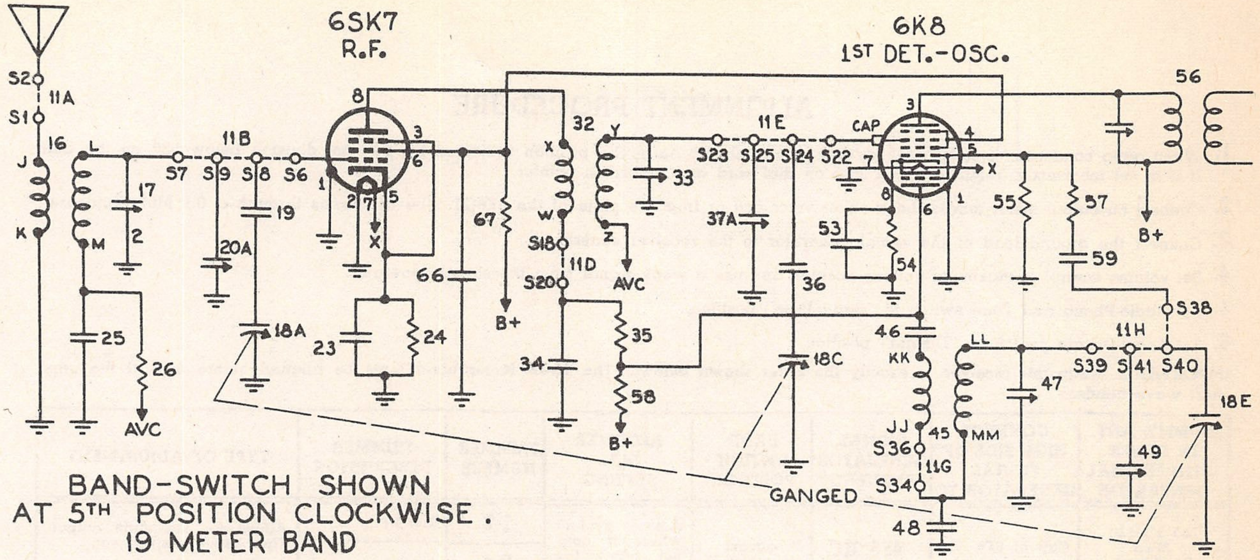
BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
SHORT WAVE BAND


6SK7
R.F.
6K8
1ST DET.-OSC.
S2
11A
S1
16
J
K
L
M
17
S7
S8
S6
11B
19
25
26
AVC
18A
8
27
4
3
6
1
2
7
5
X
23
24
66
67
B+
32
X
W
Y
Z
S18
11D
S20
AVC
33
S23
11E
S24
S22
36
18C
35
34
58
B+
3
4
5
7
2
X
8
6
1
53
54
55
57
59
56
B+
46
45
KK
LL
JJ
MM
S36
11G
S34
48
47
S38
11H
S39
S40
18E
GANGED

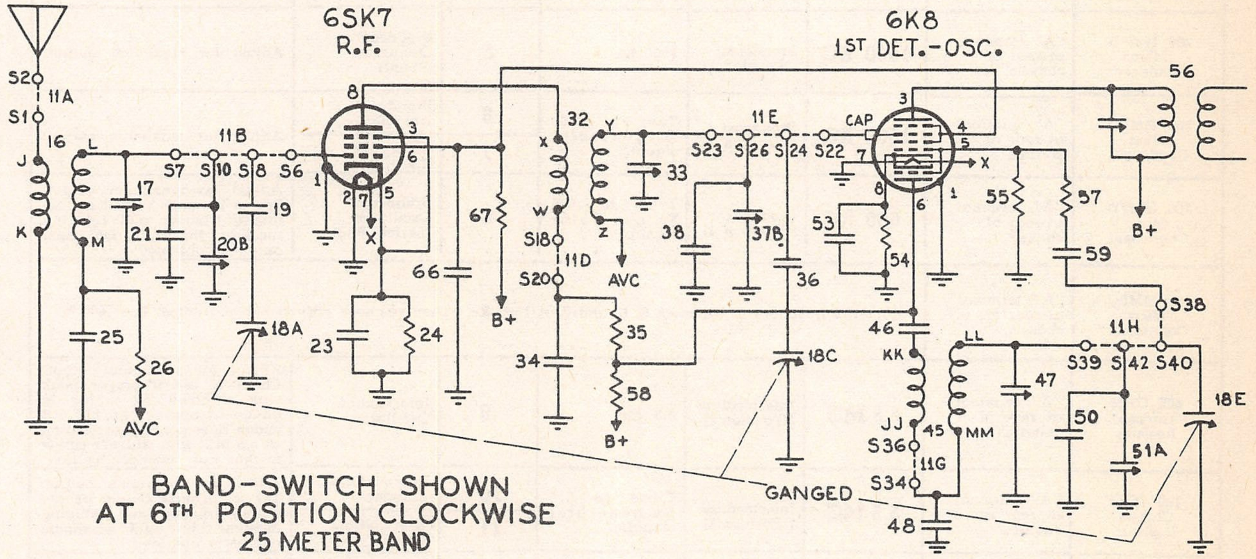
BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE.
13-16 METER BAND

# STEWART WARNER CORP.

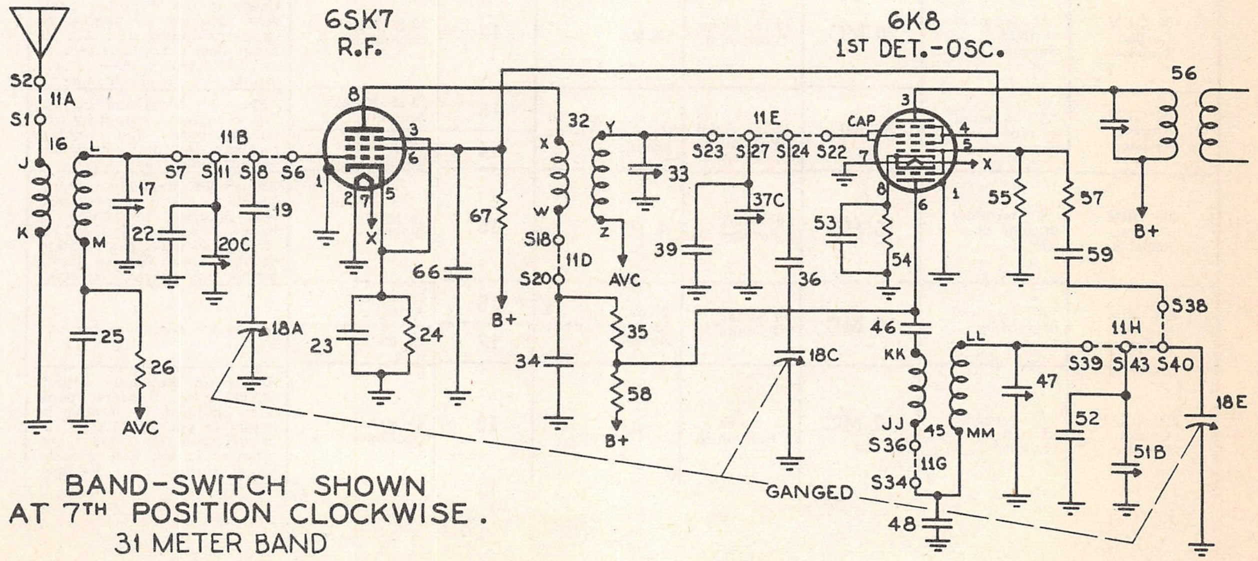
MODEL 9010-A


6SK7
R.F.
6K8
1ST DET.-OSC.
S2
11A
S1
16
J
K
L
M
17
2
S7
S9
S8
S6
11B
19
20A
18A
25
26
AVC
8
3
6
1
2
7
5
X
23
24
66
67
B+
32
X
W
Z
Y
S18
11D
S20
AVC
34
35
58
B+
33
S23
S25
S24
S22
11E
37A
36
18C
CAP
3
4
5
7
8
6
1
X
53
54
55
57
59
56
B+
S38
46
KK
JJ
45
S36
11G
S34
48
LL
MM
47
S39
S41
S40
11H
49
18E
GANGED

BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE.
19 METER BAND


6SK7
R.F.
6K8
1ST DET.-OSC.
S2
11A
S1
16
J
K
L
M
17
21
S7
S10
S8
S6
11B
19
20B
18A
25
26
AVC
8
3
6
1
2
7
5
X
23
24
66
67
B+
32
X
W
Z
Y
S18
11D
S20
AVC
34
35
58
B+
33
S23
S26
S24
S22
11E
38
37B
36
18C
CAP
3
4
5
7
8
6
1
X
53
54
55
57
59
56
B+
S38
46
KK
JJ
45
S36
11G
S34
48
LL
MM
47
50
51A
S39
S42
S40
11H
18E
GANGED

BAND-SWITCH SHOWN
AT 6TH POSITION CLOCKWISE
25 METER BAND


6SK7
R.F.
6K8
1ST DET.-OSC.
S2
11A
S1
16
J
K
L
M
17
22
S7
S11
S8
S6
11B
19
20C
18A
25
26
AVC
8
3
6
1
2
7
5
X
23
24
66
67
B+
32
X
W
Z
Y
S18
11D
S20
AVC
34
35
58
B+
33
S23
S27
S24
S22
11E
39
37C
36
18C
CAP
3
4
5
7
8
6
1
X
53
54
55
57
59
56
B+
S38
46
KK
JJ
45
S36
11G
S34
48
LL
MM
47
52
51B
S39
S43
S40
11H
18E
GANGED

BAND-SWITCH SHOWN
AT 7TH POSITION CLOCKWISE.
31 METER BAND

## ALIGNMENT PROCEDURE

1. When gang condenser is fully meshed, dial pointer should be in the position indicated by the last division below 550 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
2. Connect on output meter across the speaker voice coil or from the plate of the 6K6GT tube to chassis through a 0.1 Mfd. condenser.
3. Connect the ground lead of the signal generator to the receiver chassis.
4. Set volume control to maximum volume position and use a weak signal from the signal generator.
5. Set Radio-Phono and Tone switch to "Radio-Bass" position.
6. Set Local-Distant switch to "Distant" position.

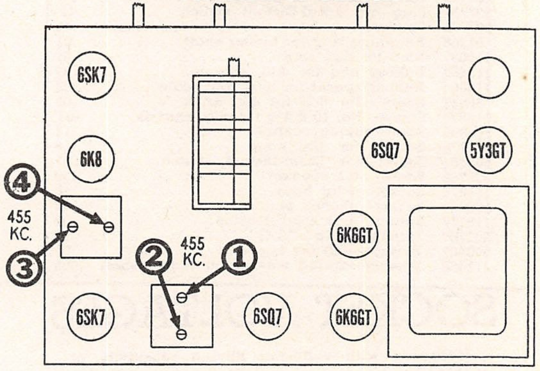
**IMPORTANT: Align this receiver in exactly the order shown below. The 13-16 Meter band must be aligned before any of the other short wave bands.**

| DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR | CONNECT HIGH SIDE OF SIGNAL GENERATOR TO | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| 200 MMFD. Mica Condenser | Cap of 6K8 | 455 KC | Broadcast (*Position 1) | Any point where it does not affect the signal. | 1-2 | 2nd I.F. | Adjust for maximum output. Then repeat adjustment. |
| | | | | | 3-4 | 1st I.F. | |
| 200 MMFD. Mica Condenser | "A" terminal at rear of chassis. | 1500 KC | Broadcast (*Position 1) | 1500 Kc. | 5 | Broadcast Oscillator (Shunt) | Adjust for maximum output. |
| 200 MMFD. Mica Condenser | "A" terminal at rear of chassis. | 1500 KC | Broadcast (*Position 1) | Tune to 1500 Kc. generator signal. | 6 | Broadcast Antenna | Adjust for maximum output. |
| | | | | | 7 | Broadcast R.F. | |
| 200 MMFD. Mica Condenser | "A" terminal at rear of chassis. | 600 KC | Broadcast (*Position 1) | Tune to 600 Kc. generator signal. | 8 | Broadcast Oscillator (Series Pad) | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| 200 MMFD. Mica Condenser | "A" terminal at rear of chassis. | Repeat adjustment of trimmers 5, 6, and 7 at 1500 Kc. Then re-check adjustment of trimmer 8 at 600 Kc. | | | | | |
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 5.5 MC | Intermediate (*Position 2) | 5.5 Mc. | 9 | Intermediate Oscillator | Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 4.6 MC. If image does not appear, realign at 5.5 MC, with trimmer screw farther out. Recheck image. |
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 5.5 MC | Intermediate (*Position 2) | Tune to 5.5 Mc. generator signal. | 10 | Intermediate Antenna | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| | | | | | 11 | Intermediate R.F. | |
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 20 MC | 13-16 Meter (*Position 4) | 20 Mc. | 12 | 13-16 Meter Oscillator | Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 19.1 MC. If image does not appear, realign at 20 MC. with trimmer screw farther out. Recheck image. |
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 20 MC | 13-16 Meter (*Position 4) | Tune to 20 Mc. generator signal. | 13 | 13-16 Meter Antenna | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| | | | | | 14 | 13-16 Meter R.F. | |
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 16 MC | 19 Meter (*Position 5) | 16 Mc. | 15 | 19 Meter Oscillator | Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 15.1 MC. If image does not appear, realign at 16 MC. with trimmer screw farther out. Recheck image. |
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 16 MC | 19 Meter (*Position 5) | Tune to 16 Mc. generator signal. | 16 | 19 Meter Antenna | Adjust for maximum output. |
| | | | | | 17 | 19 Meter R.F. | |
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 12 MC | 25 Meter (*Position 6) | 12 Mc. | 18 | 25 Meter Oscillator | Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 Mc. with trimmer screw farther out. Recheck image. |

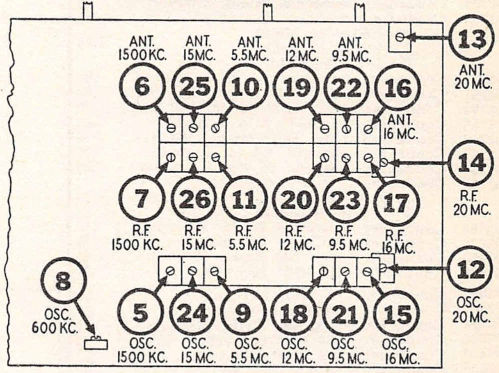
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 12 MC | 25 Meter (*Position 6) | Tune to 12 Mc. generator signal. | 19 | 25 Meter Antenna | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| | | | | | 20 | 25 Meter R.F. | |
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 9.5 MC | 31 Meter (*Position 7) | 9.5 Mc. | 21 | 31 Meter Oscillator | Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 8.6 MC. If image does not appear, realign at 9.5 MC, with trimmer screw farther out. Recheck image. |
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 9.5 MC | 31 Meter (*Position 7) | Tune to 9.5 Mc. generator signal. | 22 | 31 Meter Antenna | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| | | | | | 23 | 31 Meter R.F. | |
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 15 MC | S.W. (*Position 3) | 15 Mc. | 24 | S.W. Oscillator | Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 14.1 MC. If image does not appear, realign at 15 MC, with trimmer screw farther out. Recheck image. |
| 400 OHM Carbon Resistor | "A" terminal at rear of chassis. | 15 MC | S.W. (*Position 3) | Tune to 15 Mc. generator signal. | 25 | S.W. Antenna | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| | | | | | 26 | S.W. R.F. | |

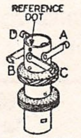
* Position 1 corresponds to extreme counter-clockwise setting of band switch. Succeeding positions are numbered in ascending order as switch is rotated clockwise.

**TOP VIEW OF CHASSIS**


6SK7
6K8
6SQ7
5Y3GT
④
455 KC.
③
②
455 KC.
①
6K6GT
6SK7
6SQ7
6K6GT

**BOTTOM VIEW OF CHASSIS**


ANT. 1500 KC.
ANT. 15 MC.
ANT. 5.5 MC.
ANT. 12 MC.
ANT. 9.5 MC.
⑬
ANT. 20 MC.
⑥ ㉕ ⑩ ⑲ ㉒ ⑯
ANT. 16 MC.
⑭
⑦ ㉖ ⑪ ⑳ ㉓ ⑰
R.F. 20 MC.
R.F. 1500 KC.
R.F. 15 MC.
R.F. 5.5 MC.
R.F. 12 MC.
R.F. 9.5 MC.
R.F. 16 MC.
⑫
⑧
OSC. 600 KC.
⑤ ㉔ ⑨ ⑱ ㉑ ⑮
OSC. 20 MC.
OSC. 1500 KC.
OSC. 15 MC.
OSC. 5.5 MC.
OSC. 12 MC.
OSC. 9.5 MC.
OSC. 16 MC.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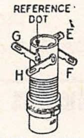
**B.C. ANT. COIL 502710**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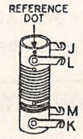
F

**INT. ANT. COIL 502713**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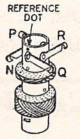
**S.W. ANT. COIL 502716**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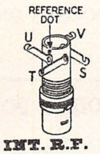
**B.C. R.F. COIL 502711**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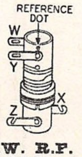
**INT. R.F. COIL 502714**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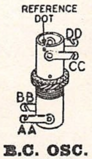
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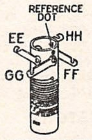
**B.C. OSC. COIL 502712**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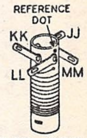
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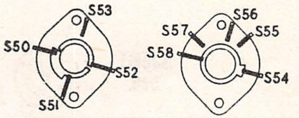
MM

**S.W. OSC. COIL 502718**


S53
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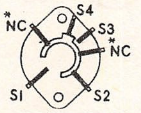
**FRONT VIEW　REAR VIEW**

**RADIO-PHONO & TONE SWITCH 502719**


S4
*NC
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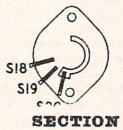
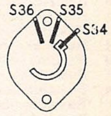
S2

**SECTION 2 FRONT VIEW**

*No connection

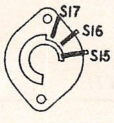


**SECTION 4 FRONT VIEW**

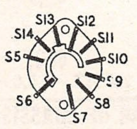


**SECTION 4 REAR VIEW**

**BAND SWITCH 502748**



**SECTION 1 FRONT VIEW**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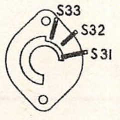
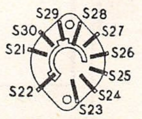
**SECTION 1 REAR VIEW**



**SECTION 3 FRONT VIEW**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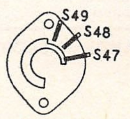
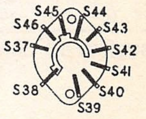
**SECTION 3 REAR VIEW**



**SECTION 5 FRONT VIEW**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**SECTION 5 REAR VIEW**

# PARTS LIST

ORDER PARTS FROM YOUR STEWART-WARNER DISTRIBUTOR ONLY

## MODEL 9010-A

| DIAGRAM NO. | PART NO. | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| | | **CONDENSERS** | |
| 13 | 502787 | Condenser—mica 100 Mmfd. 500 volt | $0.24 |
| 14A, B, C | 502753 | Condenser—trimmer assembly<br>A—1.6 to 18 Mmfd.<br>B—1.6 to 18 Mmfd.<br>C—3 to 35 Mmfd. | 1.25 |
| 17 | 502758 | Condenser—trimmer; 1.6 to 18 Mmfd. | .35 |
| 18A to E | 502749 | Condenser—variable gang | 9.00 |
| 19 | 502778 | Condenser—ceramic 200 Mmfd. 500 volt | .40 |
| 20A, B, C | 502754 | Condenser—trimmer assembly<br>A—3 to 35 Mmfd.<br>B—3 to 35 Mmfd.<br>C—1.6 to 18 Mmfd. | 1.25 |
| 21 | 502779 | Condenser—ceramic 56 Mmfd. 500 volt | .45 |
| 22 | 502788 | Condenser—mica 130 Mmfd. 500 Volt | .45 |
| 23 | 502806 | Condenser—.05 Mfd. 200 volt | .36 |
| 25 | 502806 | Condenser—.05 Mfd. 200 volt | .36 |
| 29 | 502787 | Condenser—mica 100 Mmfd. 500 volt | .24 |
| 30A, B, C | 502753 | Condenser—trimmer assembly<br>A—1.6 to 18 Mmfd.<br>B—1.6 to 18 Mmfd.<br>C—3 to 35 Mmfd. | 1.25 |
| 33 | 502758 | Condenser—trimmer; 1.6 to 18 Mmfd. | .35 |
| 34 | 502807 | Condenser—.05 Mfd. 400 volt | .37 |
| 36 | 502778 | Condenser—ceramic 200 Mmfd. 500 volt | .40 |
| 37A, B, C | 502754 | Condenser—trimmer assembly<br>A—3 to 35 Mmfd.<br>B—3 to 35 Mmfd.<br>C—1.6 to 18 Mmfd. | 1.25 |
| 38 | 502779 | Condenser—ceramic 56 Mmfd. 500 volt | .45 |
| 39 | 502788 | Condenser—mica 130 Mmfd. 500 volt | .45 |
| 41A, B, C | 502753 | Condenser—trimmer assembly<br>A—1.6 to 18 Mmfd.<br>B—1.6 to 18 Mmfd.<br>C—3 to 35 Mmfd. | 1.25 |
| 42 | 502922 | Condenser—trimmer; 300 to 600 Mmfd. | .85 |
| 44 | 502791 | Condenser—mica 1600 Mmfd. 500 volt | .80 |
| 46 | 502792 | Condenser—mica 4000 Mmfd. 500 volt | .80 |
| 47 | 502756 | Condenser—trimmer; 2 to 6 Mmfd. | .60 |
| 48 | 502793 | Condenser—mica 5600 Mmfd. 500 volt | 1.15 |
| 49 | 502757 | Condenser—trimmer; 6.5 to 35 Mmfd. | .60 |
| 50 | 502167 | Condenser—ceramic 68 Mmfd. 500 volt | .40 |
| 51A, B | 502755 | Condenser—trimmer assembly<br>A—3 to 35 Mmfd.<br>B—1.6 to 18 Mmfd. | 90 |
| 52 | 502789 | Condenser—mica 160 Mmfd. 500 volt | .45 |
| 53 | 502806 | Condenser—.05 Mfd. 200 volt | .36 |
| 59 | 502790 | Condenser—mica 200 Mmfd. 500 volt | .24 |
| 60 | 502806 | Condenser—.05 Mfd. 200 volt | .36 |
| 62 | 502806 | Condenser—.05 Mfd. 200 volt | .36 |
| 66 | 502807 | Condenser—.05 Mfd. 400 volt | .37 |
| 70 | 502787 | Condenser—mica 100 Mmfd. 500 volt | .24 |
| 73 | 502802 | Condenser—.004 Mfd. 600 volt | .30 |
| 75 | 502802 | Condenser—.004 Mfd. 600 volt | .30 |
| 78 | 502808 | Condenser—.25 Mfd. 200 volt | .45 |
| 79 | 502787 | Condenser—mica 100 Mmfd. 500 volt | .24 |
| 80 | 502803 | Condenser—.006 Mfd. 600 volt | .30 |
| 83 | 502809 | Condenser—.25 Mfd. 400 volt | .36 |
| 85 | 502805 | Condenser—.02 Mfd. 400 volt | .36 |
| 87 | 502804 | Condenser—.01 Mfd. 400 volt | .30 |
| 92 | 502805 | Condenser—.02 Mfd. 400 volt | .36 |
| 93 | 502802 | Condenser—.004 Mfd. 600 volt | .30 |
| 95 | 502802 | Condenser—.004 Mfd. 600 volt | .30 |
| 97A, B | 502720 | Condenser—electrolytic<br>A—15 Mfd. 400 volt<br>B—20 Mfd. 400 volt | 2.10 |
| | | **RESISTORS** | |
| 24 | 502125 | Resistor—carbon 220 ohms ¼ watt | .12 |
| 26 | 502134 | Resistor—carbon 470,000 ohms ¼ watt | .12 |
| 27 | 502478 | Resistor—carbon 1000 ohms ¼ watt | .12 |
| 35 | 502795 | Resistor—carbon 4700 ohms ½ watt | .12 |
| 54 | 502125 | Resistor—carbon 220 ohms ¼ watt | .12 |
| 55 | 502131 | Resistor—carbon 47,000 ohms ¼ watt | .12 |
| 57 | 502794 | Resistor—carbon 68 ohms ¼ watt | .12 |
| 58 | 502801 | Resistor—carbon 39,000 ohms ½ watt | .12 |
| 61 | 502135 | Resistor—carbon 2.2 Meg. ¼ watt | .12 |
| 63 | 502125 | Resistor—carbon 220 ohms ¼ watt | .12 |
| 65 | 502796 | Resistor—carbon 8200 ohms ¼ watt | .12 |
| 67 | 502981 | Resistor—carbon 15,000 ohms 2 watt | .25 |
| 69 | 502131 | Resistor—carbon 47,000 ohms ¼ watt | .12 |
| 71 | 502134 | Resistor—carbon 470,000 ohms ¼ watt | .12 |
| 74A, B | 502750 | Volume control—with switch; 2 meg. | 1.50 |
| 76 | 502136 | Resistor—carbon 10 meg. ¼ watt | .12 |
| 77 | 502794 | Resistor—carbon 68 ohms ¼ watt | .12 |
| 81 | 502126 | Resistor—carbon 470 ohms ¼ watt | .12 |
| 82 | 502133 | Resistor—carbon 220,000 ohms ¼ watt | .12 |
| 84 | 502132 | Resistor—carbon 100,000 ohms ¼ watt | .12 |
| 86 | 502133 | Resistor—carbon 220,000 ohms ¼ watt | .12 |
| 88 | 502136 | Resistor—carbon 10 meg. ¼ watt | .12 |
| 89 | 502133 | Resistor—carbon 220,000 ohms ¼ watt | .12 |
| 90, 91 | 502133 | Resistor—carbon 220,000 ohms ¼ watt | .12 |
| 94 | 502813 | Resistor—wire wound 300 ohms 2 watt | .25 |
| | | **COILS AND TRANSFORMERS** | |
| 12 | 502710 | Coil—BC. antenna | 2.10 |
| 15 | 502713 | Coil—Int. antenna | 1.40 |
| 16 | 502716 | Coil—S.W. antenna | 1.40 |
| 28 | 502711 | Coil—BC. R.F. | 2.30 |
| 31 | 502714 | Coil—Int. R.F. | 1.50 |
| 32 | 502717 | Coil—S.W.R.F. | 1.40 |
| 40 | 502712 | Coil—BC. oscillator | 1.80 |
| 43 | 502715 | Coil—Int. oscillator | 1.80 |
| 45 | 502718 | Coil—S.W. oscillator | 1.70 |
| 56 | 502725 | Transformer—1st I.F. | 2.15 |
| 68 | 502726 | Transformer—2nd I.F. | 2.15 |
| 96 | 502751 | Coil—filter choke | 4.60 |
| 100 | 502747 | Transformer—power | 12.50 |
| 101 | 502776 | Transformer—output for M-502775 spkr. | 2.75 |
| | | **OTHER ELECTRICAL PARTS** | |
| 11A to J | 502748 | Switch—band | 7.00 |
| 64 | 502916 | Switch—local-distant | .80 |
| 72A, B | 502719 | Switch—tone control | 1.40 |
| 98, 99 | 110629 | Lamp—dial (Mazda No. 44) 6.3V 0.25 Amps. | .15 |
| 102 | 502775 | Speaker—P.M. dynamic (8 inch) | 12.50 |
| 103 | 502777 | Cone & voice coil for M-502775 speaker | 3.00 |
| | | **MISCELLANEOUS** | |
| | 502724 | Background for dial | .35 |
| | 160026 | Base for mtg. electrolytic condenser | .04 |
| | 500420 | Clamp—for dial glass | .15 |
| | 112745 | Clip—coil mtg. | .01 |
| | 114955 | Clip—retainer on end of dial cord | .01 |
| | 502773 | Cord—dial drive (8 ft. required)...Per ft. | .05 |
| | 502921 | Dial scale—glass | 2.25 |
| | 117029 | Drum—for dial drive | .70 |
| | 501458 | Knob—tone or band switch | .16 |
| | 501449 | Knob—volume or tuning | .15 |
| | 502762 | Plug—for Local-Distant switch | .15 |
| | 502772 | Pointer | .50 |
| | 81145 | Retaining ring for tuning shaft | .01 |
| | 119087 | Ring for dial cord | .01 |
| | 113463 | Rubber pad for mtd. chassis | .03 |
| | 116584 | Rubber spacer for mtg. dial scale | .02 |
| | 85827 | Screw—No. 8-32 for dial drum | .02 |
| | 112874 | Screw—No. 10 x 1⅛ for mtg. chassis | .03 |
| | 504990 | Shaft—tuning control | .12 |
| | 502770 | Socket—for dial lamp | .18 |
| | 502761 | Socket—for Local-Distant switch | .20 |
| | 502769 | Socket—for speaker | .30 |
| | 114876 | Socket—octal base | .15 |
| | 160039 | Socket—phono. plug | .08 |
| | 113177 | Spring—dial cord tension | .09 |
| | 502767 | Terminal strip—"A G" | .18 |
| | 500487 | Washer—felt for knobs | .01 |
| | 111456 | Washer—spring washer for tuning shaft | .005 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

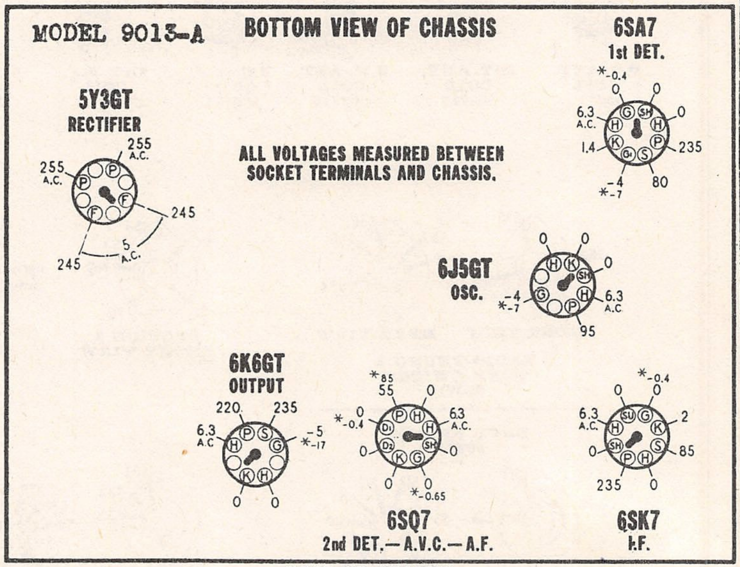
# SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*).

BE SURE THAT SWITCH ON POWER TRANSFORMER IS SET TO POSITION WHICH MOST NEARLY MATCHES LINE VOLTAGE

VOLUME ON FULL WITH NO SIGNAL    DIAL TUNED TO 540 KC.

BAND SWITCH IN BROADCAST POSITION

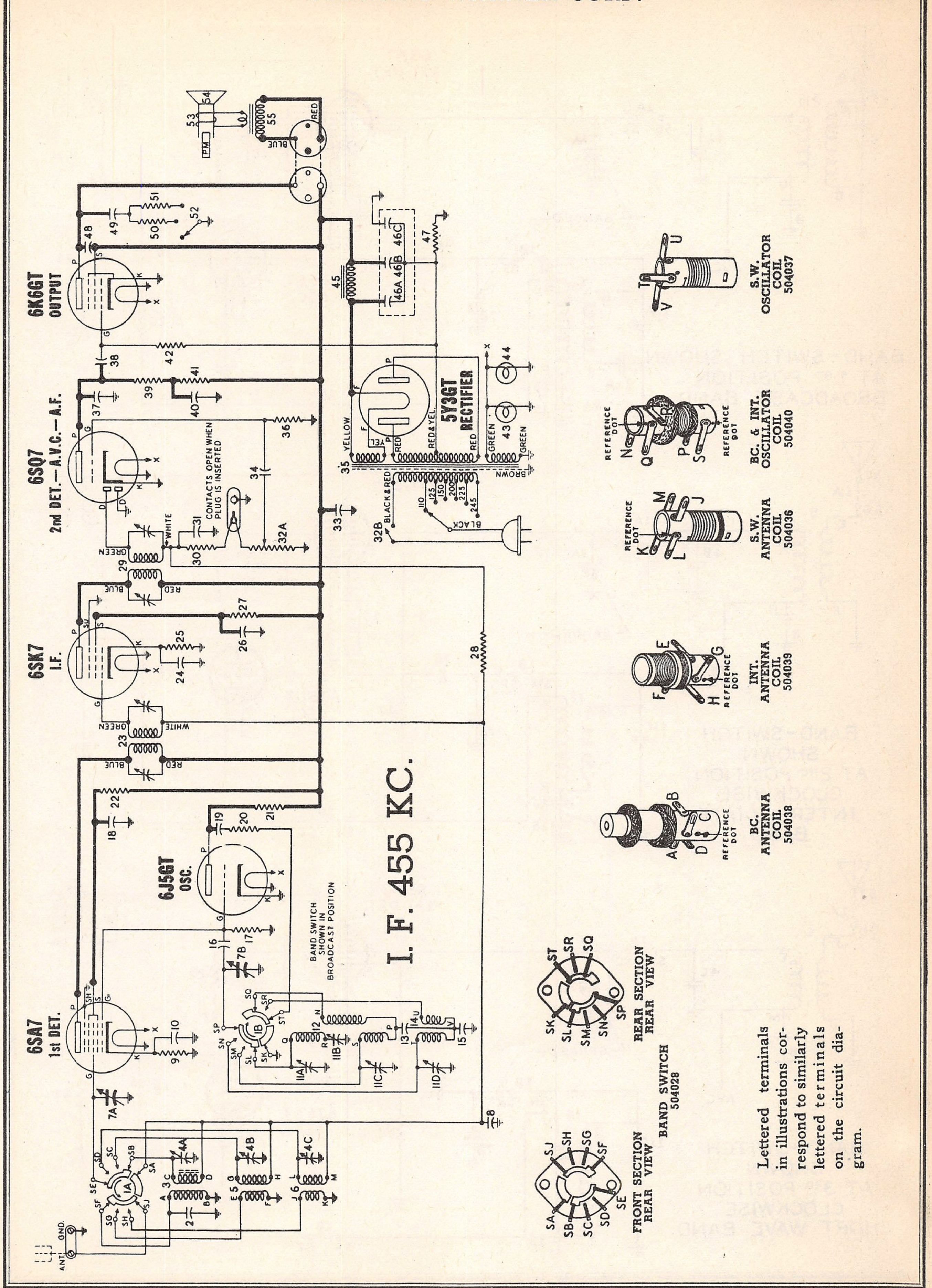


*—Measured with vacuum tube voltmeter.

NOTE:—The 6K6GT grid bias of —17 volts can be measured across resistor No. 47

## STEWART WARNER CORP.

**MODEL 9013-A**

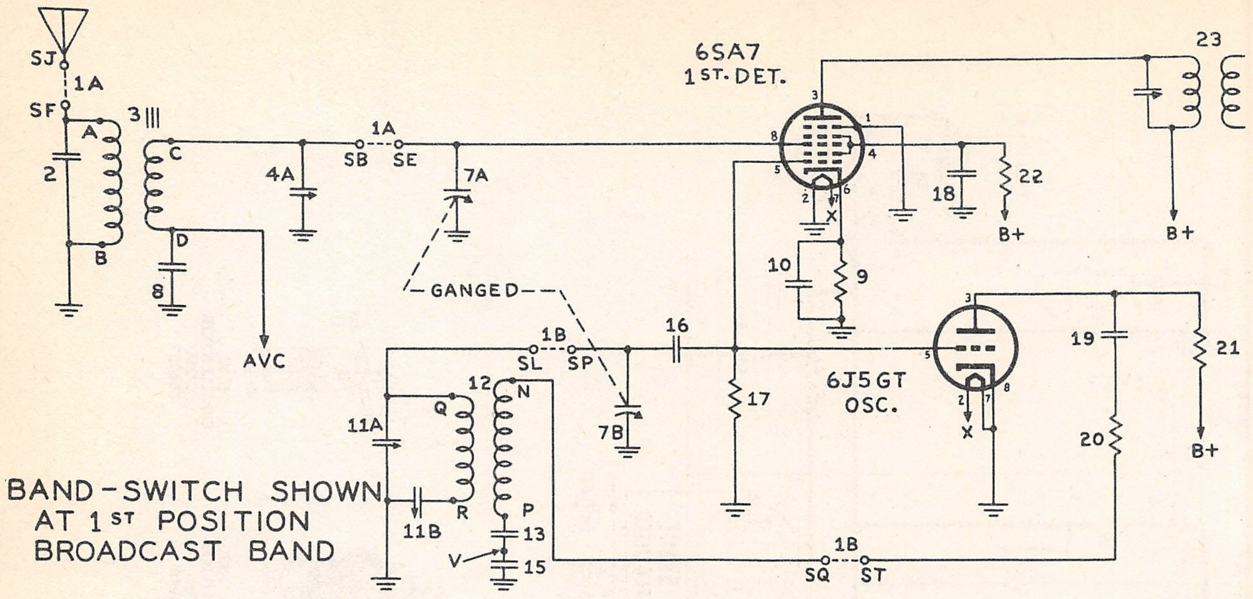

6SA7
1st DET.
6J5GT
OSC.
6SK7
I.F.
6SQ7
2nd DET.—A.V.C.—A.F.
6K6GT
OUTPUT
5Y3GT
RECTIFIER
I. F. 455 KC.
BAND SWITCH SHOWN IN BROADCAST POSITION
CONTACTS OPEN WHEN PLUG IS INSERTED
ANT.
GND.
PM
BLUE
RED
GREEN
WHITE
YELLOW
YEL
RED & YEL.
BLACK & RED
BLACK
BROWN
110
125
150
200
225
245
FRONT SECTION
REAR VIEW
REAR SECTION
REAR VIEW
BAND SWITCH
504028
BC.
ANTENNA
COIL
504038
INT.
ANTENNA
COIL
504039
S.W.
ANTENNA
COIL
504036
BC. & INT.
OSCILLATOR
COIL
504040
S.W.
OSCILLATOR
COIL
504037
REFERENCE DOT

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

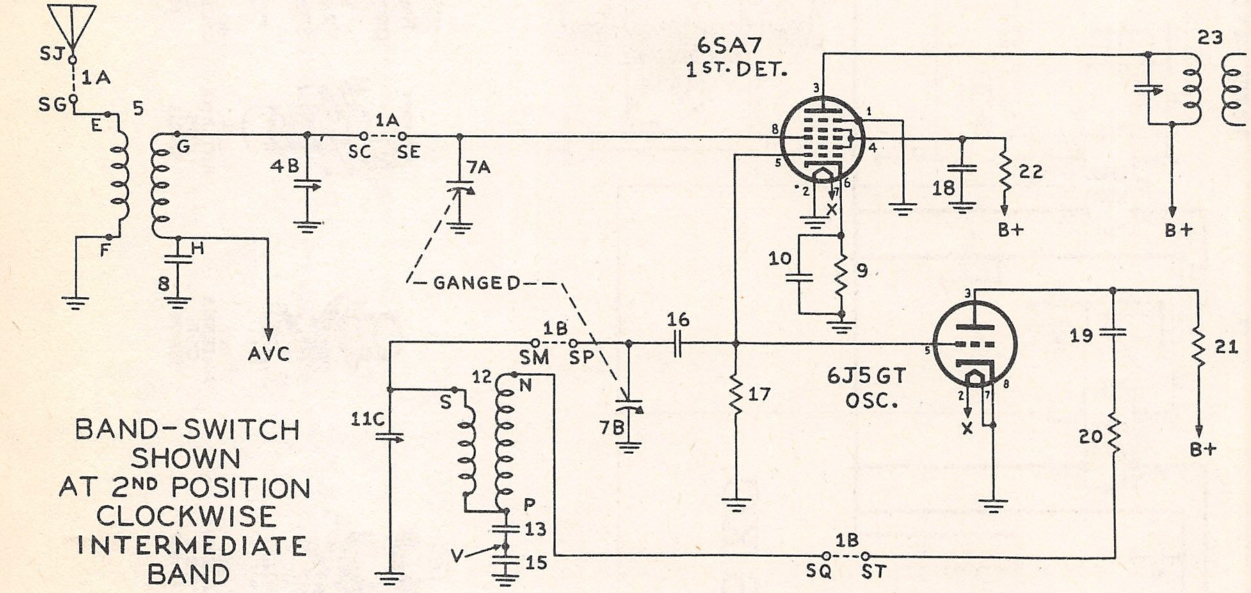
*"clarified schematics"*

MODEL 9013-A

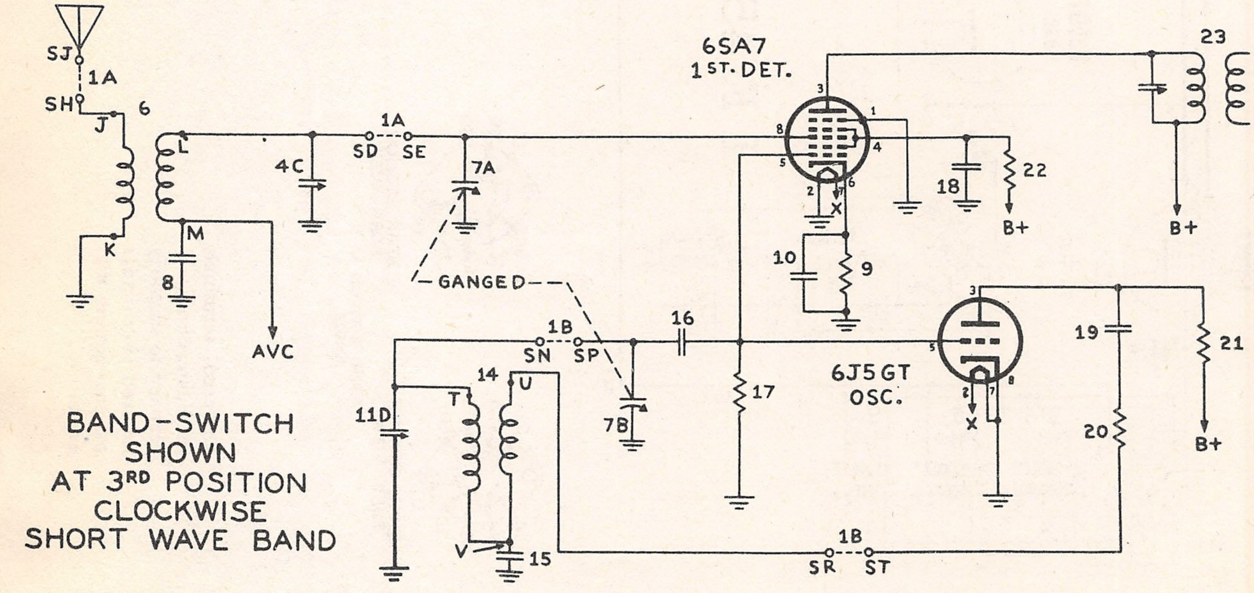
## STEWART WARNER CORP.


SJ
1A
SF
3
A
B
C
D
2
8
4A
AVC
1A
SB
SE
7A
GANGED
6SA7
1ST. DET.
23
22
18
B+
B+
10
9
X
1B
SL
SP
16
17
12
Q
N
R
P
11A
11B
13
V
15
7B
6J5GT
OSC.
19
20
21
B+
1B
SQ
ST

BAND-SWITCH SHOWN
AT 1ST POSITION
BROADCAST BAND


SJ
1A
SG
5
E
F
G
H
8
4B
AVC
1A
SC
SE
7A
GANGED
6SA7
1ST. DET.
23
22
18
B+
B+
10
9
X
1B
SM
SP
16
17
12
S
N
P
11C
13
V
15
7B
6J5GT
OSC.
19
20
21
B+
1B
SQ
ST

BAND-SWITCH
SHOWN
AT 2ND POSITION
CLOCKWISE
INTERMEDIATE
BAND


SJ
1A
SH
6
J
K
L
M
8
4C
AVC
1A
SD
SE
7A
GANGED
6SA7
1ST. DET.
23
22
18
B+
B+
10
9
X
1B
SN
SP
16
17
14
T
U
11D
V
15
7B
6J5GT
OSC.
19
20
21
B+
1B
SR
ST

BAND-SWITCH
SHOWN
AT 3RD POSITION
CLOCKWISE
SHORT WAVE BAND

# PARTS LIST

ORDER PARTS FROM YOUR STEWART-WARNER DISTRIBUTOR ONLY

| DIAGRAM NO. | PART NO. | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| | | **CONDENSERS** | |
| 2 | 502931 | Condenser—mica 100 Mmfd 500 volt | $0.24 |
| 4A, B, C | 504030 | Condenser—trimmer assembly<br>A—1.6 to 18 Mmfd.<br>B—1.6 to 18 Mmfd.<br>C—3 to 35 Mmfd. | .90 |
| 7A, B | 504026 | Condenser-variable gang | 4.60 |
| 8 | 502806 | Condenser—.05 Mfd. 200 volt | .36 |
| 10 | 502806 | Condenser—.05 Mfd. 200 volt | .36 |
| 11 (A,B, C.D) | 504031 | Condenser—trimmer assembly<br>A—3 to 35 Mmfd.<br>B—300 to 600 Mmfd.<br>C—1.6 to 18 Mmfd.<br>D—1.6 to 18 Mmfd. | 1.40 |
| 13 | 504049 | Condenser—mica 4,300 Mmfd. 500 volt | 1.30 |
| 15 | 504049 | Condenser—mica 4,300 Mmfd. 500 volt | 1.30 |
| 16 | 502929 | Condenser—mica 47 Mmfd. 500 volt | .16 |
| 18 | 502807 | Condenser—.05 Mfd. 400 volt | .36 |
| 19 | 502804 | Condenser—.01 Mfd. 400 volt | .30 |
| 24 | 502806 | Condenser—.05 Mfd. 200 volt | .36 |
| 26 | 502807 | Condenser—.05 Mfd. 400 volt | .36 |
| 31 | 502931 | Condenser—mica 100 Mmfd. 500 volt | .24 |
| 33 | 504220 | Condenser—.1 Mfd. 600 volt | .36 |
| 34 | 504051 | Condenser—.004 Mfd. 400 volt | .24 |
| 37 | 502790 | Condenser—mica 200 Mmfd. 500 volt | .24 |
| 38 | 502805 | Condenser—.02 Mfd. 400 volt | .36 |
| 40 | 502807 | Condenser—.05 Mfd. 400 volt | .36 |
| 46A, B, C | 504033 | Condenser—electrolytic<br>A—20 Mfd. 400 volt<br>B—10 Mfd. 400 volt<br>C—20 Mfd. 25 volt | 2.20 |
| 48 | 504051 | Condenser—.004 Mfd. 400 volt | .24 |
| 49 | 504050 | Condenser—.05 Mfd. 600 volt | .36 |
| | | **RESISTORS** | |
| 9 | 502125 | Resistor—carbon 220 Ohms ¼ watt | $0.12 |
| 17 | 502130 | Resistor—carbon 22,000 Ohms ¼ watt | .12 |
| 20 | 502794 | Resistor—carbon 68 Ohms ¼ watt | .12 |
| 21 | 504047 | Resistor—carbon 22,000 Ohms ½ wat | .12 |
| 22 | 502466 | Resistor—carbon 33.000 Ohms 1 watt | .16 |
| 25 | 502125 | Resistor—carbon 220 Ohms ¼ watt | .12 |
| 27 | 504048 | Resistor—carbon 56,000 Ohms ½ watt | .12 |
| 28 | 502135 | Resistor—carbon 2.2 Meg. ¼ watt | .12 |
| 30 | 502131 | Resistor—carbon 47,000 Ohms ¼ watt | .12 |
| 32A B | 504029 | Volume control 1 Meg. (with switch) | 1.35 |
| 36 | 502136 | Resistor—carbon 10 Meg. ¼ watt | .12 |
| 39 | 502133 | Resistor—carbon 220,000 Ohms ¼ watt | .12 |
| 41 | 502132 | Resistor—carbon 100,000 Ohms ¼ watt | .12 |
| 42 | 502134 | Resistor—carbon 470,000 Ohms ¼ watt | .12 |
| 47 | 502137 | Resistor—wire wound 330 Ohms 2 watt | .25 |
| 50 | 502291 | Resistor—carbon 4,700 Ohms ¼ watt | .12 |
| 51 | 502141 | Resistor—carbon 560 Ohms ¼ watt | .12 |
| | | **COILS AND TRANSFORMERS** | |
| 3 | 504038 | Coil—BC. antenna | $1.85 |
| 5 | 504039 | Coil—Int. Band antenna coil | 1.50 |
| 6 | 504036 | Coil—S.W. antenna | 1.25 |
| 12 | 504040 | Coil—BC. and Int. Band Oscillator | 1.80 |
| 14 | 504037 | Coil—S.W. Oscillator | 1.25 |
| 23 | 504024 | Transformer—1st I.F. | 2.60 |
| 29 | 504025 | Transformer—2nd I.F. | 2.60 |
| 35 | 504032 | Transformer—power | 11.60 |
| 45 | 502751 | Choke coil | 4.60 |
| 55 | 504763 | Transformer—output for W-504056 spkr. | 2.75 |
| | | **OTHER ELECTRICAL PARTS** | |
| 1A, B | 504028 | Switch—band | $2.40 |
| 43, 44 | 110629 | Lamp—dail (Mazda No. 44) 6.3V 0.25Amps. | .15 |
| 52 | 504027 | Switch—tone | .85 |
| 53 | 504056 | Speaker—P.M. dynamic (6 inch) | 8.90 |
| 54 | 504764 | Cone & voice coil for W-504056 spkr. | 2.50 |
| | | **MISCELLANEOUS PARTS** | |
| | 504054 | Background for dial | $0.10 |
| | 504034 | Base for mfg. electrolytic condenser | .04 |
| | 119559 | Clamp—dial glass | .08 |
| | 112745 | Clip—coil mounting | .01 |
| | 114955 | Clip—retainer on end of dial cord | .01 |
| | 502773 | Cord—dail drive (66 in. required) per ft. | .05 |
| | 504055 | Dial scale—glass | 1.30 |
| | 117029 | Drum—for dial drive | .70 |
| | 504108 | Plug—speaker | .25 |
| | 501449 | Knob—volume or tuning | .15 |
| | 501458 | Knob—tone or band switch | .16 |
| | 502601 | Pointer | .18 |
| | 81145 | Retaining ring for tuning shaft | .01 |
| | 119087 | Ring for dial cord | .01 |
| | 113463 | Rubber pad—chassis mtg. | .03 |
| | 116584 | Rubber spacer for mtg. dial scale | .02 |
| | 85827 | Screw—8-32 for dial drum | .02 |
| | 112874 | Screw—No. 10 x 1⅛; chassis mtg. | .03 |
| | 118606 | Shaft—tuning control | .18 |
| | 112818 | Socket—dial lamp with lead | .10 |
| | 160392 | Socket—octal | .16 |
| | 504035 | Socket—speaker | .18 |
| | 113177 | Spring—dial cord tension | .09 |
| | 502767 | Terminal strip—"GND-ANT" | .18 |
| | 504044 | Terminal strip—phono | .22 |
| | 111456 | Washer—spring washer for tuning shaft | .005 |
| | 500487 | Washer—felt; for knobs | .01 |

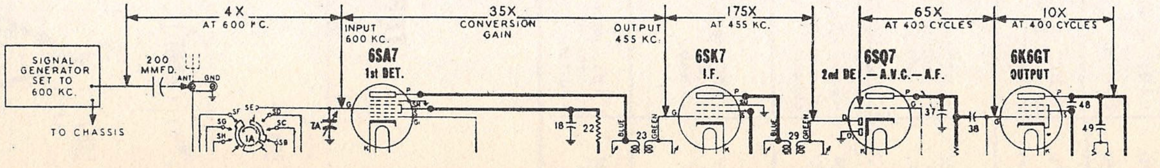
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

## APPROXIMATE STAGE GAIN DATA

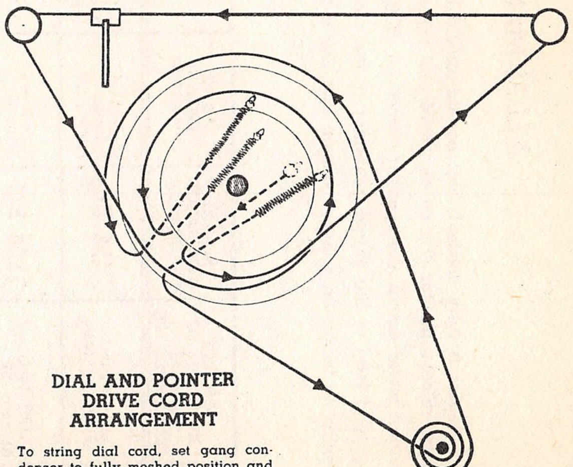
Be sure R.F. and I.F. stages are accurately aligned before measuring gain. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. A vacuum tube voltmeter may be used for audio gain measurements. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes).
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead at terminal D of BC. antenna coil (#3). Then connect positive battery terminal to chassis. This provides a definite operating point.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning).
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is depedent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



### DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

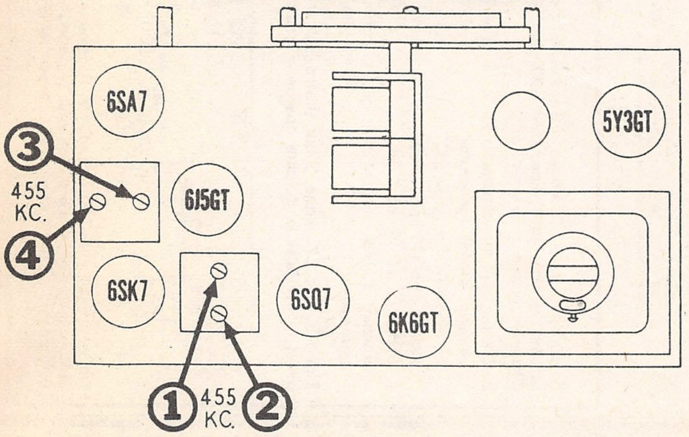
| | |
|---|---|
| 113177 | Tension Spring |
| 114955 | Clip on end of cord |
| 119087 | Ring |
| 502773 | Cord (66 inches)<br>36 inches for pointer drive<br>30 inches for tuning drive |

## ALIGNMENT PROCEDURE

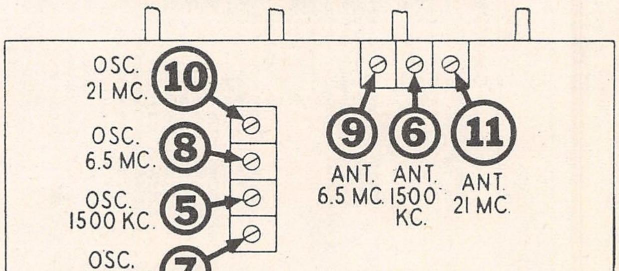
1. When gang condenser is fully meshed, dial pointer should be in the position indicated by the last division below 55 on the dial. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
2. Connect on output meter across the speaker voice coil or from the plate of the 6K6GT tube to chassis through a 0.1 Mfd. condenser.
3. Connect the ground lead of the signal generator to the receiver chassis.
4. Set volume control to maximum volume position and use a weak signal from the signal generator.

| DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR | CONNECT HIGH SIDE OF SIGNAL GENERATOR TO | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| 1 MFD. Condenser | Lug on front section of gang. | 455 KC | Broadcast (counter-clockwise) | Any point where it does not affect the signal. | 1-2<br>3-4 | 2nd I.F.<br>1st I.F. | Adjust for maximum output. Then repeat adjustment. |
| 200 MMFD. Mica Condenser | "ANT" terminal at rear of chassis. | 1500 KC | Broadcast (counter-clockwise) | 1500 Kc. | 5 | Broadcast Oscillator (Shunt) | Adjust for maximum output. |
| 200 MMFD. Mica Condenser | "ANT" terminal at rear of chassis. | 1500 KC | Broadcast (counter-clockwise) | Tune to 1500 Kc. generator signal. | 6 | Broadcast Antenna | Adjust for maximum output. |
| 200 MMFD. Mica Condenser | "ANT" terminal at rear of chassis. | 600 KC | Broadcast (counter-clockwise) | Tune to 600 Kc. generator signal. | 7 | Broadcast Oscillator (Series Pad) | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| 400 OHM Carbon Resistor | "ANT" terminal at rear of chassis. | 6.5 MC | Intermediate (middle) | 6.5 Mc. | 8 | Intermediate Oscillator | Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 5.6 Mc. If image does not appear, realign at 6.5 Mc. with trimmer screw farther out. Recheck image. |
| 400 OHM Carbon Resistor | "ANT" terminal at rear of chassis. | 6.5 MC | Intermediate (middle) | Tune to 6.5 Mc. generator signal. | 9 | Intermediate Antenna | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| 400 OHM Carbon Resistor | "ANT" terminal at rear of chassis. | 21 MC | Short wave (clockwise) | 21 Mc. | 10 | S.W. Oscillator | Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 20.1 Mc. If image does not appear, realign at 21 Mc. with trimmer screw farther out. Recheck image. |
| 400 OHM Carbon Resistor | "ANT" terminal at rear of chassis. | 21 MC | Short wave (clockwise) | Tune to 21 Mc. generator signal. | 11 | S.W. Antenna | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |

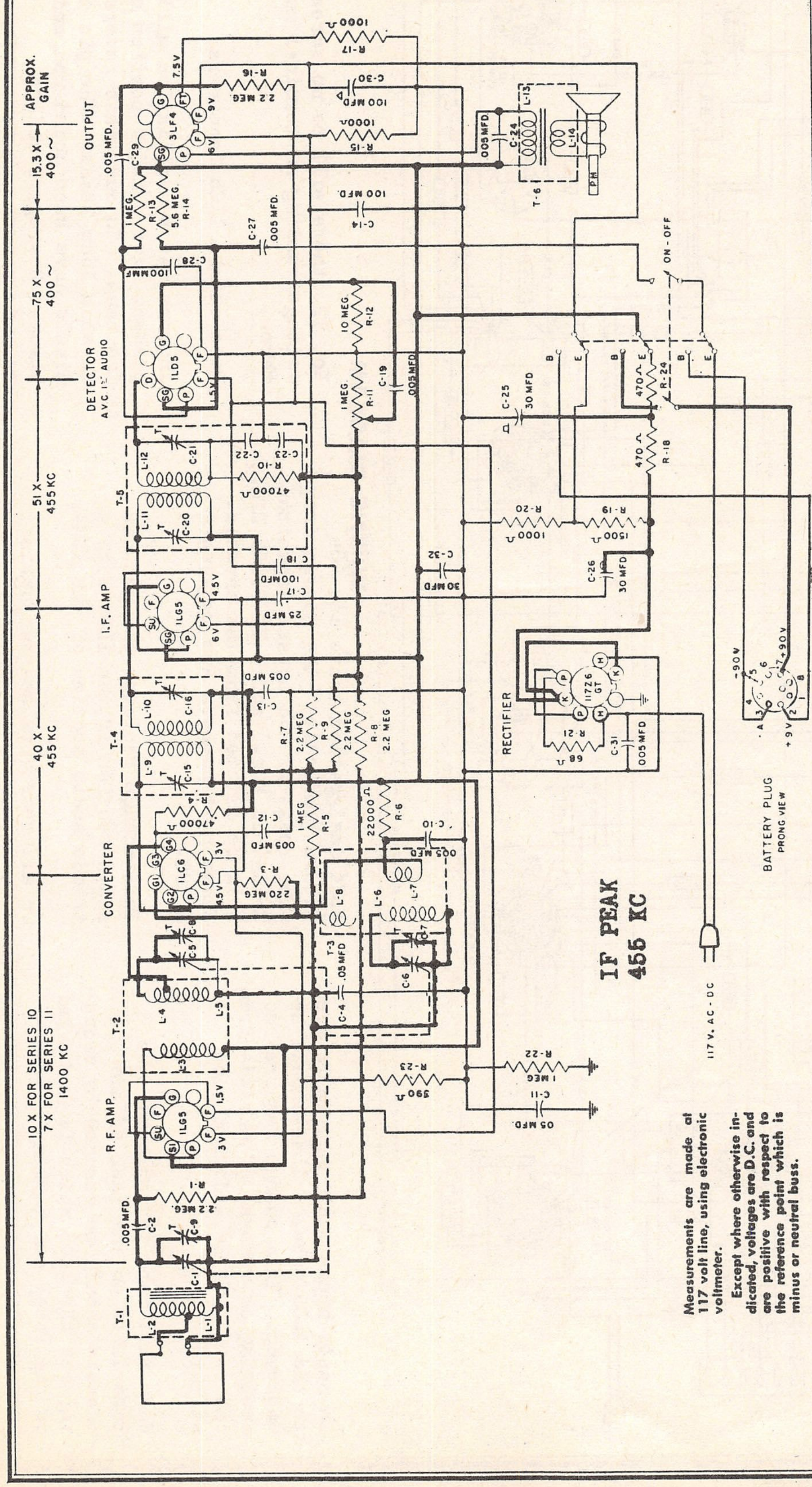
**TOP VIEW OF CHASSIS**



**BOTTOM VIEW OF CHASSIS**

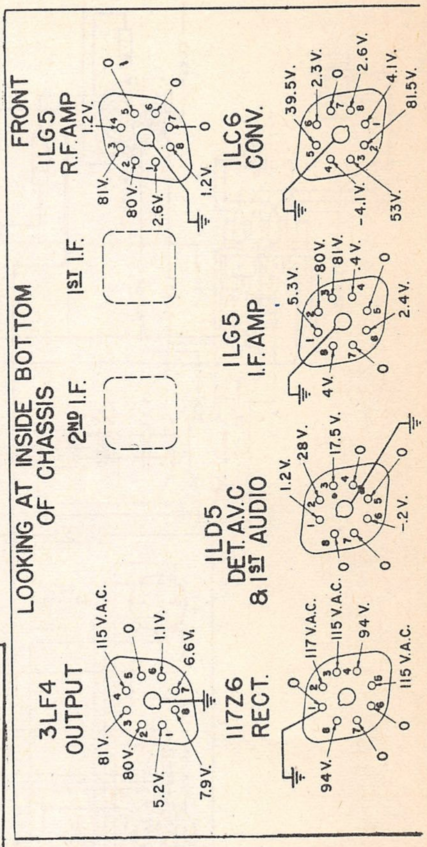


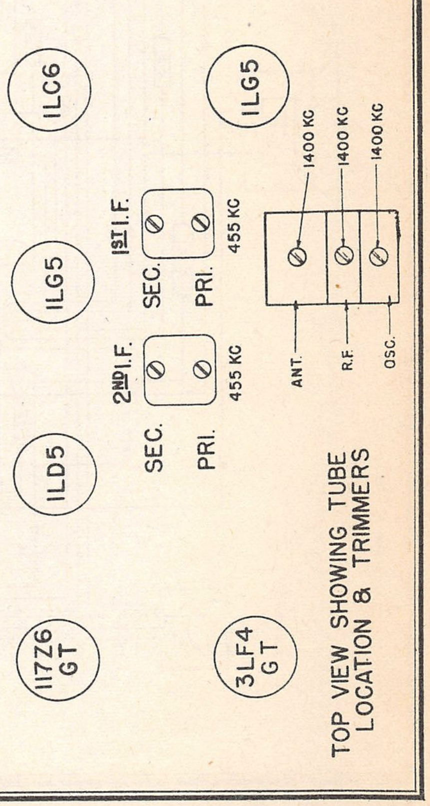
# STROMBERG CARLSON CO.


R.F. AMP.
CONVERTER
I.F. AMP
DETECTOR AVC 1ST AUDIO
OUTPUT
RECTIFIER
APPROX. GAIN
10 X FOR SERIES 10
7 X FOR SERIES 11
1400 KC
40 X 455 KC
51 X 455 KC
75 X 400 ~
15.3 X 400 ~
IF PEAK 455 KC
BATTERY PLUG PRONG VIEW
117 V. AC - DC
ON - OFF
1LG5
1LC6
1LD5
3LF4
117Z6 GT
T-1
T-2
T-3
T-4
T-5
T-6
L-1
L-2
L-3
L-4
L-5
L-6
L-7
L-8
L-9
L-10
L-11
L-12
L-13
L-14
C-1
C-2
C-3
C-4 .05 MFD
C-5
C-6
C-7
C-8
C-9
C-10 .005 MFD
C-11 .05 MFD.
C-12 .005 MFD
C-13 .005 MFD
C-14 100 MFD.
C-15
C-16
C-17 25 MFD
C-18 100 MMFD
C-19 .005 MFD
C-20
C-21
C-22
C-23
C-24 .005 MFD
C-25 30 MFD
C-26 30 MFD
C-27 .005 MFD.
C-28 100 MMF
C-29 .005 MFD.
C-30 100 MFD
C-31 .005 MFD
C-32 30 MFD
R-1 2.2 MEG.
R-3 220 MEG
R-4 47000 Ω
R-5 1 MEG
R-6 22000 Ω
R-7 2.2 MEG
R-8 2.2 MEG
R-9 2.2 MEG
R-10 47000 Ω
R-11 1 MEG.
R-12 10 MEG
R-13 1 MEG.
R-14 5.6 MEG
R-15 1000 Ω
R-16 2.2 MEG
R-17 1000 Ω
R-18 470 Ω
R-19 1500 Ω
R-20 1000 Ω
R-21 68 Ω
R-22 1 MEG
R-23 390 Ω
R-24 470 Ω
PM
-90 V
+90 V
+9 V
-A
B
E

Measurements are made at 117 volt line, using electronic voltmeter.

Except where otherwise indicated, voltages are D.C. and are positive with respect to the reference point which is minus or neutral buss.

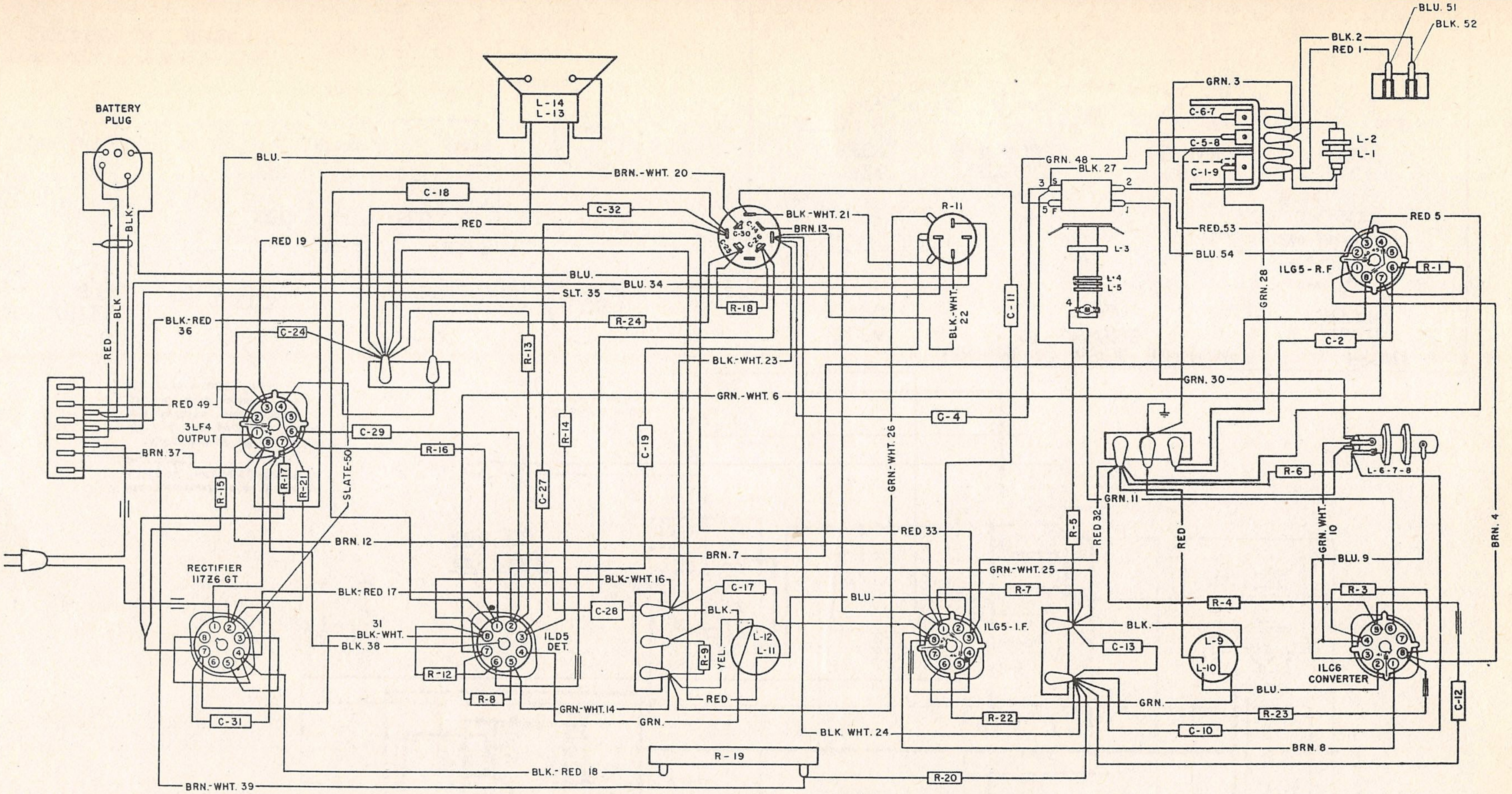

LOOKING AT INSIDE BOTTOM OF CHASSIS
FRONT
1LG5 R.F. AMP
1LC6 CONV.
1ST I.F.
2ND I.F.
1LG5 I.F. AMP
1LD5 DET. A.V.C & 1ST AUDIO
3LF4 OUTPUT
117Z6 RECT.
1.2V.
81V.
80V.
2.6V.
39.5V.
2.3V.
4.1V.
81.5V.
-4.1V.
53V.
5.3V.
4V.
2.4V.
28V.
17.5V.
-.2V.
115 V.A.C.
1.1V.
6.6V.
7.9V.
5.2V.
117 V.A.C.
94 V.


1LC6
1LG5
1LD5
117Z6 GT
3LF4 GT
2ND I.F.
1ST I.F.
SEC.
PRI.
455 KC
1400 KC
ANT.
R.F.
OSC.

TOP VIEW SHOWING TUBE LOCATION & TRIMMERS

**MODEL 1105**

## STROMBERG CARLSON CO.


BLU. 51
BLK. 52
BLK. 2
RED 1
GRN. 3
C-6-7
C-5-8
C-1-9
L-2
L-1
GRN. 48
BLK. 27
RED 5
RED.53
BLU. 54
ILG5-R.F
R-1
GRN. 28
L-3
L-4
L-5
C-2
GRN. 30
L-6-7-8
R-6
GRN. 11
RED 32
R-5
RED
GRN.-WHT. 10
BLU. 9
R-3
BRN. 4
R-4
ILC6 CONVERTER
C-12
L-9
L-10
BLK.
C-13
BLU.
GRN.
R-23
C-10
BRN. 8
R-22
R-20
BLK. WHT. 24
ILG5-I.F.
R-7
GRN.-WHT. 25
RED 33
C-4
C-11
R-11
BLK.-WHT. 22
GRN.-WHT. 26
BRN. 7
C-17
L-12
L-11
YEL.
R-9
BLK.-WHT. 16
C-28
R-19
BLK.-RED 18
GRN.-WHT. 14
GRN.
ILD5 DET.
R-12
R-8
31 BLK.-WHT.
BLK. 38
BLK.-RED 17
BRN. 12
C-19
C-27
R-14
R-13
R-16
C-29
SLATE-50
GRN.-WHT. 6
BLK.-WHT. 23
R-24
BLK.-WHT. 21
BRN. 13
C-14
C-30
C-26
C-25
R-18
BRN.-WHT. 20
C-32
C-18
RED 19
BLU.
BLU. 34
SLT. 35
C-24
L-14
L-13
BLK.-RED 36
RED 49
3LF4 OUTPUT
BRN. 37
R-15
R-17
R-21
RECTIFIER 117Z6 GT
C-31
BRN.-WHT. 39
BATTERY PLUG
BLK
RED

### WIRING DIAGRAM

In cases where microphonism is due to the 1LD5 tube, a 1LH4 should be employed. This change requires no rewiring or removal of chassis from cabinet. This is a direct substitute.

When this tube is replaced, the tube label on the back of the chassis should be changed by crossing out the 1LD5 which is indicated on the label and marking in the 1LH4 designation above it. On future production the screen dropping resistor and bypass capacitor R-14-(5.6 Meg.) and C-27 (.005 Mfd.) will be omitted from the chassis. These part numbers are 28200 and 27760.

This change replaces the pentode audio section of the 1LD5 with a triode audio section of the 1LH4.

On all receivers bearing series No. 12, there will be no screen voltage reading on terminal number three.

Note on all 1105 Receivers:

In some cases oscillation will be present over a major portion of the band. To cure this reverse antenna loop leads. The pin terminals have been coded red and black. Disregard coding.

# STROMBERG CARLSON CO.

## ALIGNING

***Never realign unless absolutely necessary.***

Use a good signal generator modulated at 400 or 1000 cycles with variable output voltage. Use a sensitive output meter across the voice coil of the speaker. Always align using the smallest possible input from the signal generator. A strong signal makes adjustments approximate. Always have volume control "full on".

Refer to Location Chart on page two for trimmer locations.

### Aligning Procedure *(follow this order exactly)*

### Intermediate Frequency Adjustments

The built-in loop should remain connected to the antenna and ground terminals. (or use a dummy loop).

1. Turn the tuning control to the extreme low frequency position *(Variable capacitor plates all the way in)*.
2. Connect both signal generator leads to an 8 inch radiating loop *(1 turn)*.

   Place the radiating loop close to the antenna of the receiver. The antenna in the 1105 is built around the carrying case.
3. Introduce a modulated signal of 455 KC to the radiating loop.
4. Adjust the I.F. aligners for maximum output in the following order:
   - A. Secondary of second I.F. Transformer
   - B. Primary of second I.F. Transformer
   - C. Secondary of first I.F. Transformer
   - D. Primary of first I.F. Transformer

### Dial Pointer Adjustment

Align the two arrow pointers, located at the extreme ends of the dial, horizontal with respect to the chassis base.

### Radio Frequency Adjustments

The built-in antenna should remain connected to the antenna and ground terminals of the receiver.

1. Leave signal generator and radiating loop connected in same position as for I.F. Transformer.
2. Set signal generator and receiver tuning dial to 1400 kilocycles. Arrow on dial scale indicates 1400 kilocycles.
3. Adjust the oscillator, radio frequency and antenna trimmers for maximum output.
4. Set both the signal generator's frequency and the receiver's tuning dial to 600 kilocycles and check calibration.

Note: If the calibration is off at 600 kilocycles, operations 2 and 3 may be repeated until the best results are obtained.

## IDENTIFICATION TABLE

| Model | Chassis | Cabinet | Speaker |
|---|---|---|---|
| 1105 | 112009 | 108025 | 155013 |

## SPECIFICATIONS

Voltage Rating....................105-125 Volts
Type of Circuit.................Superheterodyne
Tuning Range...............540 Kc. to 1600 Kc.
Number and type of Tubes—6
1—1LG5...........R.F. Amplifier
1—1LC6..............Converter
1—1LG5............I.F. Amplifier
1—1LD5....Demodulator, A.V.C., 1st Audio
1—3LF4...............Power Output
1—117Z6GT................Rectifier
Input Power Rating.......................25 Watts
Input Power Frequency...........25-60 Cycles AC-DC
Intermediate Frequency....................455 Kc.
Speaker Voice Coil Impedance .at 400 Cycles 3.5 Ohms
Speaker.......................................PM
Power Output ... 170 Milliwatts AC; 180 Milliwatts Batt.

### Resistors

| | | |
|---|---|---|
| 27407 | R-6 | 22,000 Ohm |
| 28153 | R-23 | 390 Ohm |
| 28154 | R-18-24 | 470 Ohm |
| 28158 | R-15-17 | 1,000 Ohm |
| 28177 | R-4 | 47,000 Ohm |
| 28183 | R-3 | .22 Meg. |
| 28191 | R-5-13-22 | 1. Meg. |
| 28195 | R-1-7-8-9-16 | 2.2 Meg. |
| 28200 | R-14 | 5.6 Meg. |
| 28203 | R-12 | 10. Meg. |
| 45529 | R-20 | 1,000 Ohm 1 W |
| 114310 | R-10 | 47,000 Ohm |
| 145007 | R-11 | 1. Meg. Volume Control Off-On Switch |
| 149015 | R-19 | 1,500 Ohm Voltage Divider |
| 149206 | R-21 | 68 Ohm 2 W |

### Capacitors

| | | |
|---|---|---|
| 27760 | C-2-10-12-13-19-24-27-29-31 | .005 mf. |
| 34800 | C-28 | 100 mmf. |
| 40632 | C-4-11 | .05 mf. |
| 110001 | C-1-9-5-8-6-7 | Variable Capacitor |
| 110010 | C-18 | 100 mfd. Electrolytic |
| 111008 | C-14-25-26-30 | 100 mfd., 30 mfd., 30 mfd., 100 mfd. Electrolytic |
| 111013 | C-32 | 30 mfd. Electrolytic |
| 110421 | C-17 | .25 mfd. |

### Transformers, and Coils

| | | |
|---|---|---|
| 114001 | T-2 (L-3-4-5) | RF Coil |
| 114023 | T-1 (L-1-2) | Antenna Coil |
| 114024 | T-3 (L-6-7-8) | Oscillator Coil |
| 114025 | R.F. Coil used on Series 10 | See Note Page 4 |
| 114309 | T-4 (L-9-10-C-15-16) | 1st I.F. Transformer |
| 114310 | T-5 (L-11-12-C-20-21-22-23-R-10) | 2nd I.F. Transformer |
| 155006 | | Speaker Cone Assembly |
| 155011 | T-6 (L-13-14) | Output Transformer |
| 155013 | | Speaker Assembly |

### Miscellaneous

| | |
|---|---|
| 30151 | Socket, Tube 117Z6 |
| 33218 | Cord, AC |
| 34590 | Socket, Tube (4) |
| 109008 | Cable Plug Assembly, Battery |
| 116001 | Contact Strip, Antenna |
| 122010 | Dial Scale |
| 124002 | Cord, Dial Drive |
| 131001 | Grommet, Variable Mounting |
| 131003 | Grommet, Tube Socket 1LD5 |
| 144005 | Indicator, Off-On |
| 150011 | Shaft, Dial Drive |
| 151015 | Shield, Tube |
| 152008 | Socket, Tube 1LD5 |
| 156009 | Spring, Indicator |
| 158008 | Switch, AC-Batt. |
| 159011 | Cord Tip, Antenna Red |
| 159012 | Cord Tip, Antenna Black |
| 168004 | Battery Pack |

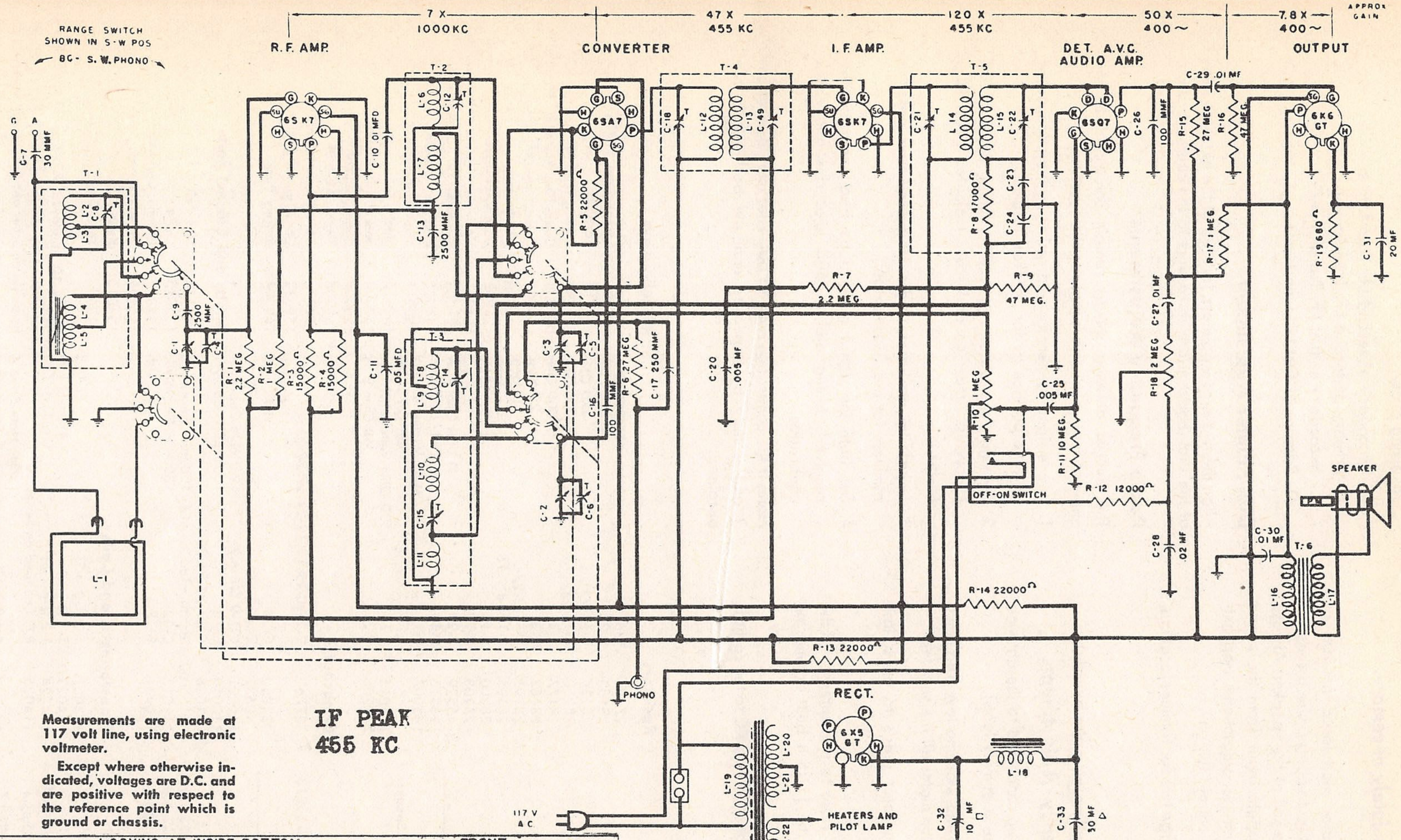
### Knobs and Cabinet Parts

| | |
|---|---|
| 24135 | Tips, Felt |
| 130013 | Grille |
| 132041 | Handle, Carrying |
| 132042 | Handle, Panel |
| 134015 | Knob (2) |
| 138007 | Lens, Dial |

**Series 10** employed R.F. Coil 114025. This has been superseded by coil No. 114001. Rewire to use 114001 as shown on Schematic and Wiring Diagram.

**NOTE—When ordering replacement parts always specify series number as well as model and part number. Series number is stamped on back of chassis.**

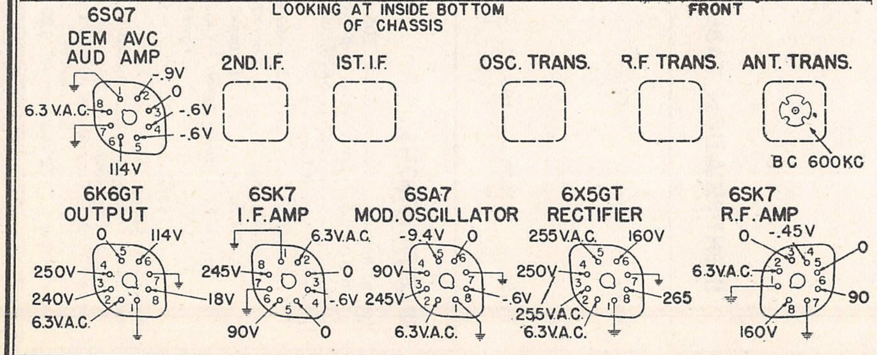
# STROMBERG CARLSON CO.


APPROX. GAIN
7 X 1000KC
47 X 455 KC
120 X 455 KC
50 X 400~
7.8 X 400~
R.F. AMP.
CONVERTER
I.F. AMP.
DET. A.V.C. AUDIO AMP.
OUTPUT
RANGE SWITCH SHOWN IN S-W POS
BC - S.W. PHONO
G
A
C-7 30 MMF
T-1
L-2
C-8
L-3
L-4
L-5
L-1
C-9 2500 MMF
C-1
C-4
T
6SK7
G
K
SU
SG
H
S
P
C-10 .01 MFD
T-2
L-6
C-12
L-7
C-13 2500 MMF
R-1 2.2 MEG
R-2 1 MEG
R-3 15000Ω
R-4 15000Ω
C-11 .05 MFD
T-3
L-8
L-9
C-14
L-10
C-15
L-11
6SA7
R-5 22000Ω
C-3
C-5
C-2
C-6
C-16 100 MMF
R-6 .27 MEG
C-17 250 MMF
T-4
C-18
L-12
L-13
C-49
C-20 .005 MF
R-7 2.2 MEG
6SK7
T-5
C-21
L 14
L-15
C-22
R-8 47000Ω
C-23
C-24
R-9 47 MEG.
R-10 1 MEG
C-25 .005 MF
R-11 10 MEG.
OFF-ON SWITCH
R-12 12000Ω
6SQ7
D
N
C-26 100 MMF
R-15 .27 MEG
R-16 .47 MEG
C-29 .01 MF
C-27 .01 MF
R-18 2 MEG
R-17 1 MEG
C-28 .02 MF
6K6 GT
R-19 680Ω
C-31 20 MF
SPEAKER
C-30 .01 MF
T-6
L-16
L-17
R-14 22000Ω
R-13 22000Ω
PHONO
RECT.
6X5 GT
L-18
L-19
L-20
L-21
L-22
HEATERS AND PILOT LAMP
C-32 10 MF □
C-33 30 MF △
117 V A C

Measurements are made at 117 volt line, using electronic voltmeter.

Except where otherwise indicated, voltages are D.C. and are positive with respect to the reference point which is ground or chassis.

**IF PEAK 455 KC**


LOOKING AT INSIDE BOTTOM OF CHASSIS
FRONT
6SQ7 DEM AVC AUD AMP
-.9V
0
-.6V
-.6V
6.3 V.A.C.
114V
2ND. I.F.
IST. I.F.
OSC. TRANS.
R.F. TRANS.
ANT. TRANS.
BC 600KC
6K6GT OUTPUT
0
114V
250V
240V
6.3V.A.C.
18V
6SK7 I.F. AMP
6.3V.A.C.
245V
0
-.6V
90V
0
6SA7 MOD. OSCILLATOR
-9.4V
0
90V
245V
-.6V
6.3V.A.C.
6X5GT RECTIFIER
255V.A.C.
160V
250V
265
255V.A.C.
6.3V.A.C.
6SK7 R.F. AMP
0
-.45V
0
6.3V.A.C.
90
160V

## Resistors

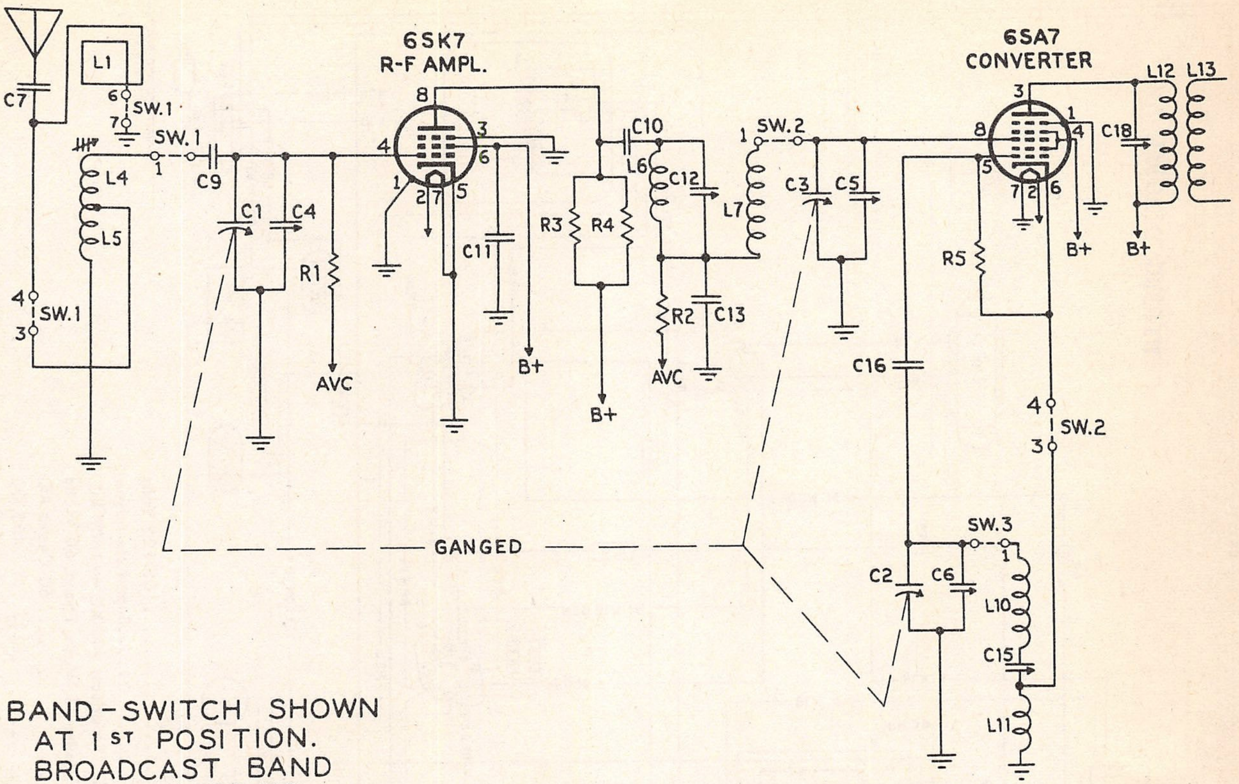
| | | |
|---|---|---|
| 27407 | R-5 | 22,000 Ohm |
| 28171 | R-12 | 12,000 Ohm |
| 28184 | R-6-15 | .27 Meg. |
| 28187 | R-8-9-16 | .47 Meg. |
| 28191 | R-2-17 | 1 Meg. |
| 28195 | R-1-7 | 2.2 Meg. |
| 28203 | R-11 | 10 Meg. |
| 145004 | R-18 | Tone Control |
| 145005 | R-10 | Volume Control, Off-On |
| 149011 | R-13-14 | 22,000 Ohm |
| 149174 | R-19 | 680 Ohm |
| 149186 | R-3-4 | 15,000 Ohm |

## Capacitors

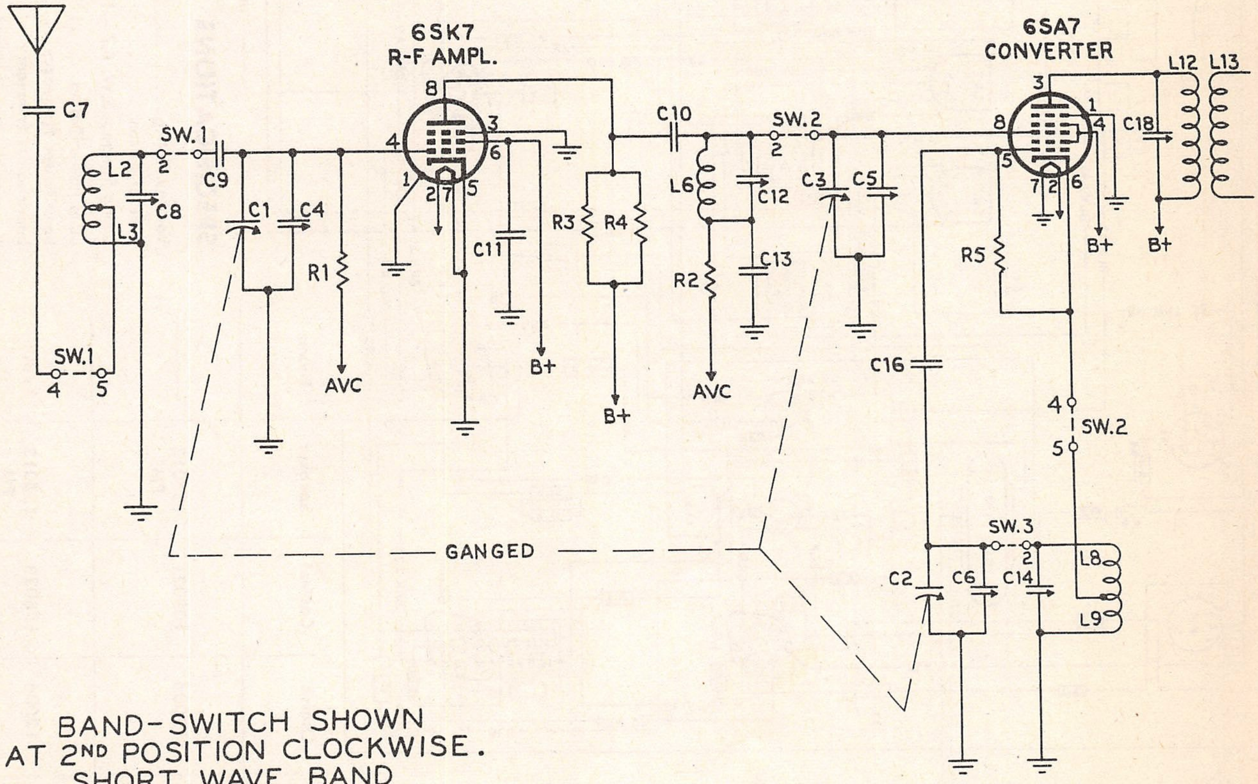
| | | |
|---|---|---|
| 25376 | C-17 | 250 mmf. |
| 25484 | C-28 | .02 mf. |
| 25485 | C-10-27-29-30 | .01 mf. |
| 27760 | C-20—C-25 | .005 mf. |
| 29559 | C-9-13 | 2500 mmf. |
| 34800 | C-16-26 | 100 mmf. |
| 34889 | C-7 | 30 mmf. |
| 40632 | C-11 | .05 mf. |
| 110010 | C-1-2-3-4-5-6 | Variable Capacitor |
| 111004 | C-31-32-33 | 20-10-30 mfd. Electrolytic |

MODEL 1110

## STROMBERG CARLSON CO.


6SK7
R-F AMPL.
6SA7
CONVERTER
L1
SW.1
C7
L4
L5
C9
C1
C4
R1
AVC
C11
B+
R3
R4
C10
L6
C12
R2
C13
L7
SW.2
C3
C5
C18
L12
L13
R5
C16
SW.3
C2
C6
L10
C15
L11
GANGED

BAND - SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540 - 1600 KC.

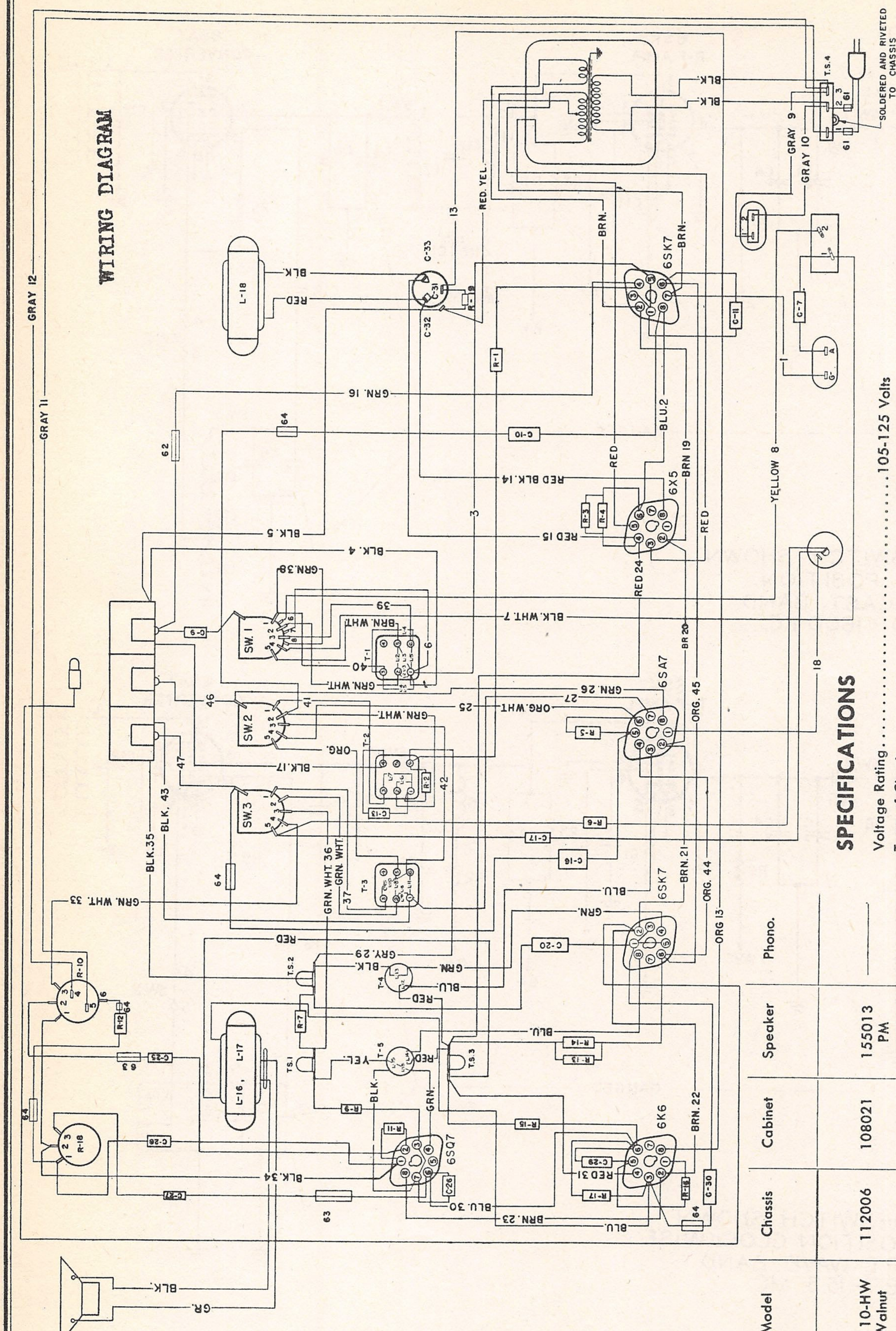

6SK7
R-F AMPL.
6SA7
CONVERTER
C7
L2
L3
C8
SW.1
C9
C1
C4
R1
AVC
C11
B+
R3
R4
C10
L6
C12
C13
R2
SW.2
C3
C5
C18
L12
L13
R5
C16
SW.3
C2
C6
C14
L8
L9
GANGED

BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
SHORT WAVE BAND
8.7-15.5 MC.

MODEL 1110

## STROMBERG CARLSON CO.

### WIRING DIAGRAM


SOLDERED AND RIVETED TO CHASSIS
T.S. 4
BLK.
GRAY 9
GRAY 10
GRAY 12
GRAY 11
RED. YEL.
13
BRN.
6SK7
L-18
C-33
C-31
C-32
R-19
R-1
C-11
C-7
GRN. 16
62
64
C-10
BLU. 2
BRN 19
RED
RED BLK. 14
6X5
R-3
R-4
BLK. 5
RED 15
RED 24
YELLOW 8
BLK. 4
GRN. 38
39
BRN. WHT.
BLK. WHT. 7
C-9
SW. 1
T-1
40
GRN. WHT.
6
BR 20
6SA7
GRN. 26
27
ORG. WHT.
25
ORG. 45
18
46
41
SW. 2
T-2
ORG.
R-5
R-2
BLK. 17
47
42
C-13
BLK. 43
SW. 3
R-6
C-17
BLK. 35
C-16
GRN. WHT. 36
GRN. WHT.
37
T-3
BRN. 21
ORG. 44
GRN. WHT. 33
BLU.
GRN.
ORG 13
R-10
RED
C-20
GRY. 29
T.S. 2
BLK.
T-4
R-12
C-25
63
R-7
T.S. 1
T-5
YEL.
T.S. 3
R-14
R-13
L-16, L-17
R-9
R-11
R-15
BRN. 22
6K6
R-18
C-26
6SQ7
C-29
RED 31
BLK. 34
C-28
R-17
R-16
C-30
C-27
BLU. 30
BRN. 23
GR.

## SPECIFICATIONS

Voltage Rating.....................105-125 Volts
Type of Circuit.....................Superheterodyne
Tuning Range..S.W. 8.7—15.5 MC. Broadcast 540 KC.—1600 KC.
Input Power Rating..............Radio 45 Watts, Phono. 60 Watts
Input Power Frequency..................60 Cycles AC.
Intermediate Frequency.......................455 KC.
Speaker Voice Coil Impedance..............at 400 Cycles 3.5 Ohms
Power Output......................................2 Watts

| Model | Chassis | Cabinet | Speaker | Phono. |
|---|---|---|---|---|
| 1110-HW Walnut | 112006 | 108021 | 155013 PM | — |
| 110-PTW Walnut | 112006 | 108023 | 155013 PM | 148007 |

STROMBERG CARLSON CO.

## ALIGNING

***Never realign unless absolutely necessary.***

Use a good signal generator modulated at 400 or 1,000 cycles, with variable output voltage and a sensitive output meter across the voice coil of the speaker.

Always align using the lowest possible input from the signal generator. A strong signal makes adjustments approximate.

Always have the volume control "full on."

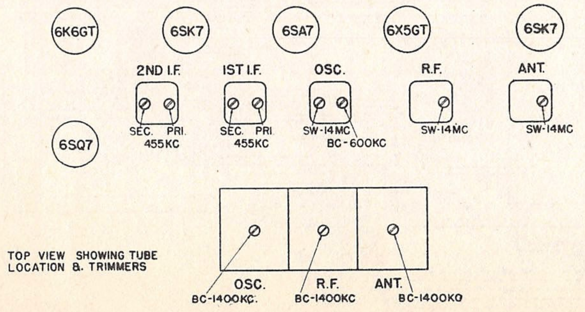
### Aligning Procedure *(follow this order exactly)*

### Intermediate Frequency Adjustments.

1. Set range switch to Standard Broadcast Position.
2. Tune set to extreme high frequency end of dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 KC. to the grid of the 6SA7 Converter tube (middle section of gang condenser) using a 0.1 mfd. capacitor in series with the output lead of the signal generator.
5. Adjust the I.F. aligners for maximum output in the following order:
   a. Secondary of second I.F. transformer.
   b. Primary of second I.F. transformer.
   c. Secondary of first I.F. transformer.
   d. Primary of first I.F. transformer.

### Dial Pointer Adjustment

With plates of the gang tuning capacitor fully engaged make certain that the dial pointer is in a horizontal position directly on the calibration marks located at the low frequency end of dial scale. Adjust the dial pointer if necessary.



TOP VIEW SHOWING TUBE LOCATION & TRIMMERS

### Switches

| | |
|---|---|
| 145005 | Volume Control, Off-on Switch |
| 158004 | Range Switch |

### Radio Frequency Adjustments

### Standard Broadcast Range.

***Antenna must remain connected for R.F. adjustments.***

1. With the signal generator output lead connected to the Antenna and Ground terminal of the receiver, tune the signal generator frequency and receiver tuning dial to 1400 KC.
2. Adjust the oscillator, R.F. and antenna trimmers of the gang condenser for maximum signal.
3. Set the signal generator frequency and receiver tuning dial to 600 KC.
4. Adjust the 600 KC. padding condenser in oscillator coil shield for maximum signal.
5. Adjust the iron core in antenna transformer for maximum output. (Underside of chassis)
6. Repeat the above procedure until no further change is required.

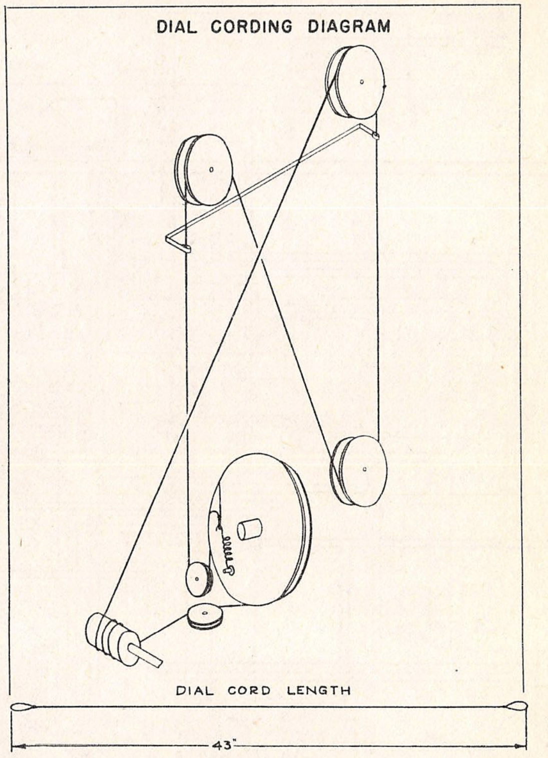
### Radio Frequency Adjustments

### Short Wave Range

1. Set the range switch to Short Wave position.
2. Set the signal generator frequency and receiver tuning dial to 14 MC.
3. Connect the output of the signal generator to the antenna terminal on the chassis.
4. Adjust the oscillator, R.F. and antenna trimmers for maximum output.
5. Repeat the above procedure until no further change is required.

| | |
|---|---|
| 24135 | Felt Tips |
| 26122 | Antenna—Ground Strip |
| 28694 | Socket, Pilot |
| 29956 | Lamp, Pilot |
| 32048 | Socket, AC. Outlet |
| 32075 | Pulley, Small |
| 32076 | Pulley, Medium |
| 32077 | Pulley, Large |
| 33218 | Cord, AC. |
| 34421 | Connector, Phono |
| 40546 | Clip, Pulley |
| 80881 | Crystal Cartridge (L-70) |
| 101047 | Back |
| 122007 | Dial Scale |
| 124005 | Dial Cord |
| 129003 | Gear Assembly, Switch Drive |
| 143001 | Plug, Antenna |
| 144004 | Pointer, Dial |
| 146025 | Station Call Letters |
| 150007 | Shaft Assembly, Dial Drive |
| 150008 | Shaft, Switch Drive |
| 152002 | Socket, Tube |
| 152005 | Socket, Loop |
| 156008 | Spring, Dial Cord |

DIAL CORDING DIAGRAM



PART No. 124005

### Transformers, and Coils

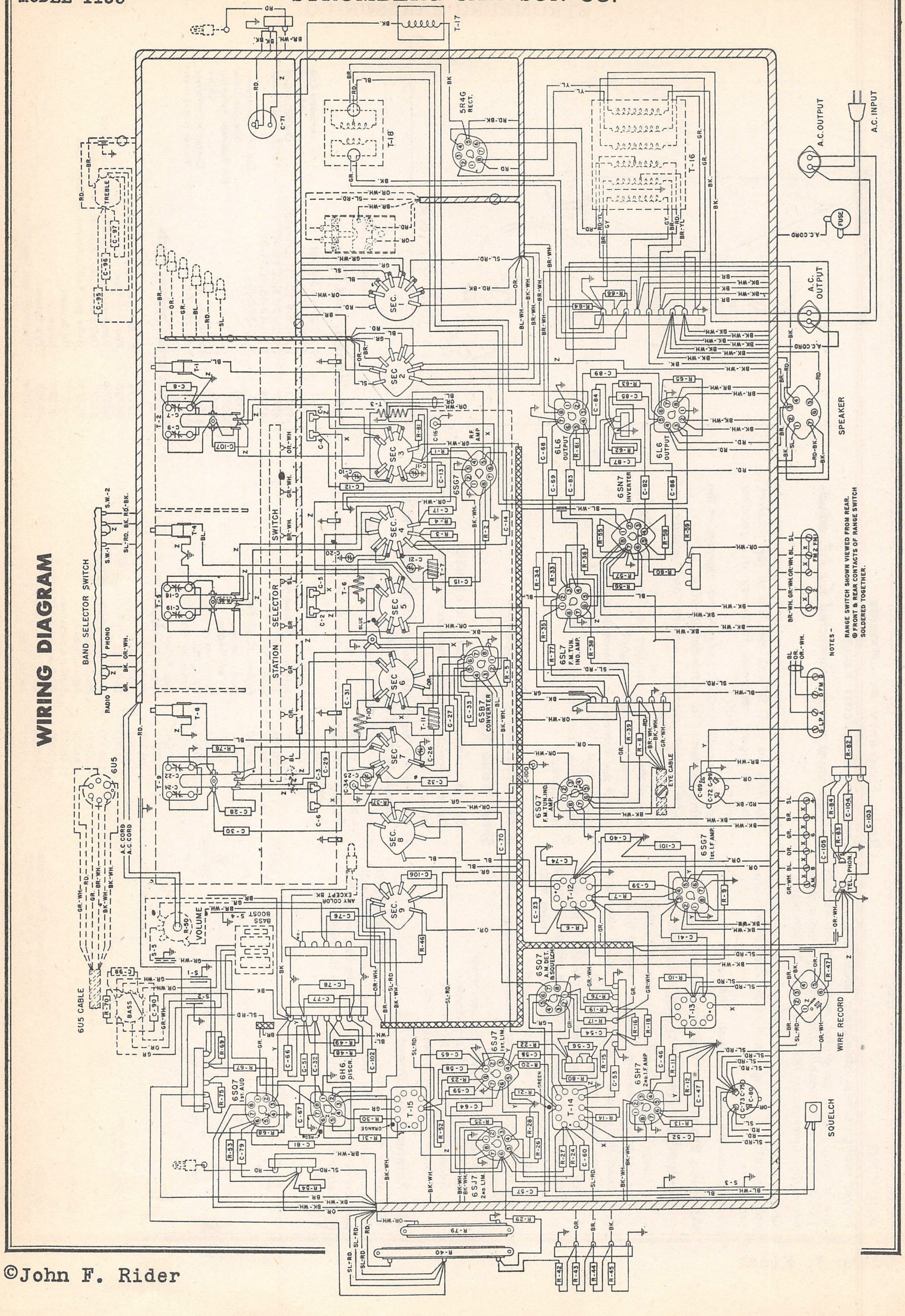
| | | |
|---|---|---|
| 114011 | T-1 (L-2-3-4-5) (C-8) | Antenna Coil |
| 114012 | T-2 (L-6-7) (C-12) | R.F. Coil |
| 114013 | T-3 (L-8-9-10-11) (C-14-15) | Oscillator Coil |
| 114307 | T-4 (L-12-13) (C-18-49) | 1st I.F. Transformer |
| 114308 | T-5 (L-14-15) (C-21-22-23-24-R-8) | 2nd I.F. Transformer |
| 155006 | | Speaker Cone |
| 155013 | | PM Speaker Assembly |
| 161001 | L-18 | Choke |
| 161207 | T-6 (L-16-17) | Output Transformer |
| 161402 | L-19-20-21-22 | Power Transformer |

### Knobs and Cabinet Parts

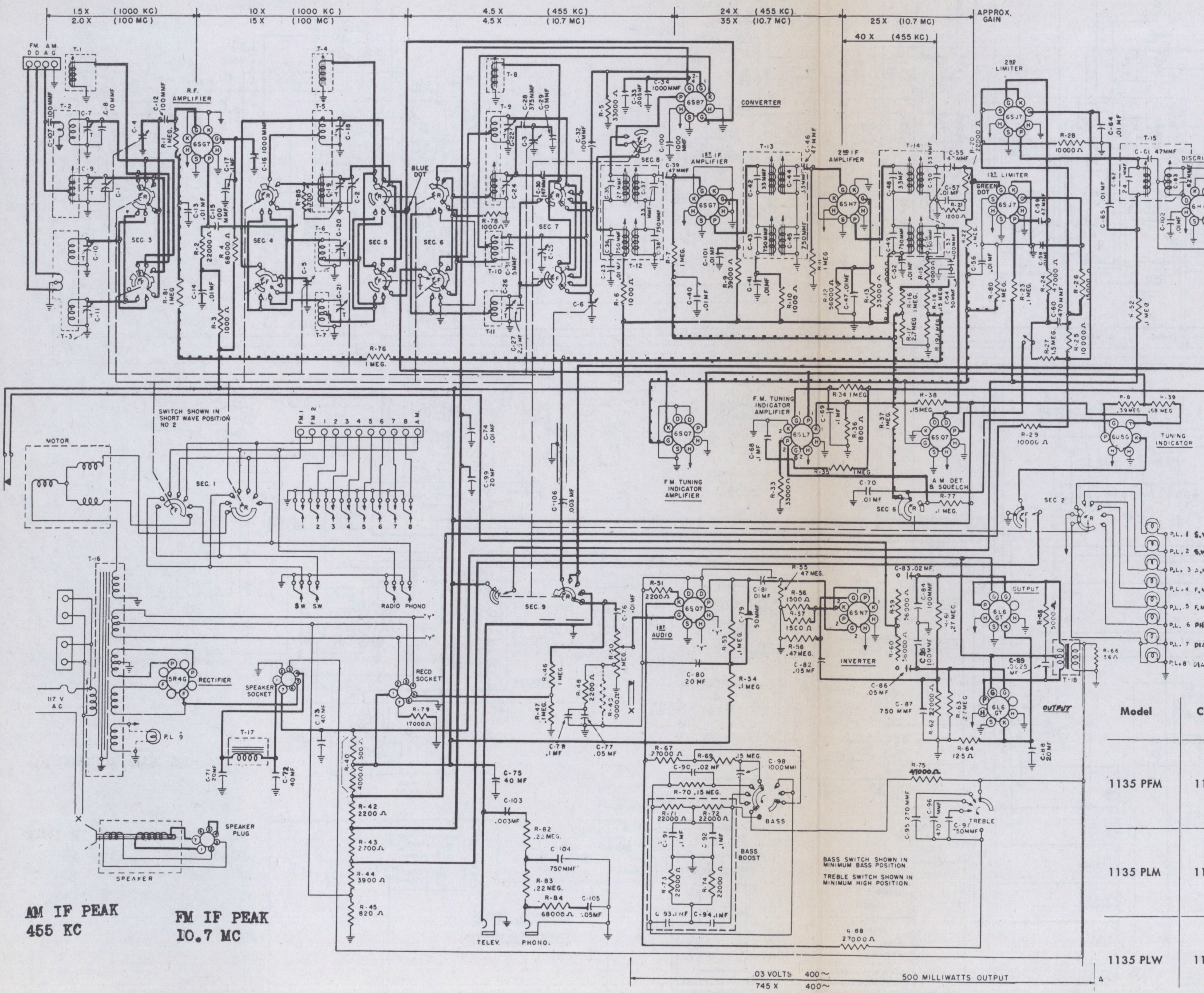
| | |
|---|---|
| 32224 | Knob,—Volume, Tone, Tuning |
| 35725 | Knob,—Range |
| 80874 | Decal—Tone, Volume-Off-on, Stations, Range |
| 80875 | Grille and Baffle, Assembly—Left Hand |
| 80876 | Grille and Baffle, Assembly—Right Hand |
| 80877 | Lid Support |
| 80878 | Hinge |
| 107003 | Push Button |
| 125005 | Escutcheon and Lens, Dial |

MODEL 1135

# STROMBERG CARLSON CO.


WIRING DIAGRAM
BAND SELECTOR SWITCH
RADIO
PHONO
S.W.-1
S.W.-2
STATION
SELECTOR
SWITCH
6U5
6U5 CABLE
A.C.CORD
VOLUME
BASS BOOST
BASS
TREBLE
5R4G RECT.
T-16
T-17
T-18
A.C. OUTPUT
A.C. INPUT
A.C. CORD
FUSE
SPEAKER
6L6 OUTPUT
6L6 OUTPUT
6SN7 INVERTER
6SG7 R.F. AMP.
6SB7 CONVERTER
6SL7 F.M. TUN. IND. AMP.
6SQ7 F.M. TUN. IND. AMP.
6SG7 1st. I.F. AMP.
6SQ7 A.M. DET. & SQUELCH
6SJ7 1st. LIM.
6SJ7 2nd. LIM.
6SH7 2nd. I.F. AMP
6H6 DISCR.
6SQ7 1st. AUD
EYE CABLE
WIRE RECORD
SQUELCH
NOTES -
RANGE SWITCH SHOWN VIEWED FROM REAR.
ⓐ FRONT & REAR CONTACTS OF RANGE SWITCH SOLDERED TOGETHER.
ANY COLOR EXCEPT BK.

# STROMBERG CARLSON CO.


1.5 X (1000 KC)
2.0 X (100 MC)
10 X (1000 KC)
15 X (100 MC)
4.5 X (455 KC)
4.5 X (10.7 MC)
24 X (455 KC)
35 X (10.7 MC)
25 X (10.7 MC)
40 X (455 KC)
APPROX. GAIN
FM AM
D D A G
R.F. AMPLIFIER
6SG7
BLUE DOT
CONVERTER
6SB7
1ST I.F. AMPLIFIER
6SG7
2ND I.F AMPLIFIER
6SH7
2ND LIMITER
6SJ7
1ST LIMITER
GREEN DOT
6SJ7
DISCRIMINATOR
6H6
ORANGE DOT
RED DOT
SEC. 3
SEC. 4
SEC. 5
SEC. 6
SEC. 7
SEC. 8
SWITCH SHOWN IN SHORT WAVE POSITION NO 2
MOTOR
SEC. 1
FM 1 FM 2 1 2 3 4 5 6 7 8 A.M.
FM TUNING INDICATOR AMPLIFIER
6SQ7
F.M. TUNING INDICATOR AMPLIFIER
6SL7
A.M. DET & SQUELCH
6SQ7
6U5G
TUNING INDICATOR
SEC. 2
SEC. 6
SW SW RADIO PHONO
SEC. 9
1ST AUDIO
6SQ7
INVERTER
6SN7
OUTPUT
6L6 GT
T-18
5R4G RECTIFIER
SPEAKER SOCKET
RECD SOCKET
T-16
T-17
117 V AC
P.L. 9
SPEAKER PLUG
SPEAKER
BASS
BASS BOOST
TREBLE
BASS SWITCH SHOWN IN MINIMUM BASS POSITION.
TREBLE SWITCH SHOWN IN MINIMUM HIGH POSITION.
TELEV. PHONO.
P.L. 1 S.W.
P.L. 2 S.W.
P.L. 3 A.M.
P.L. 4 F.M.
P.L. 5 F.M.
P.L. 6 PHO
P.L. 7 DIAL
P.L. 8 DIAL
.03 VOLTS 400~
745 X 400~
500 MILLIWATTS OUTPUT

AM IF PEAK
455 KC

FM IF PEAK
10.7 MC

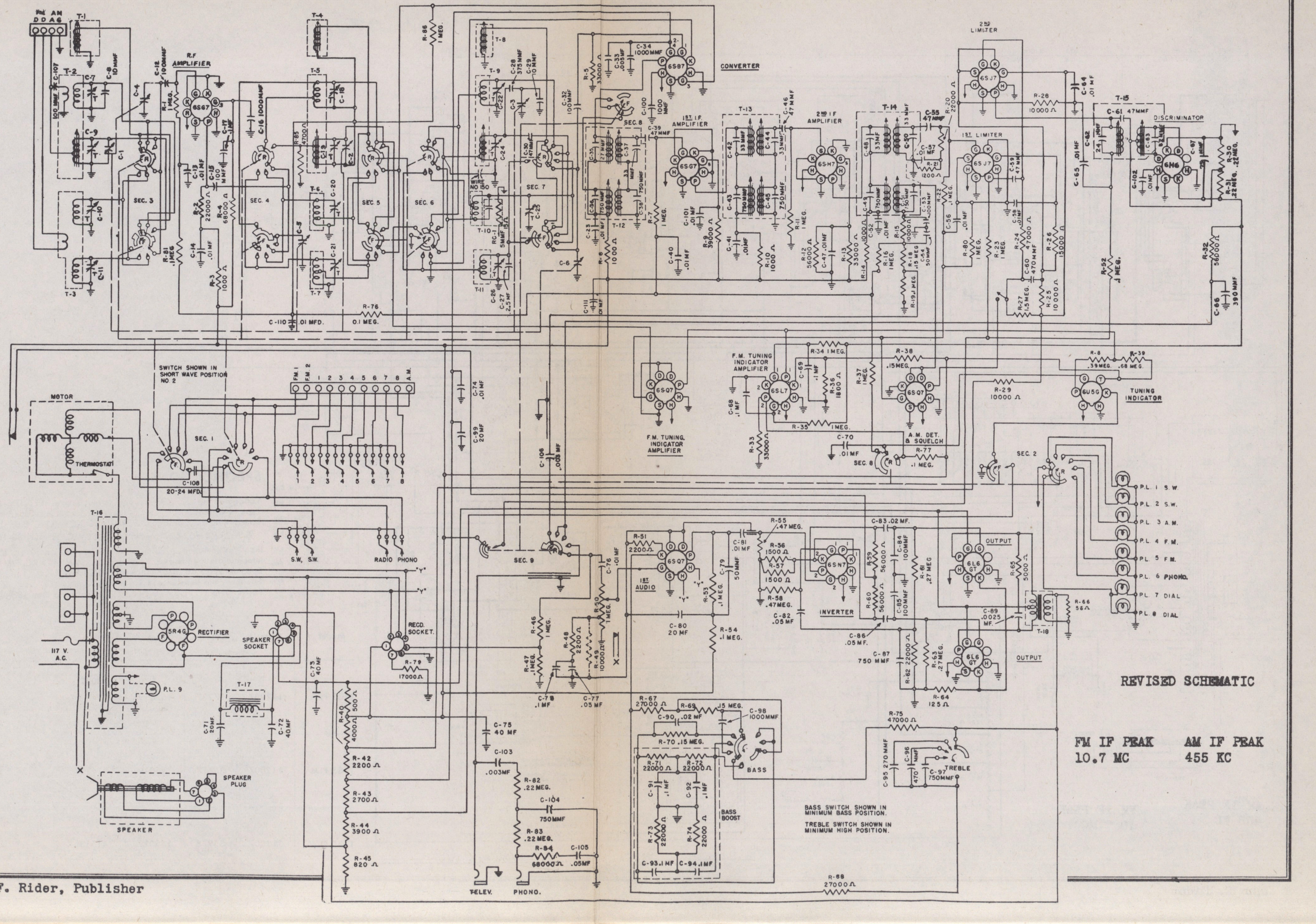
## SPECIFICATIONS

Voltage Rating..................................105-125 Volts
Type of Circuit..................................Superheterodyne
Tuning Range ... Broadcast, 540-1620 KC.—S.W., 8.8—10.2 MC.
S.W., 11.2—12.6 MC.—FM (2) 42-50 MC.—FM (1) 88-108 MC.
Input Power Rating..................................235 Watts
Intermediate Frequency....................AM. 455 KC. FM-107 MC.
Speaker Voice Coil Impedance at 400 Cycles..............10 Ohms
Speaker Field Resistance..................................210 Ohms
Power Output....................19 Watts less than 10% Distortion

| Model | Chassis | Cabinet | Speaker | Phono |
|---|---|---|---|---|
| 1135 PFM | 112007 | 37237 | 155019 | 148002<br>&<br>41613 |
| 1135 PLM | 112007 | 35717 | 155019 | 41613 |
| 1135 PLW | 112007 | 35978 | 155019 | 41613 |

**MODEL 1135A**

## STROMBERG CARLSON CO.



FM AN
D D A G
T-1
T-2
T-3
T-4
T-5
T-6
T-7
T-8
T-9
T-10
T-11
T-12
T-13
T-14
T-15
T-16
T-17
T-18
R.F AMPLIFIER
6SG7
CONVERTER
6SB7
1ST I.F AMPLIFIER
6SG7
2ND I.F AMPLIFIER
6SH7
1ST LIMITER
6SJ7
2ND LIMITER
6SJ7
DISCRIMINATOR
6H6
SEC. 1
SEC. 2
SEC. 3
SEC. 4
SEC. 5
SEC. 6
SEC. 7
SEC. 8
SEC. 9
WIRE NO 150
SWITCH SHOWN IN SHORT WAVE POSITION NO 2
FM 1 FM 2 1 2 3 4 5 6 7 8 A.M.
MOTOR
THERMOSTAT
C-108 20-24 MFD.
C-110 .01 MFD.
R-76 0.1 MEG.
R-86 1 MEG.
6SQ7
F.M. TUNING INDICATOR AMPLIFIER
6SL7
A.M. DET. & SQUELCH
6SQ7
6U5G
TUNING INDICATOR
S.W. S.W. RADIO PHONO
5R4G
RECTIFIER
117 V. A.C.
P.L. 9
SPEAKER SOCKET
RECD. SOCKET
SPEAKER PLUG
SPEAKER
1ST AUDIO
6SQ7
INVERTER
6SN7
OUTPUT
6L6 GT
OUTPUT
6L6 GT
P.L. 1 S.W.
P.L. 2 S.W.
P.L. 3 A.M.
P.L. 4 F.M.
P.L. 5 F.M.
P.L. 6 PHONO.
P.L. 7 DIAL
P.L. 8 DIAL
BASS
BASS BOOST
TREBLE
TELEV.
PHONO.
BASS SWITCH SHOWN IN MINIMUM BASS POSITION.
TREBLE SWITCH SHOWN IN MINIMUM HIGH POSITION.
R-40 500 Ω 4000 Ω
R-42 2200 Ω
R-43 2700 Ω
R-44 3900 Ω
R-45 820 Ω
R-68 27000 Ω
R-75 47000 Ω
C-75 40 MF
C-71 20 MF
C-72 40 MF
C-73 40 MF
C-103 .003MF
R-82 .22 MEG.
C-104 750MMF
R-83 .22 MEG.
R-84 68000 Ω
C-105 .05MF

**REVISED SCHEMATIC**

| FM IF PEAK | AM IF PEAK |
|---|---|
| 10.7 MC | 455 KC |

MODEL 1135A

## STROMBERG CARLSON CO.

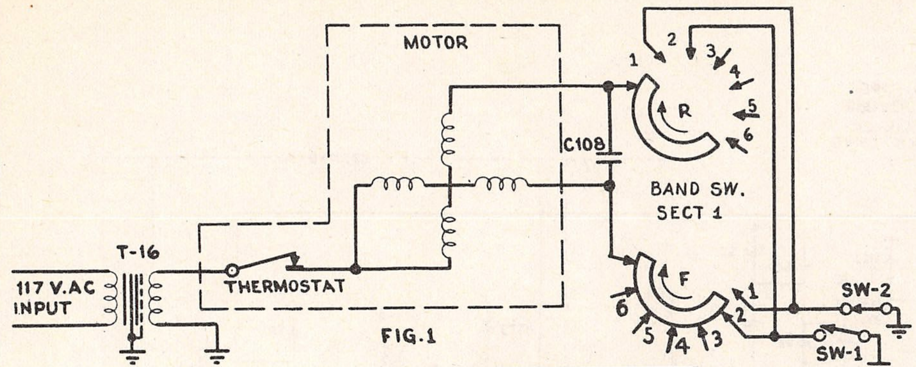

MOTOR
T-16
117 V.AC INPUT
THERMOSTAT
C108
BAND SW. SECT 1
R
F
1
2
3
4
5
6
SW-2
SW-1

FIG.1

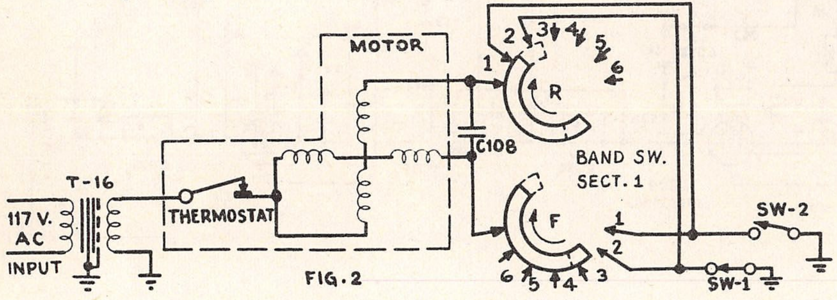
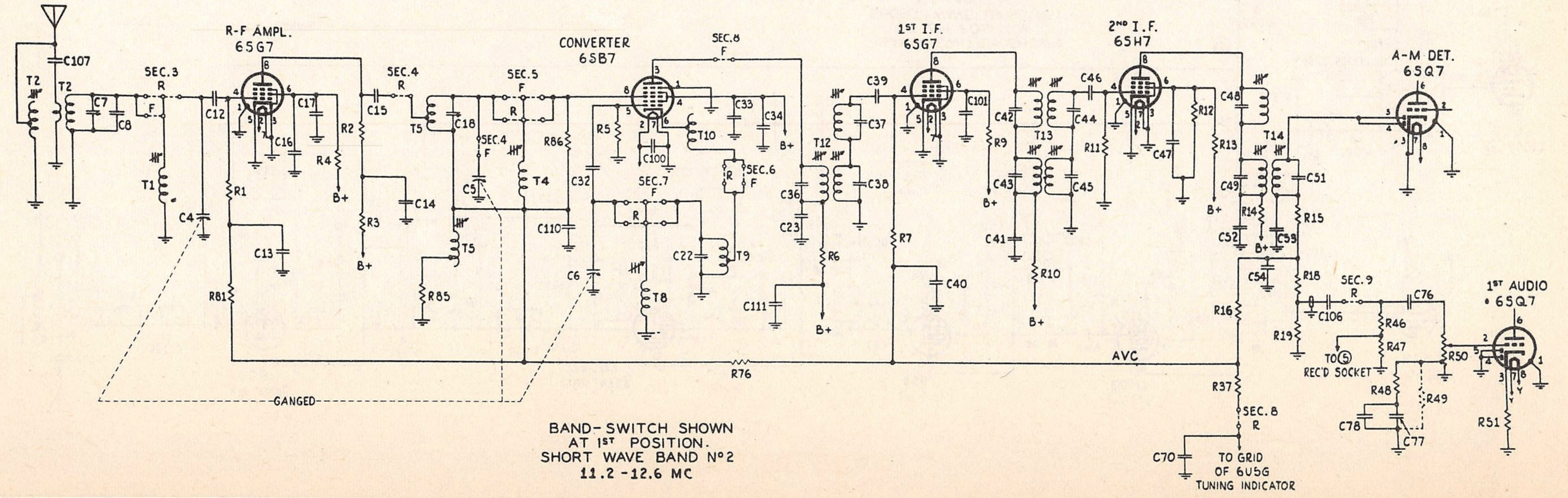

MOTOR
T-16
117 V. AC INPUT
THERMOSTAT
C108
BAND SW. SECT. 1
R
F
1
2
3
4
5
6
SW-2
SW-1

FIG.2

NOTES: - FIGS. 1 AND 2 SHOW SCHEMATICALLY HOW THE BAND SWITCH IS ROTATED BY THE MOTOR WHEN THE DESIRED PUSHBUTTON IS DEPRESSED. PUSHBUTTONS 1 (SHORT WAVE 2-BAND) AND 2 (SHORT WAVE 1-BAND) ARE THE ONLY ONES SHOWN FOR CLARITY OF DIAGRAM. THE OTHER PUSHBUTTONS OPERATE IN A SIMILAR MANNER. FIG. 1 SHOWS THE MOTOR AT REST WITH THE BAND SWITCH AT SW-2 POSITION, NO. 1 BUTTON DEPRESSED. IF SW-1 BAND IS DESIRED THEN NO. 2 BUTTON IS CLOSED AND NO. 1 - OPENS, THIS PUTS A GROUND THROUGH SECTION 1-F OF THE BAND SWITCH ON ONE WINDING OF THE MOTOR, COMPLETING THE CIRCUIT, WHICH CAUSES THE MOTOR TO TURN THE BAND SWITCH IN THE DIRECTION OF THE ARROWS SHOWN TO POSITION OF FIG. 2 (SOLID LINES). THE GROUND WILL THEN BE DISCONNECTED FROM THE MOTOR WINDING, OPENING THE CIRCUIT AND CAUSING THE MOTOR TO STOP. IF THE MOTOR DOESN'T STOP FAST ENOUGH AND THE BAND SWITCH IS ROTATED TOO FAR, THEN IT WILL HAVE TO ASSUME THE POSITION SHOWN IN DOTTED LINES. THIS WILL PUT A GROUND ON THE OTHER WINDING OF THE MOTOR, THROUGH CONTACT 2 OF SECTION 1-R OF THE BAND SWITCH, MAKING THE MOTOR REVERSE ITS DIRECTION OF ROTATION TO ITS NORMAL POSITION (SOLID LINES) FOR SW-1.

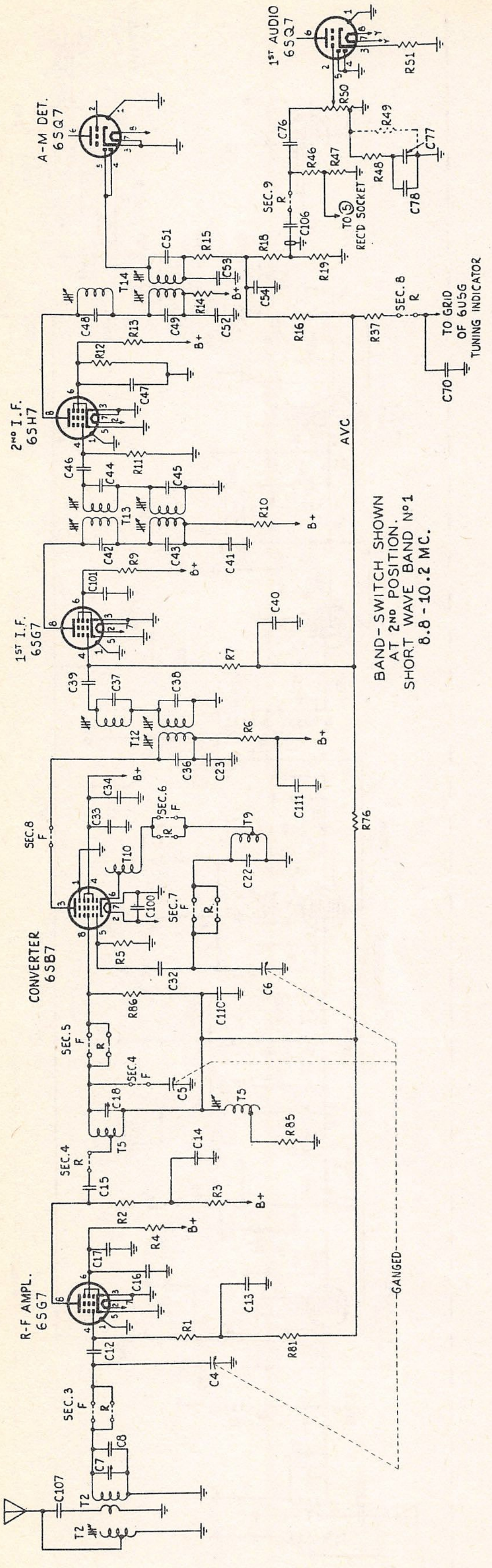
**MOTOR BREAKDOWN FOR MODEL 1135A ONLY**


R-F AMPL. 6SG7
CONVERTER 6SB7
1ST I.F. 6SG7
2ND I.F. 6SH7
A-M DET. 6SQ7
1ST AUDIO • 6SQ7
T1
T2
T4
T5
T8
T9
T10
T12
T13
T14
C4
C5
C6
C7
C8
C12
C13
C14
C15
C16
C17
C18
C22
C23
C32
C33
C34
C36
C37
C38
C39
C40
C41
C42
C43
C44
C45
C46
C47
C48
C49
C51
C52
C53
C54
C70
C76
C77
C78
C100
C101
C106
C107
C110
C111
R1
R2
R3
R4
R5
R6
R7
R9
R10
R11
R12
R13
R14
R15
R16
R18
R19
R37
R46
R47
R48
R49
R50
R51
R76
R81
R85
R86
SEC.3 R F
SEC.4 R
SEC.4 F
SEC.5 F
SEC.6 R F
SEC.7 F R
SEC.8 F
SEC.8 R
SEC.9 R
B+
AVC
GANGED
TO 5 REC'D SOCKET
TO GRID OF 6U5G TUNING INDICATOR

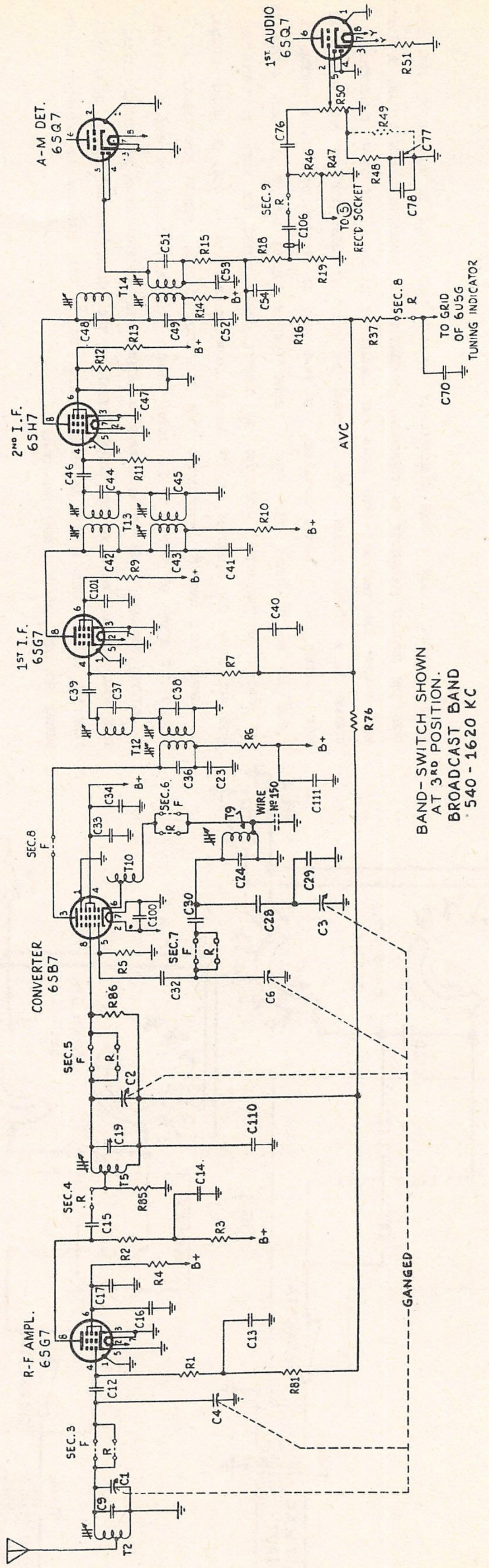
BAND-SWITCH SHOWN AT 1ST POSITION. SHORT WAVE BAND Nº2 11.2 - 12.6 MC

MODEL 1135A

## STROMBERG CARLSON CO.


R-F AMPL. 6SG7
CONVERTER 6SB7
1ST I.F. 6SG7
2ND I.F. 6SH7
A-M DET. 6SQ7
1ST AUDIO 6SQ7
SEC.3 F R
SEC.4 F R
SEC.5 F R
SEC.6 F R
SEC.7 F R
SEC.8 F R
SEC.9 R
T2
T5
T9
T10
T12
T13
T14
AVC
GANGED
B+
TO 5 REC'D SOCKET
TO GRID OF 6U5G TUNING INDICATOR
C107 C7 C8 C12 C4 C13 C15 C14 C16 C17 C18 C5 C110 C32 C6 C22 C100 C33 C34 C36 C23 C111 C39 C37 C38 C40 C101 C42 C43 C41 C46 C44 C45 C47 C48 C49 C52 C51 C53 C54 C106 C76 C77 C78 C70
R1 R81 R2 R4 R3 R85 R86 R5 R6 R76 R7 R9 R10 R11 R12 R13 R14 R15 R16 R18 R19 R37 R46 R47 R48 R49 R50 R51

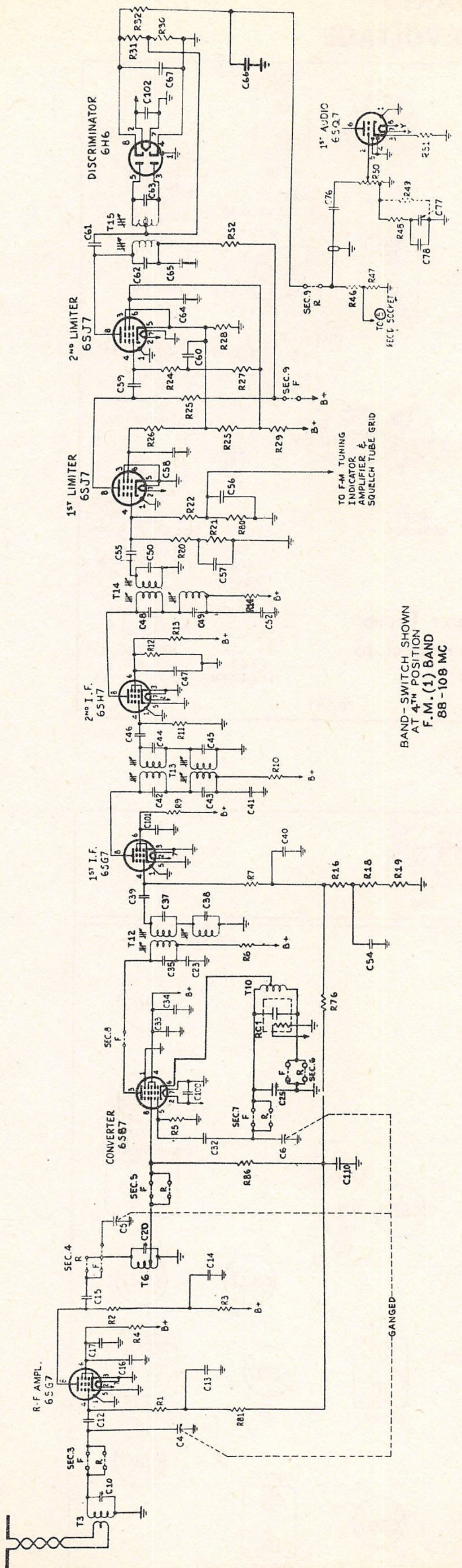
BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE BAND No 1
8.8 - 10.2 MC.


R-F AMPL. 6SG7
CONVERTER 6SB7
1ST I.F. 6SG7
2ND I.F. 6SH7
A-M DET. 6SQ7
1ST AUDIO 6SQ7
SEC.3 F R
SEC.4 R
SEC.5 F R
SEC.6 F R
SEC.7 F R
SEC.8 F R
SEC.9 R
T2
T5
T9
T10
T12
T13
T14
WIRE No 150
AVC
GANGED
B+
TO 5 REC'D SOCKET
TO GRID OF 6U5G TUNING INDICATOR
C9 C1 C12 C4 C13 C15 C14 C16 C17 C19 C2 C110 C32 C6 C30 C28 C3 C24 C29 C100 C33 C34 C36 C23 C111 C39 C37 C38 C40 C101 C42 C43 C41 C46 C44 C45 C47 C48 C49 C52 C51 C53 C54 C106 C76 C77 C78 C70
R1 R81 R2 R4 R3 R85 R86 R5 R6 R76 R7 R9 R10 R11 R12 R13 R14 R15 R16 R18 R19 R37 R46 R47 R48 R49 R50 R51

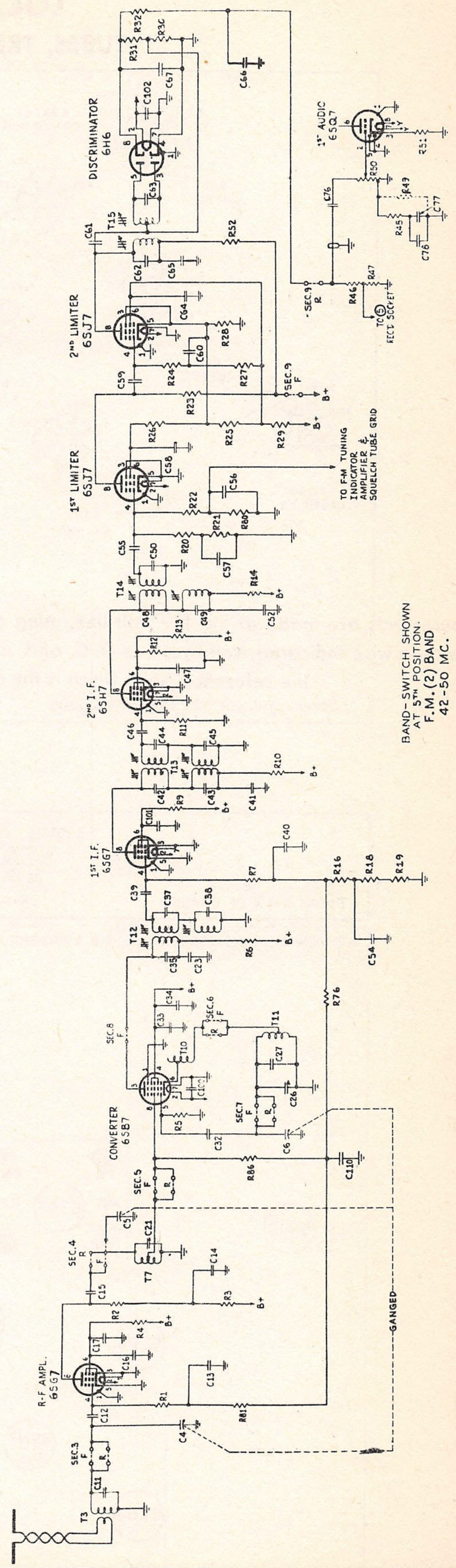
BAND-SWITCH SHOWN
AT 3RD POSITION.
BROADCAST BAND
540 - 1620 KC

**MODEL 1135A**

# STROMBERG CARLSON CO.


R-F AMPL. 6SG7
CONVERTER 6SB7
1ST I.F. 6SG7
2ND I.F. 6SH7
1ST LIMITER 6SJ7
2ND LIMITER 6SJ7
DISCRIMINATOR 6H6
1ST AUDIO 6SQ7
T3
T6
T10
T12
T13
T14
T15
SEC.3
SEC.4
SEC.5
SEC.6
SEC.7
SEC.8
SEC.9 F
SEC.9 R
GANGED
B+
TO F-M TUNING INDICATOR AMPLIFIER & SQUELCH TUBE GRID
TO RECT SOCKET

BAND-SWITCH SHOWN AT 4TH POSITION F.M.(1) BAND 88-108 MC

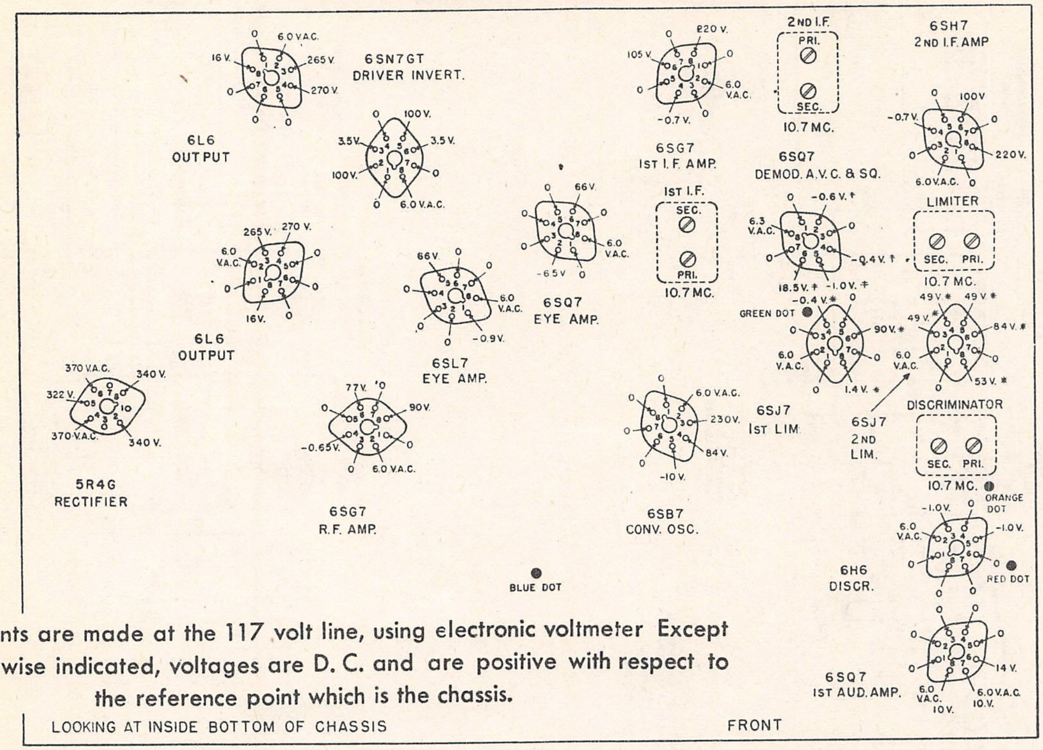

R-F AMPL. 6SG7
CONVERTER 6SB7
1ST I.F. 6SG7
2ND I.F. 6SH7
1ST LIMITER 6SJ7
2ND LIMITER 6SJ7
DISCRIMINATOR 6H6
1ST AUDIO 6SQ7
T3
T7
T10
T11
T12
T13
T14
T15
SEC.3
SEC.4
SEC.5
SEC.6
SEC.7
SEC.8
SEC.9 F
SEC.9 R
GANGED
B+
TO F-M TUNING INDICATOR AMPLIFIER & SQUELCH TUBE GRID
TO RECT SOCKET

BAND-SWITCH SHOWN AT 5TH POSITION. F.M.(2) BAND 42-50 MC.

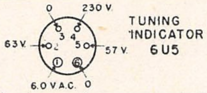
STROMBERG CARLSON CO.

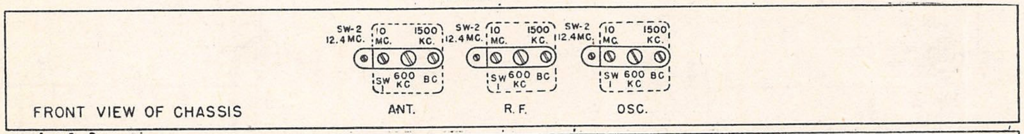
# LOCATION CHARTS

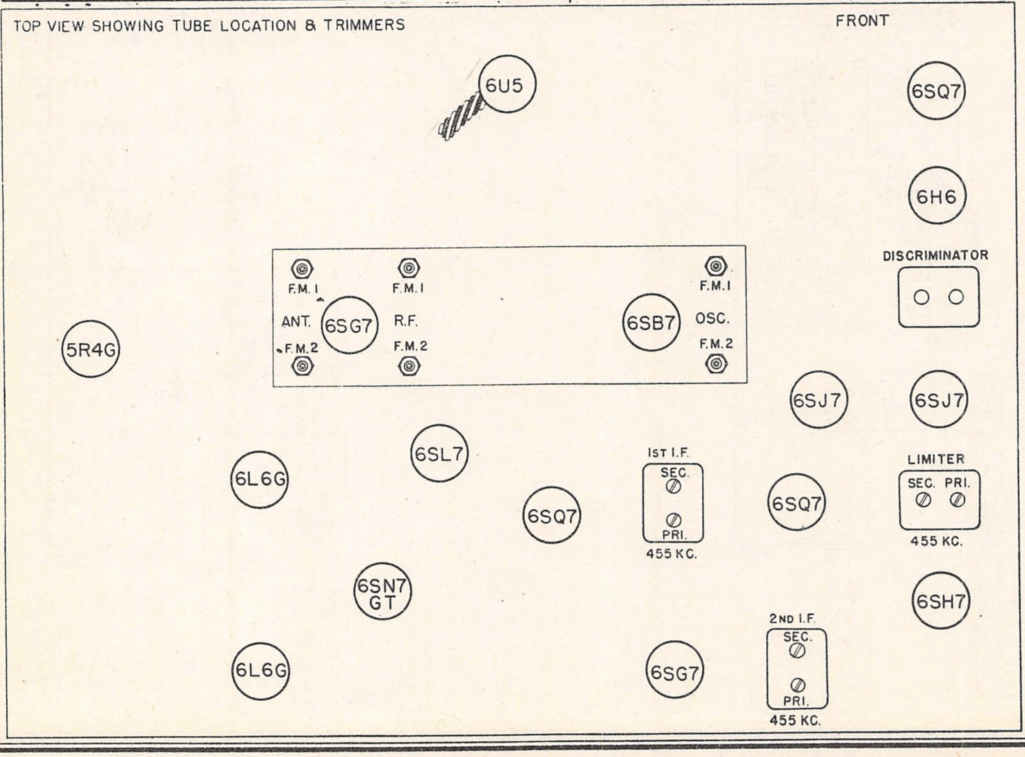
## TUBES, TRIMMERS AND VOLTAGE


6SN7GT DRIVER INVERT.
6.0 V.A.C.
265 V.
270 V.
16 V.
6L6 OUTPUT
100 V.
3.5 V.
6.0 V.A.C.
6L6 OUTPUT
265 V.
270 V.
6.0 V.A.C.
16V.
66V.
6.0 V.A.C.
-0.9V.
6SL7 EYE AMP.
66 V.
6.0 V.A.C.
-6.5 V
6SQ7 EYE AMP.
370 V.A.C.
340 V.
322 V.
5R4G RECTIFIER
77V.
90V.
-0.65V.
6.0 V.A.C.
6SG7 R.F. AMP.
220 V.
105 V.
6.0 V.A.C.
-0.7 V.
6SG7 IST I.F. AMP.
2ND I.F.
PRI.
SEC.
10.7 MC.
IST I.F.
SEC.
PRI.
10.7 MC.
6SH7 2ND I.F. AMP
100V
-0.7 V.
220 V.
6.0 V.A.C.
6SQ7 DEMOD. A.V.C. & SQ.
-0.6 V.†
6.3 V.A.C.
-0.4 V.†
18.5 V.†
-1.0 V.†
LIMITER
SEC.
PRI.
10.7 MC.
49 V.*
84 V.*
53 V.*
GREEN DOT
-0.4 V.*
90 V.*
6.0 V.A.C.
1.4 V.*
6SJ7 IST LIM.
6SJ7 2ND LIM.
DISCRIMINATOR
SEC.
PRI.
10.7 MC.
6.0 V.A.C.
230V.
84V.
-10 V.
6SB7 CONV. OSC.
ORANGE DOT
-1.0V.
6.0 V.A.C.
RED DOT
6H6 DISCR.
14 V.
6.0 V.A.C.
10 V.
6SQ7 IST AUD. AMP.
BLUE DOT
LOOKING AT INSIDE BOTTOM OF CHASSIS
FRONT

Measurements are made at the 117 volt line, using electronic voltmeter Except where otherwise indicated, voltages are D. C. and are positive with respect to the reference point which is the chassis.


230 V.
63 V.
57 V.
6.0 V.A.C.
TUNING INDICATOR
6U5


SW-2 12.4 MC.
10 MC.
1500 KC.
SW
600 KC
BC
ANT.
R.F.
OSC.
FRONT VIEW OF CHASSIS


TOP VIEW SHOWING TUBE LOCATION & TRIMMERS
FRONT
6U5
6SQ7
6H6
DISCRIMINATOR
F.M. I
ANT.
6SG7
F.M. 2
R.F.
6SB7
OSC.
5R4G
6SJ7
6SJ7
6SL7
6L6G
6SQ7
IST I.F.
SEC.
PRI.
455 KC.
6SQ7
LIMITER
SEC. PRI.
455 KC.
6SN7 GT
6SH7
6L6G
6SG7
2ND I.F.
SEC.
PRI.
455 KC.

For schematic, see P.16-9,10

## ALIGNING

***Never realign unless absolutely necessary.***

Refer to "Location Chart" for alignment adjusters. Allow set to warm up 10 to 15 minutes before attempting to align.

Always align using the smallest possible input from the signal generator. A strong signal makes adjustments approximate.

Always have volume full on.

The alignment of this receiver does not require special equipment or information; however, it is well to adhere to the standard procedure as outlined.

The required equipment is: 1 Electronic Voltmeter, 1 Output Meter, 1 Standard Signal Generator, 1 High Frequency Signal Generator, 1 No. 80777 Aligning Tool.

## ALIGNING PROCEDURE *(follow this order exactly)*

### Intermediate Frequency Adjustments

### Amplitude Modulation

The I.F. aligners that are used to adjust the amplitude modulation (AM) channel are found on the top side of the chassis. They consist of 6 adjustable iron cores used to tune the inductance of the 1st, 2nd and 3rd I.F. transformers (161202, 161200, 161201). These cores are found inside the plastic tubes protruding from the top of the I.F. transformers and are equipped with small screwdriver slots.

**Caution:** These cores are made of high quality R.F. iron and are fragile; therefore care must be used in adjusting them.

1. Connect the signal generator to the modulator grid, terminal number 8 of the 6SB7 converter tube which is connected to the wave band switch, and is identified by a blue dot.
2. Connect the output meter across the voice coil of the speaker (green and black wires from cable).
3. Adjust the signal generator to 455 KC. Use 30% modulation at 400 cycles.
4. Adjust volume control full on.
5. Adjust tone control to maximum high, minimum bass.
6. Adjust range switch to standard broadcast band, actuate any AM. push button.
7. Adjust the tuning selector to approximately 600 KC.
8. Adjust I.F. cores for maximum output with a reduced signal Input.

### Frequency Modulation

The I.F. Aligners may be found from the underside of the chassis. The adjusters are 6 Iron cores used to tune the inductance of the high frequency coils.

1. Connect the signal generator to the modulator grid, terminal number 8 of the 6SB7 converter tube, which is connected to the wave band switch, and is identified by a blue dot.
2. Connect the electronic voltmeter to the junction of the 22,000 ohm and the 100,000 ohm resistors in the first limiter grid circuit identified by a green dot. This junction point will be found underneath the limiter shield.
3. Adjust the voltmeter to the lowest negative voltage scale.
4. Actuate push button on extreme right of row of eight.
5. Adjust the tuning selector to approximately 21 on this band.
6. Adjust the signal generator to 10.7 megacycles. No modulation is required.
7. Adjust the cores for maximum output of the voltmeter. Reduce the input signal and readjust until the maximum output is secured for minimum input. (Approximately 1 volt output).

### Discriminator Alignment (FM)

**Caution: *Discriminator secondary must be zeroed at same generator setting used for FM I.F. alignment.***

1. Connect the signal generator to the grid of the second I.F. tube, terminal No. 4 of the 6SH7.
2. Connect the electronic voltmeter to the center of the diode load resistors at the point indicated by the orange dot.
3. Adjust the primary for maximum output with .1 volt from signal generator set at 10.7 megacycles.
4. Switch the electronic voltmeter to the high side of the diode load resistors, identified by a red dot.
5. Adjust the secondary for zero output.
6. Swing generator to 75 KC. higher and 75 KC. lower in frequency and note the plus and minus voltage. If these voltage values are not approximately equal, repeat operations 3, 4 and 5.

### R.F. Adjustment—Amplitude Modulation

***The Broadcast band should be adjusted first. The built-in loop should remain connected to the antenna and ground terminals.***

1. Connect the signal generator to the AM antenna terminals leaving the loop antenna connected. A 400 ohm resistor must be used in series with the signal generator. Use of a 30% modulated signal of 400 cycles is recommended.
2. Adjust the signal generator to 1500 KC.
3. Adjust station selector to 1500 KC.
4. Adjust range switch to AM Broadcast. Actuate any AM push button.
5. Adjust the oscillator, R.F. and antenna trimmer for maximum output.
6. Reduce the input signal and readjust the trimmers until the maximum output is secured for minimum input.
7. Adjust station selector to 600 KC.
8. Set signal generator to 600 KC.
9. Adjust iron cores in oscillator, R.F. and antenna coils for maximum output.
10. Repeat 1500 KC. and 600 KC. alignments until no further change is required.

### R.F. Adjustment—Short Wave (9-10 MC. Band)

***The built-in loop should remain connected to the antenna and ground terminals.***

1. Connect the signal generator to the antenna and ground terminals of the receiver using a 400 ohm resistor.
2. Set the dial pointer to 10 MC.
3. Adjust signal generator to 10 MC.
4. Actuate left S.W. push button.
5. Adjust oscillator, R.F., and antenna trimmer for maximum output. (No further alignment is required on this band.)

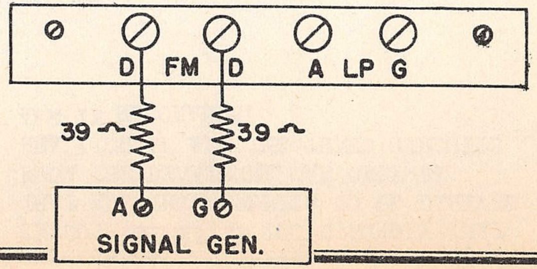
### R.F. Adjustment—Short Wave (11.2-12.6 MC. Band)

1. Connect the signal generator to the antenna and ground terminals of the receiver using a 400 ohm resistor in series with the signal generator.
2. Set dial pointer to 12.4 MC.
3. Adjust signal generator to 12.4 MC.
4. Actuate right S.W. push button.
5. Adjust oscillator, R.F. and antenna iron cores for maximum output.

### R.F. Adjustments—Frequency Modulation

***Align the FM (2) Band first.***

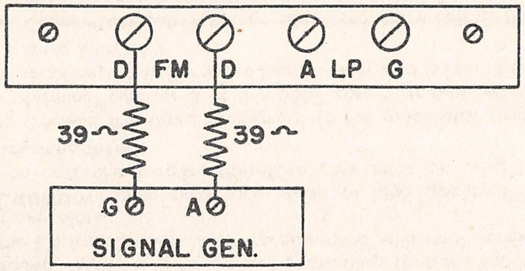
1. Set dial pointer to channel 90 (49 MC.)
2. Connect the signal generator to FM dipole terminals using 39 ohm resistors as indicated (disconnect dipole antenna). *Connect signal generator ground to chassis ground.*



3. Set signal generator to 49 MC.
4. Actuate FM (2) push button (extreme right hand button in row of 8 buttons).
5. Connect electronic voltmeter to the junction of the 22,000 and the 100,000 ohm resistors in the first limiter grid circuit (identified by green dot).
6. Adjust oscillator R.F. and antenna trimmers for maximum output on electronic voltmeter.

### *FM (1) Band*

Adjust the same as the FM (2) band using 106 MC., setting the dial pointer to channel 290. Connect the generator to the dipole input using 39 ohm resistors as indicated. Actuate 3rd push button from right in row of 8 buttons. *Connect signal generator ground to chassis ground. Note reverse signal generator connection.*



### Dial Pointer Adjustment

Check dial pointer to see that it is aligned with the two diamond shaped markers at the extreme left of the dial scale, when the variable capacitor plates are completely engaged.

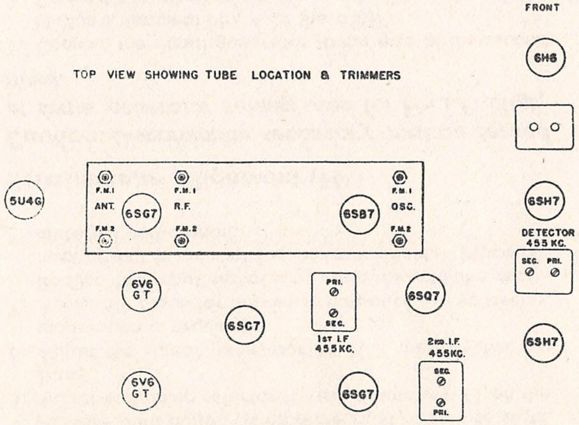
IN ALMOST EVERY LOCATION FM PERFORMANCE IS IMPROVED WITH THE ADDITION OF A DYNTENNA. IN REMOTE OR FRINGE AREAS THIS FOLDED DIPOLE IS A MUST IF GOOD RESULTS ARE TO BE EXPECTED FROM THE STATIONS NOW ON THE AIR.

WHEN INSTALLING A DYNATENNA, IT IS MOST IMPORTANT THAT THE INSTRUCTIONS BE FOLLOWED VERY CLOSELY. GET IT HIGH, STAY AWAY FROM METAL CONDUCTORS OF ALL TYPES, AND ORIENT IT CAREFULLY. AFTER FOLLOWING THESE FUNDAMENTALS CLOSELY, THERE ARE SIMPLE ADJUSTMENTS THAT MAY BE MADE THAT WILL ADD TO THE OVERALL GAIN CONSIDERABLY, AS FOLLOWS:

1 - AFTER DYNATENNA HAS BEEN INSTALLED AND PROPERLY CONNECTED TO THE RECEIVER TUNE IN THE WEAKEST STATION THAT CAN BE HEARD OR ONE IN OR NEAR THE CENTER OF THE FREQUENCY BAND ASSIGNED TO YOUR AREA.

2 - IN THE CASE OF RECEIVERS THAT HAVE TUNING EYE TUBES (1135), REMOVE THE TUBE FROM HOLDER IN ORDER THAT IT MAY BE SEEN FROM BACK OF SET.

3 - ADJUST ANTENNA AND RF-FM TRIMMERS (SEE CHART BELOW) FOR GREATEST DEFLECTION OF EYE. IN THE CASE OF SETS THAT DO NOT HAVE AN EYE TUBE, SOME ADJUSTMENT IS MADE. OPTIMUM SIGNAL STRENGTH IS DETERMINED BY INCREASE IN RATIO OF AUDIBLE SIGNAL TO NOISE LEVEL.


TOP VIEW SHOWING TUBE LOCATION & TRIMMERS

THE TRIMMERS REFERRED TO ARE EASILY ACCESSIBLE AND MAY BE REACHED FROM THE BACK OF THE CABINET WITHOUT REMOVING THE CHASSIS.

THIS RECOMMENDED ADJUSTMENT WILL MAKE A VERY NOTCEABLE IMPROVEMENT IN SIGNAL STRENGTH IN ANY INSTALLATION THAT IS MADE A FEW MILES FROM THE TRANSMITTER. WE CANNOT EMPHASIZE TOO STRONGLY THAT THAT ALL THE BENEFITS TO BE DERIVED FROM THE DYNATENNA CAN ONLY BE REALIZED IF ALL THE TUNED CIRCUITS ARE IN RESONANCE.

## Cabinet Parts

| PF | | PL |
|---|---|---|
| 29597 | Labyrinth | 29597 |
| 35852 | Screws, Escutcheon Mtg. | 35852 |
| 37083 | Key Pull | 37083 |
| 37139 | Decal, Station | 37139 |
| 37140 | Decal Off-On, Volume | 37140 |
| 37145 | Lid Support | — |
| 37149 | Drawer Pull | 39024 |
| — | Grille Cloth—W— | 37168 |
| 37169 | Grille Cloth—M— | 130017 |
| 37239 | Socket, Phono. Compartment | — |
| 37240 | Lamp, Phono. Compartment | — |
| 37242 | Block, Lamp and Switch Mtg. | — |
| 37579 | Escutcheon | 35726 |
| 38442 | Bullet Catch with Strike | 38442 |
| 39200 | Piano Hinge | — |
| 80681 | Stop Hinge | 80681 |
| — | Phono. Drawer and Tracks | 108035 |
| 108036 | Phono. Panel | — |
| — | Phono. Drawer Track Right | 132021 |
| — | Phono. Drawer Track Left | 132022 |
| 150024 | Metal Grille | 130023 |
| 801401 | Lamp Cap, Bullseye | 801401 |

## Knobs—Push Buttons

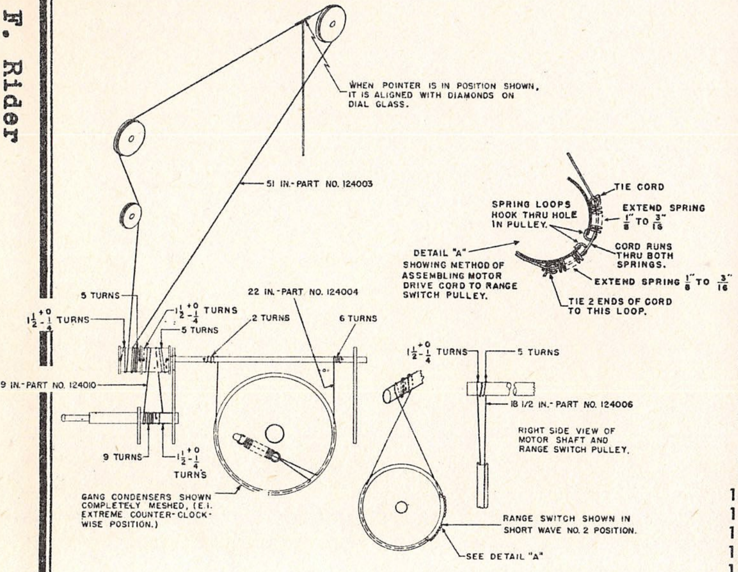
| Part No. | |
|---|---|
| 32156 | Push Button |
| 32172 | Lens, Push Button |
| 32224 | Off-On, Volume |
| 35866 | Call Letter Kit |
| 37007 | Indicator Lever, Tone |
| 37093 | Tuning |
| 121007 | "S.W." Push Button Tab |
| 121008 | "Radio" Push Button Tab |
| 121009 | "Record" Push Button Tab |

## Controls—Switches

| Part No. | | |
|---|---|---|
| 37238 | | Phono. Compartment Switch |
| 145002 | R-50 | 1 Meg. Volume Control and Switch |
| 158005 | | Tone Switch, Bass |
| 158006 | | Tone Switch, Treble |
| 158014 | | Squelch Switch |
| 158019 | | Switch, S.W., Radio, Phono |

# STROMBERG CARLSON CO.

## CORD STRINGING DIAGRAM
1135-A RADIO REC.


WHEN POINTER IS IN POSITION SHOWN, IT IS ALIGNED WITH DIAMONDS ON DIAL GLASS.
51 IN.-PART NO. 124003
TIE CORD
SPRING LOOPS HOOK THRU HOLE IN PULLEY.
EXTEND SPRING 1/8" TO 3/16"
CORD RUNS THRU BOTH SPRINGS.
DETAIL "A" SHOWING METHOD OF ASSEMBLING MOTOR DRIVE CORD TO RANGE SWITCH PULLEY.
EXTEND SPRING 1/8" TO 3/16"
TIE 2 ENDS OF CORD TO THIS LOOP.
5 TURNS
1½ +0 -¼ TURNS
22 IN.-PART NO. 124004
1½ +0 -¼ TURNS
5 TURNS
2 TURNS
6 TURNS
29 IN.-PART NO. 124010
1½ +0 -¼ TURNS
5 TURNS
18 1/2 IN.-PART NO. 124006
RIGHT SIDE VIEW OF MOTOR SHAFT AND RANGE SWITCH PULLEY.
9 TURNS
1½ +0 -¼ TURNS
GANG CONDENSERS SHOWN COMPLETELY MESHED, (E.I. EXTREME COUNTER-CLOCK-WISE POSITION.)
RANGE SWITCH SHOWN IN SHORT WAVE NO. 2 POSITION.
SEE DETAIL "A"

## Coils—Transformers—Speaker

| Part No. | | |
|---|---|---|
| 32460 | | Speaker Cone |
| *112008 | | R.F. Chassis Assembly |
| 114003 | T-5 | R.F. Coil SW-1 Broadcast |
| 114004 | T-9 | Oscillator Coil SW-1 Broadcast |
| 114005 | T-2 | Antenna Coil SW-1 Broadcast |
| 114020 | T-1, T-4, T-8 | Antenna, R.F., Oscillator, Coil S.W. Band (2) |
| 114317 | T-15 | Discriminator Transformer |
| 140001 | | Motor, Switch Drive |
| 155019 | | Speaker Assembly |
| 161002 | T-17 | Filter Choke |
| 161200 | T-13 | 2nd I.F. Transformer |
| 161201 | T-14 | 3rd I.F. Transformer |
| 161202 | T-12 | 1st I.F. Transformer |
| 161206 | T-18 | Output Transformer |
| 161403 | T-16 | Power Transformer |

*Band Switch, Sockets, Variable Capacitor, R.F. Coils all bands. This is a complete R.F. Assembly. Sold as a unit only.

**NOTE—When ordering replacement parts always specify series number as well as model and part number. Series number is stamped on back of chassis.**

## Resistors

| Part No. | | |
|---|---|---|
| 27407 | R-20, R-62, R-71, R-72, R-73, R-74 | 22,000 Ohms |
| 27640 | R-18, R-69, R-70 | .15 Meg. |
| 28006 | R-19, R-22, R-23, R-47, R-52, R-53, R-54, R-77, R-81 | .1 Meg. |
| 28157 | R-45 | 820 Ohms |
| 28158 | R-3, R-6, R-10, R-14, R-78 | 1,000 Ohms |
| 28159 | R-21 | 1,200 Ohms |
| 28160 | R-56, R-57 | 1,500 Ohms |
| 28161 | R-36 | 1,800 Ohms |
| 28162 | R-48, R-51 | 2,200 Ohms |
| 28170 | R-15, R-25, R-28, R-29, R-49 | 10,000 Ohms |
| 28172 | R-26 | 15,000 Ohms |
| 28174 | R-67, R-68 | 27,000 Ohms |
| 28175 | R-13, R-33 | 33,000 Ohms |
| 28176 | R-9 | 39,000 Ohms |
| 28177 | R-24, R-75 | 47,000 Ohms |
| 28178 | R-12, R-32, R-59, R-60 | 56,000 Ohms |
| 28179 | R-4, R-84 | 68,000 Ohms |
| 28183 | R-30, R-31, R-82, R-83 | .22 Meg. |
| 28184 | R-61, R-63 | .27 Meg. |
| 28186 | R-8 | .39 Meg. |
| 28187 | R-55, R-58 | .47 Meg. |
| 28189 | R-39 | .68 Meg. |
| 28191 | R-7, R-11, R-16, R-34, R-35, R-37 R-46, R-76, R-80 | 1 Meg. |
| 28193 | R-27 | 1.5 Meg. |
| 28196 | R-17 | 2.7 Meg. |
| 145002 | R-50 | .1 Meg. Volume Control |
| 149004 | R-85 | 4,700 Ohms |
| 149005 | R-2 | 22,000 Ohms |
| 149006 | R-5 | 33,000 Ohms |
| 149007 | R-1 | 1 Meg. |
| 149009 | R-79 | 17,000 Ohms Voltage Divider |
| 149010 | R-40 | 500 Ohms, 4,000 Ohms Voltage Divider |
| 149078 | R-42 | 2,200 Ohms, 2 W |
| 149164 | R-66 | 56 Ohms, 1 W |
| 149180 | R-43 | 2,700 Ohms, 1 W |
| 149182 | R-44 | 3,900 Ohms, 1 W |
| 149194 | R-38 | .15 Meg., 1 W |
| 149207 | R-65 | 5,000 Ohms, 5 W |
| 149208 | R-64 | 125 Ohms, 5 W |

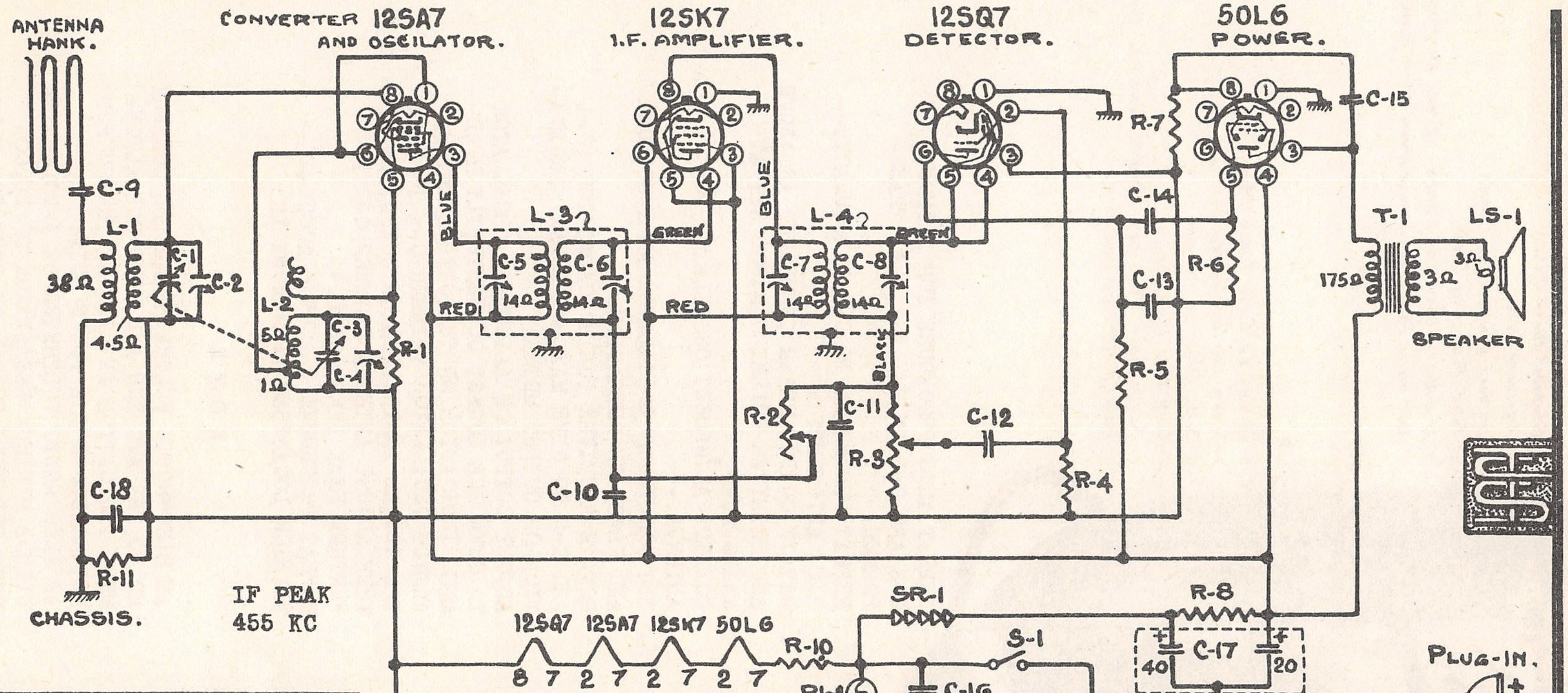
## Capacitors

| Part No. | | |
|---|---|---|
| 25150 | C-90 | .02 mf (400 V) |
| 25484 | C-83 | .02 mf (600 V) |
| 25485 | C-13, C-14, C-23, C-40, C-47, C-52, C-56, C-57, C-58, C-64, C-65, C-70, C-74, C-76, C-81, C-102 | .01 mf (600 V) |
| 28325 | C-17 | .1 mf |
| 29359 | C-67 | 75 mmf |
| 29559 | C-89 | .0025 mf |
| 29891 | C-86 | .05 mf (600 V) |
| 34796 | C-54, C-79 | 50 mmf |
| 34800 | C-53, C-84, C-85 | 100 mmf |
| 40632 | C-77, C-82, C-105 | .05 mf (400 V) |
| 46315 | C-103, C-106 | .003 mf (400 V) |
| 110006 | C-11, C-20, C-21, C-25, C-26 | R.F. Trimmer H.F. |
| 110007 | C-10 | Antenna F.M. H.F. Trimmer |
| 110201 | C-36, C-38, C-43, C-45, C-49, C-51 | 750 mmf |
| 110202 | C-8 | 10 mmf |
| 110203 | C-28 | 375 mmf |
| 110208 | C-95 | 270 mmf |
| 110209 | C-60, C-96 | 470 mmf |
| 110215 | C-87, C-97, C-104 | 750 mmf |
| 110216 | C-66 | 390 mmf |
| 110401 | C-12, C-15, C-32, C-107 | 100 mmf |
| 110402 | C-30, C-39, C-41, C-46, C-55, C-59, C-61, C-101 | 47 mmf |
| 110403 | C-62 | 24 mmf |
| 110406 | C-63 | 62 mmf |
| 110407 | C-37, C-42, C-44, C-48, C-50 | 33 mmf |
| 110408 | C-16, C-34, C-100 | 1,000 mmf |
| 110410 | C-35 | 27 mmf |
| 110411 | C-29 | 10 mmf |
| 110412 | C-27 | 2.5 mmf |
| 110413 | C-31 | 5 mmf |
| 110415 | C-68, C-69, C-78, C-91, C-92, C-93, C-94 | .1 mf |
| 110417 | C-98 | 1,000 mmf Ceramic |
| 110419 | C-33 | .005 mf |
| 111005 | C-73, C-75, C-80 | 40 mf, 4 mf, 20 mf, Electrolytic |
| 111006 | C-71 | 20 mf, Electrolytic |
| 111007 | C-72, C-88, C-99 | 40 mf, 20 mf, 20 mf, Electrolytic |

## Miscellaneous

| Part No. | |
|---|---|
| 25156 | Fuse |
| 27958 | Fuse Holder |
| 28694 | Socket, Pilot |
| 29956 | Pilot Lamp |
| 30152 | Socket, Speaker |
| 30269 | Corner Mtg., Dial Scale |
| 31539 | Jack, Phono |
| 32075 | Pulley |
| 32076 | Pulley |
| 33218 | Cord, A.C. |
| 34068 | Cable and Socket, Eye |
| 40546 | Clip, Pulley |
| 113002 | Clip, Tube Ground |
| 118001 | Iron Core, I.F. |
| 118002 | Iron Core, R.F. |
| 122009 | Dial Scale |
| 124003 | Cord, Pointer |
| 124004 | Drive Cord, Condenser Gang |
| 124006 | Drive Cord Assembly, Motor |
| 124010 | Drive Cord, Selector |
| 138002 | Lens, Phono |
| 138005 | Lens, Range |
| 144003 | Pointer, Dial |
| 145002 | Volume Control |
| 147002 | Pulley Assembly, Band Switch |
| 150004 | Shaft Assembly, Dial and Pulley Drive |
| 150005 | Shaft, Knob Drive |
| 151035 | Shield, Pilot Lamp |
| 152002 | Socket, Tube (10) |
| 152004 | Socket, Recorder |
| 152007 | Socket, Pilot Bullseye |
| 152014 | Socket, Tube (3) |
| 152026 | Socket, A.C. |
| 158019 | Switch Assembly, SW, Radio, Phono. |
| 159002 | Binding Post, Ant. |
| 159008 | Binding Post, 6 pt. |
| 159009 | Binding Post, 5 pt. |
| 167009 | Bass Boost |
| 80891 | Phono. Cartridge Qtm. |
| 80892 | Metal Needle for 80891 |
| 80894 | Jewel Needle for 80891 |

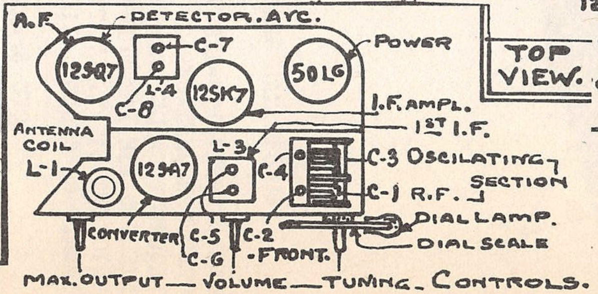
# TELECOIN CORP.

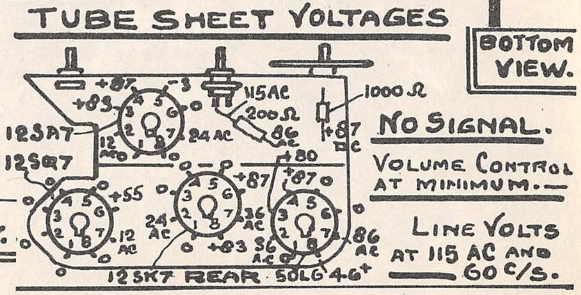

ANTENNA HANK.
C-9
L-1
38Ω
4.5Ω
C-1
C-2
CONVERTER 12SA7 AND OSCILATOR.
L-2
5Ω
1Ω
C-3
C-4
R-1
BLUE
RED
L-3
C-5
14Ω
C-6
14Ω
12SK7 I.F. AMPLIFIER.
GREEN
RED
C-10
L-4
C-7
14Ω
C-8
14Ω
BLUE
GREEN
BLACK
R-2
C-11
R-3
C-12
R-4
12SQ7 DETECTOR.
R-5
C-13
C-14
R-6
R-7
50L6 POWER.
C-15
T-1
175Ω
3Ω
3Ω
LS-1
SPEAKER
C-18
R-11
CHASSIS.
IF PEAK 455 KC
12SQ7 12SA7 12SK7 50L6
8 7 2 7 2 7 2 7
R-10
PL-1
C-16
SR-1
S-1
R-8
C-17
40
20
PLUG-IN.
117 VOLTS

## LIST OF SYMBOLS

| SYMBOL | DESCRIPTION. |
|---|---|
| C-1 | ANT. TUNING CAPACITATOR INCL'S TRIMMER C-2 |
| C-3 | C.S.C. " " " " C-4 |
| C-5-6 | 1ST I.F. TRIMMER CAPACITORS. |
| C-7-8 | 2ND I.F. " " . |
| C-9 | CAPACITOR. -0.001 M.F.D. 500 V. - MICA |
| C-10 | " -0.05 200 " - PAPER |
| C-11 | " -0.00025 M.F.D 500 " - MICA |
| C-12 | " -0.002 " 600 " - PAPER |
| C-13 | " -0.00025 " 500 " - MICA |
| C-14 | " -0.02 " 400 " - PAPER |
| C-15 | " -0.02 " 400 " - " |
| C-16 | " -0.05 " 400 " - " |
| C-17 | " -40/20 M.F.D.-150 V. ELECTROL'C |
| C-18 | " -0.05 " 400 VOLTS. PAPER |
| L-1 | ANTENNA COIL. |
| L-2 | OSCILATOR COIL. |
| L-3 | 1ST I.F. TRANSFORMER. |
| L-4 | 2ND I.F. TRANSFORMER. |
| LS-1 | LOUDSPEAKER - 4" P.M. |
| PL-1 | PILOT LAMP - 115 VOLTS - 6 WATT. |
| S-1 | POWER SWITCH. S.P.S.T. (PART OF R-3). |
| SR-1 | SELENIUM RECTIFIER-100 MILLI A. 5 PL'S |
| T-1 | OUTPUT TRANSFORMER. |

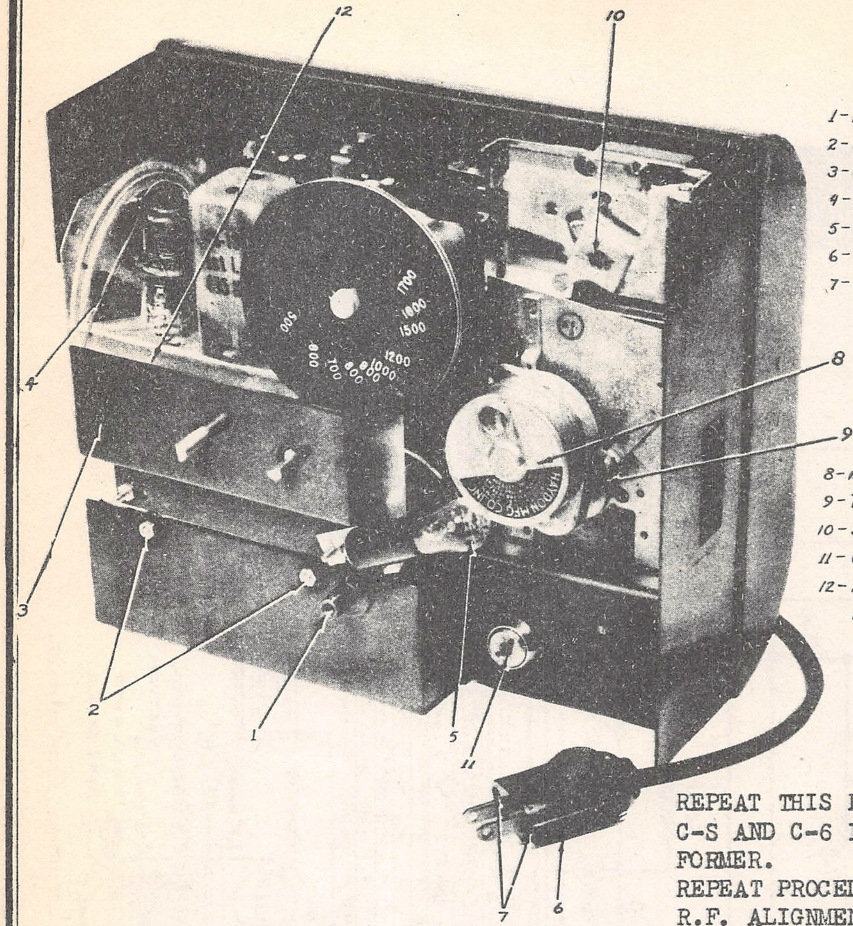
| SYMBOL | DESCRIPTION. |
|---|---|
| R-1 | RESISTOR - 20.000 OHMS 1/2 " . |
| R-2 | POTENTIOMETER - 2 MEGGS. |
| R-3 | POTENTIOMETER S.P.S.T SWITCH (S-1) 500.000 OHMS |
| R-4 | RESISTOR - 15.0 MEGOHMS - 1/2 WATT. |
| R-5 | " - 470.000 OHMS - " . |
| R-6 | " - 470.000 " - " . |
| R-7 | " - 150 " - " . |
| R-8 | " - 1000 " - 5 WATT. |
| R-10 | " - 200 " - 10 " . |
| R-11 | " - 250.000 " - 1/2 " . |


TOP VIEW.
A.F.
DETECTOR. AVC.
12SQ7
C-7
L-4
C-8
12SK7
50L6
POWER
I.F. AMPL.
1ST I.F.
ANTENNA COIL
L-1
12SA7
L-3
C-4
C-3 OSCILATING SECTION
C-1 R.F.
DIAL LAMP.
DIAL SCALE
CONVERTER
C-5
C-6
C-2
FRONT.
MAX. OUTPUT — VOLUME — TUNING CONTROLS.


TUBE SHEET VOLTAGES
BOTTOM VIEW.
+87
-3
+83
115AC
200Ω
86 AC
1000Ω
+87 DC
12SA7
12SQ7
12 AC
24 AC
+80
+87
+55
24 AC
36 AC
+83
36 AC
86 AC
12 AC
12SK7 REAR 50L6 4.6+
NO SIGNAL.
VOLUME CONTROL AT MINIMUM.
LINE VOLTS AT 115 AC AND 60 C/S.

MODEL M5TS4

# TELECOIN CORP.



1-Nut For Cabinet Stud-Type Lock.
2-Hex Nuts Securing Chassis To Cabinet Back.
3-Control Knob Panel.
4-Antenna Wire.
5-110 Volt 6 Watt Dial Lamp.
6-Fuse Plug And Cord.
7-2-110Volt Fuses 2 or 3 Amps. Eject By Pushing Out With Pencil or Screwdriver From Rear.
8-110 Volt 60 Cycle Timer Motor.
9-Timer On-Off Switch.
10-Slug Rejector Assembly.
11-Coin Box Lock.
12-Adjustable Maximum Volume Control Under Panel. (R-2 on Schematic)

## ELECTRICAL SPECIFICATIONS

POWER SUPPLY.105-125 V.-50/60 CYCL. AC
POWER CONSUMPTION - 30 WATTS
FREQUENCY RANGE 500-1700 KCS.
INTERMEDIATE FREQUENCY 455 KCS.
AUDIO OUTPUT 1.5 WATTS
TIMER.--60 CYCLES. 110 VOLTS - AC.

## LOUD SPEAKER

PERMANENT MAGNET...4" DIAMETER.

## ALIGNMENT PROCEDURE

ALIGNMENT FREQUENCIES:

I.F. 455 KCS. R.F. 1700 KCS.

I.F. ALIGNMENT:

CONNECT OUTPUT METER ACROSS THE VOICE COIL.--TURN THE RECEIVER VOLUME CONTROL TO MAXIMUM.

CONNECT HIGH SIDE OF ALIGNMENT OSCILLATOR, THROUGH A.05 MFD CAPACITOR, TO THE CONVERTER GRID.

SET ALIGNMENT OSCILLATOR AT 455 KCS AND ADJUST OUTPUT TO GIVE THE LOWEST CONVENIENTLY READABLE INDICATION ON THE OUTPUT METER.

ADJUST TRIMMERS C-7 AND C-8 IN 2ND I.F. TRANSFORMER TO GIVE MAXIMUM INDICATION ON OUTPUT METER.--

REPEAT THIS PROCEDURE FOR TRIMMERS C-S AND C-6 IN THE 1ST I.F. TRANSFORMER.

REPEAT PROCEDURE TO CHECK ACCURACY.--

R.F. ALIGNMENT :

RETAIN OUTPUT METER CONNECTED AS ABOVE AND RECEIVER VOLUME CONTROL SET AT MAXIMUM.--

CONNECT ALIGNMENT OSCILLATOR TO ANTENNA.--

SET ALIGNMENT OSCILLATOR AT 1700 KCS. AND PLACE IN OPERATION.

ROTATE RECEIVER TUNING CAPACITOR (C-1 AND C-3 TO GIVE MAXIMUM SIGNAL INDICATION ON OUTPUT METER.

ADJUST OUTPUT OF ALIGNMENT OSCILLATOR TO GIVE THE LOWEST CONVENIENTLY READABLE INDICATION ON THE OUTPUT METER.

ADJUST OSCILLATOR TRIMMER C-4 TO PEAK THE SIGNAL INDICATION ON OUTPUT METER.-

THEN ADJUST ANTENNA TRIMMER C-2 TO FURTHER PEAK THE SIGNAL.--

REPEAT PROCEDURE TO CHECK ACCURACY--

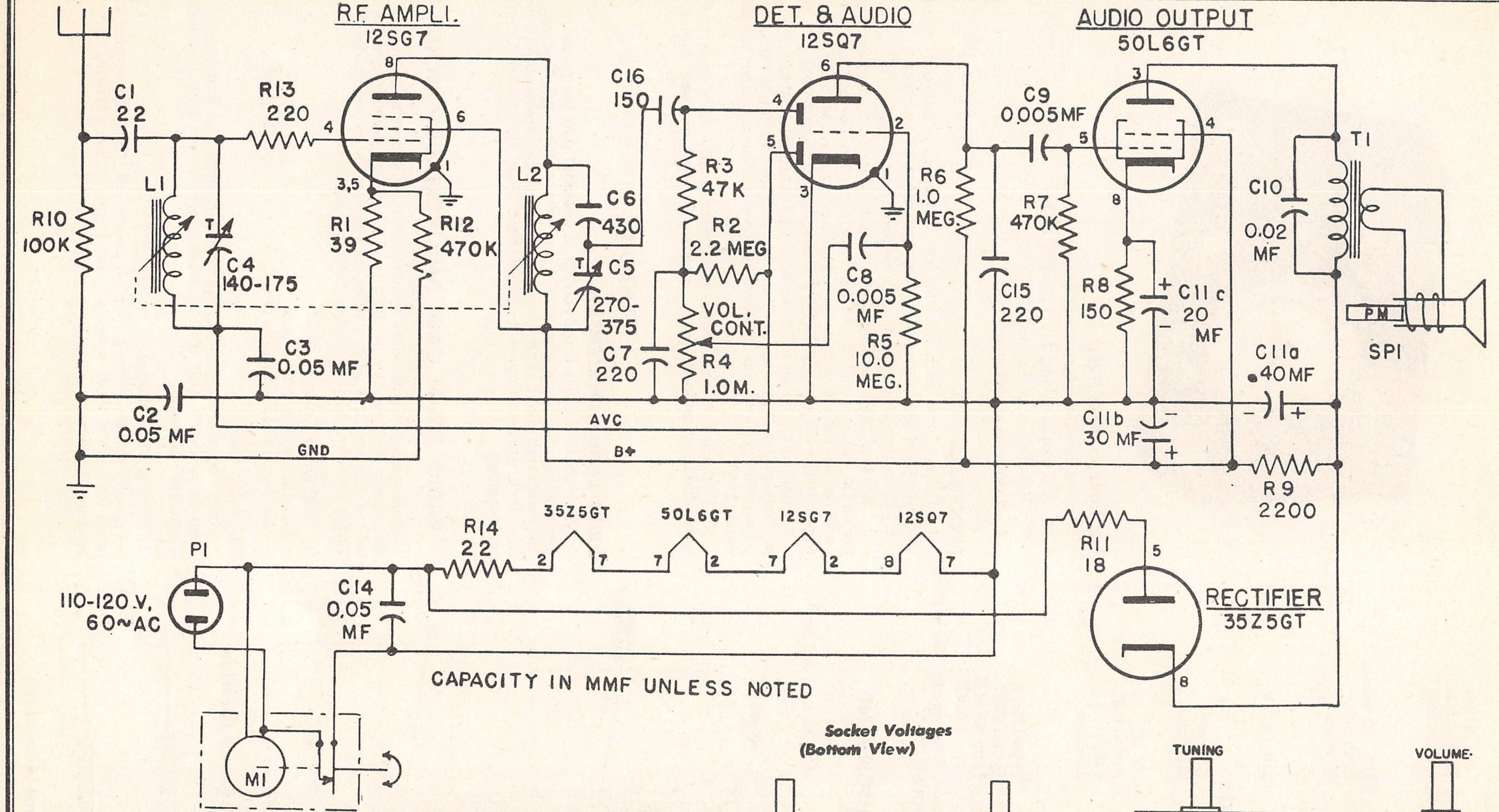
TRIMMER LOCATIONS ARE SHOWN IN

## NOTES

AN ELECTRONIC VOLTMETER MAY BE CONNECTED TO THE AVC BUS AND USED FOR ALIGNMENT INDICATION IN LIEU OF THE OUTPUT METER ACROSS THE VOICE COIL.

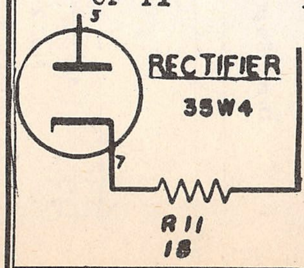
AN ELECTRONIC VOLTMETER OR A VOLTMETER WITH A MINIMUM RESISTANCE OF 20,000 OHMS PER VOLT SHOULD BE USED FOR VOLTAGE MEASUREMENTS.

## TELECHRON, INC.


R.F. AMPLI.
12SG7
DET. & AUDIO
12SQ7
AUDIO OUTPUT
50L6GT
C1 22
R13 220
R10 100K
L1
C4 140-175
R1 39
R12 470K
C3 0.05 MF
C2 0.05 MF
GND
AVC
B+
L2
C6 430
C5 270-375
C16 150
R3 47K
R2 2.2 MEG
VOL. CONT.
R4 1.0M.
C7 220
C8 0.005 MF
R5 10.0 MEG.
R6 1.0 MEG.
C15 220
C9 0.005MF
R7 470K
R8 150
C11c 20 MF
C11b 30 MF
C11a 40MF
C10 0.02 MF
T1
PM
SP1
R9 2200
R14 22
35Z5GT
50L6GT
12SG7
12SQ7
R11 18
RECTIFIER
35Z5GT
P1
110-120 V. 60~AC
C14 0.05 MF
M1
CLOCK MOTOR
& SWITCH

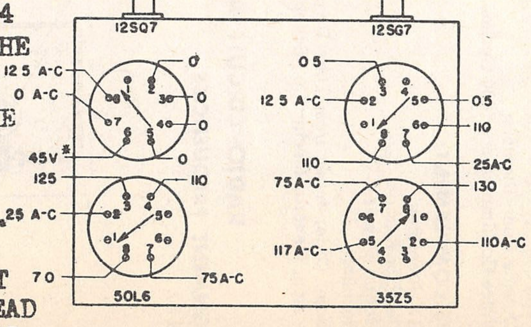
CAPACITY IN MMF UNLESS NOTED

R11 GOES
TO TAP ON PRI.
OF T1

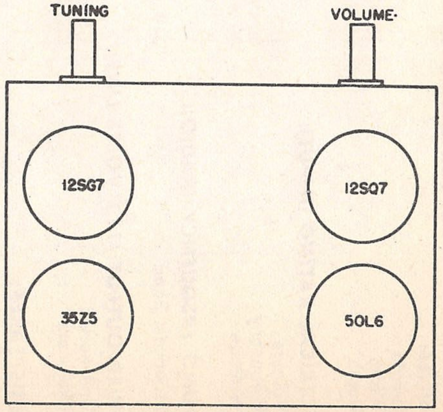

RECTIFIER
35W4
R11
18
5
7

ON LATER MODELS A 35W4 RECT. TUBE REPLACES THE 35Z5GT. THE FOLLOWING CHANGES IN WIRING ARE MADE: R11 IN THE CATHODE LEAD OF THE 35W4 (AS SHOWN ON LEFT) INSTEAD OF THE PLATE LEAD OF THE 35Z5GT. R14 IS BETWEEN PIN #4 OF THE 35W4 AND PIN #7 OF THE 50L6GT IN THE FILAMENT CIRCUIT INSTEAD OF BETWEEN PIN#2 OF THE 35Z5GT AND R11.

**Socket Voltages**
**(Bottom View)**


12SQ7
12.5 A-C
0 A-C
0
0
0
45V*
0
12SG7
05
12.5 A-C
05
110
110
25A-C
50L6
125
110
25 A-C
70
75A-C
35Z5
75A-C
130
117A-C
110A-C

*Measured with 20,000 ohm/volt meter


TUNING
VOLUME
12SG7
12SQ7
35Z5
50L6

Tube Location (Top View)

## SPECIFICATIONS

**CABINET:**

| | |
|---|---|
| Height | 5¾ inches |
| Width | 10⅝ inches |
| Depth | 4¾ inches |

**ELECTRICAL RATING (INPUT):**

| | |
|---|---|
| Voltage | 105–125 volts, a-c |
| Frequency | 60 cycles |
| Wattage | 30 watts |

**TUNING FREQUENCY (RADIO):**

| | |
|---|---|
| Broadcast Band | 540–1600 kc |

**POWER OUTPUT (117 VOLTS LINE):**

| | |
|---|---|
| Undistorted | 1.5 watts |
| Maximum | 2.2 watts |

**LOUDSPEAKER:**

| | |
|---|---|
| Type | Alnico P.M. |
| Outside Cone Diameter | 4 inch |
| Voice Coil Impedance (400 Cycles) | 3.5 ohms |

**TUBE COMPLEMENT:**

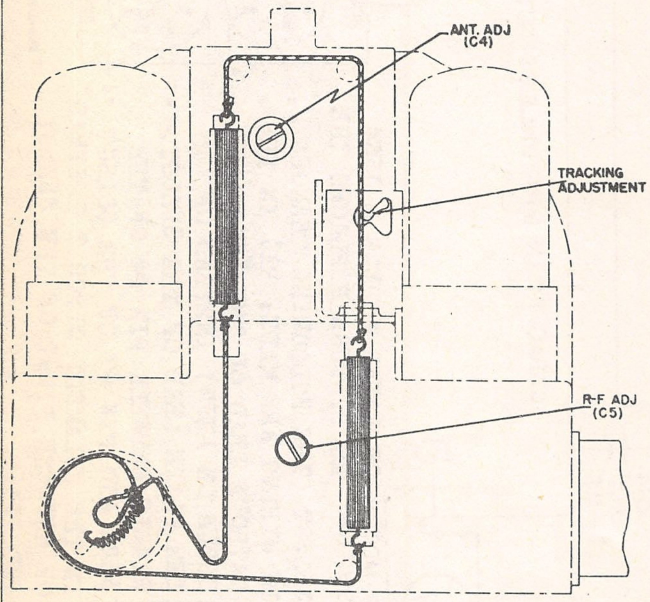
| | |
|---|---|
| R-F Amplifier | Type 12SG7 |
| Detector-Audio | Type 12SQ7 |
| Output Power | Type 50L6GT |
| Rectifier | Type 35Z5GT |

Note: Order tubes from Tube Division, Replacement Parts Section, General Electric Co., Schenectady, N. Y.

## RADIO CIRCUIT ALIGNMENT

**ALIGNMENT FREQUENCIES**

| | |
|---|---|
| R-F | 1620 kc and 580 kc |



Drive Stringing and Trimmer Location

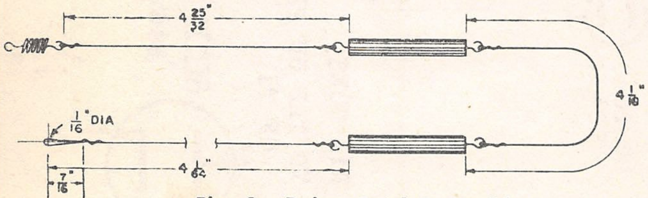
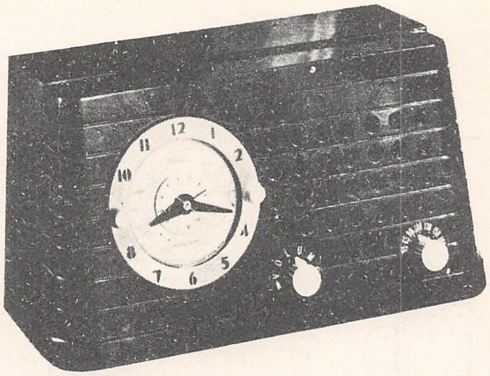


Fig. 2. Drive Cord Assembly



**EQUIPMENT REQUIRED**

1. Test oscillator with audio tone modulation.
2. A-C output meter, 1½ volts full scale.
3. 100 mmf. mica capacitor.
4. Insulated screwdriver.

**PROCEDURE**

1. Connect test oscillator through 100 mmf. to antenna lead; connect output meter across the loudspeaker voice coil leads.
2. Turn dial pointer as far clockwise as it will go.
3. Set test oscillator to 1620 kc with tone modulation. Keeping the radio volume control set for maximum and attenuating test oscillator so that the output meter reading never exceeds 1¼ volts, trim antenna (C4) and RF (C5) trimmers for maximum output.
4. Set test oscillator to 580 kc with tone modulation. While rocking tuning control in vicinity of this dial calibration, adjust tracking adjustment platform up or down to give maximum output meter reading.
5. Recheck 1620 calibration adjustment. If RF (C5) trimmer has to be changed appreciably for maximum output, recheck step 4.

## GENERAL

**DRIVE CORD REPLACEMENT**

When replacing the drive cord, it is essential that the measurements shown in Figure 2 be maintained very accurately, otherwise alignment and dial calibration difficulties will be experienced. Use a 1/32-inch diameter nylon jacketed cord, Part No. RDC-015, for replacement.

## RADIO STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20 per cent. Readings are taken with low signal input.

(1) R-F Stage Gains.

| | |
|---|---|
| Antenna lead to 12SG7 grid | 8 at 1000 kc |
| 12SG7 grid to 12SQ7 diode plate | 50 at 1000 kc |

(2) Audio Gain.

0.06 volts at 400 cycles across volume control (R4) with control set at maximum will give approximately ½-watt output across speaker voice coil.

(3) Socket Pin Voltages.

Figure 4 shows voltages from all points to B –. Voltage readings much lower than those specified may help localize defective components or tubes.

## RADIO REPLACEMENT PARTS LIST—MODEL No. 8H59

(Order from G-E Co., Specialty Division, Wolfe St. Plant, Syracuse, N. Y.)

### UNIVERSAL G-E RADIO REPLACEMENT PARTS

| CAT. NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| UCC-039 | C8 | CAPACITOR—0.005 mfd., 600 v., paper |
| UCC-045 | C2, 3 | CAPACITOR—0.05 mfd., 600 v., paper |
| UCG-543 | C6 | CAPACITOR—430 mmf., silver mica |
| UCU-512 | C1 | CAPACITOR—22 mmf., mica |
| UCU-532 | C16 | CAPACITOR—150 mmf., mica |
| UCU-536 | C7, 15 | CAPACITOR—220 mmf., mica |
| UIC-001 | | CEMENT—Speaker cement |
| UOP-405 | SP1 | LOUDSPEAKER—4-inch PM speaker |
| UOX-009 | | CONE—Speaker replacement cone |
| URD-015 | R1 | RESISTOR—39 ohms, ½ w., carbon |
| URD-029 | R8 | RESISTOR—150 ohms, ½ w., carbon |
| URD-033 | R13 | RESISTOR—220 ohms, ½ w., carbon |
| URD-089 | R3 | RESISTOR—47,000 ohms, ½ w., carbon |
| URD-097 | R10 | RESISTOR—100,000 ohms, ½ w., carbon |
| URD-113 | R7, 12 | RESISTOR—470,000 ohms, ½ w., carbon |
| URD-121 | R6 | RESISTOR—1.0 megohm, ½ w., carbon |
| URD-129 | R2 | RESISTOR—2.2 megohms, ½ w., carbon |
| URD-145 | R5 | RESISTOR—10.0 megohms, ½ w., carbon |
| URE-057 | R9 | RESISTOR—2,200 ohms, 1 w., carbon |

NOTE: See page 1 for tube complement

### SPECIALIZED G-E REPLACEMENT PARTS

| CAT. NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| RAB-016 | | COVER—Cabinet back cover |
| RAU-009 | | CABINET—Plastic cabinet |
| RCC-039 | C9 | CAPACITOR—0.005 mfd., 600 v., paper |
| RCC-041 | C10 | CAPACITOR—0.02 mfd., 600 v., paper |
| RCC-045 | C14 | CAPACITOR—0.05 mfd., 600 v. paper |
| RCE-031 | C11A, B, C | CAPACITOR—40 mfd., 150 v.; 30 mfd., 150 v.; 20 mfd., 25 v.; electrolytic |
| RCY-007 | C4 | TRIMMER—140-175 mmf., antenna trimmer |
| RCY-008 | C5 | TRIMMER—270-375 mmf.; r-f trimmer |
| RDC-015 | | CORD—Tuning drive cord (bulk) |
| RDK-028 | | KNOB—Volume or tuning knob |
| REI-004 | | CORE—Powdered iron tuning core |
| RHJ-001 | | ASSEMBLY—Tuning shaft assembly and spacer |
| RIT-005 | | COVER—Electrolytic cardboard cover (inner and outer) |
| RJS-003 | | SOCKET—Tube socket |
| RLA-005 | L1, 2 | COIL—Antenna or R-F coil |
| RMB-003 | | BUSHING—Drive shaft bushing |
| RMS-034 | | SPRING—Drive cord tension spring |
| RMX-006 | | PULLEY—Drive pulley |
| RRW-003 | R14 | RESISTOR—22 ohms, 1 w., wirewound |
| RRW-008 | R11 | RESISTOR—18 ohms, 1 w., glassohm W.W. |
| RWL-009 | | CORD—Power cord |

## CLOCK REPLACEMENT PARTS LIST—MODEL No. 8H59

(Order from Telechron Inc., Ashland, Mass.)

| CAT. NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| C35X84 | | Bezel $2\frac{9}{16}''$ Rd. Gold Color |
| C58X16 | | Crystal $2\frac{9}{16}''$ Rd. |
| C61X701 | | Dial |
| C34X111 | 4 | Front Plate Assem. |
| C32X130 | | Hands (Hr. and Min.) Maroon Lacquer |
| C31X27 | | Hand (Sweep Sec.) Gold Color |
| C55X4 | | Alarm Disc |
| C59X221 | | Numeral Color Ring (Maroon) |
| C4X6 | 3 | Knob—Alarm Set—Ivory Color Plastic |
| C40X75 | 1 | Knob—Switch—Ivory Color Plastic |
| C3X49 | 14 | Knob—Time Set—Stat. Bronze Color |
| C11X8 | 15 | Alarm Set Shaft Assem. |
| C10X115 | 7 | Time Set Shaft Assem. |
| C40X73 | 19 | Switch Shaft Assem. |
| C40X260 | 20 | Switch Shaft Spacer |
| C40X261 | 6 | Time Set Shaft Spacer |
| C40X262 | 5 | Time Set Shaft Spacer (at Front Plate) |
| C40X263 | 17 | Alarm Set Shaft Spacer |
| C14X15 | 10 | Minute Hand Sleeve Assem. |
| C13X11 | 9 | Hour Hand Sleeve Assem. |
| C15X3 | 8 | Alarm Hand Sleeve Assem. |
| C40X77 | 16 | Intermediate Gear and Shaft Assem. |

| CAT. NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| C17X8 | 12 | Cam Shaft Assem. |
| C16X14 | 13 | Sweep Second Hand Shaft Assem. |
| C40X78 | 18 | Switch Lever Assem. |
| C44X38 | 24 | Rotor Unit (M1630) |
| C45X69 | 27 | Field and Coil Assem. |
| C40X202 | 25 | Spreader Post |
| C64X1 | 2 and 22 | Front Plate Screws |
| C35X39 | 21 | Base Plate Assem. |
| C40X252 | 11 | Cam Friction Washer |
| C1X1 | 26 | Motor Mtg. Screws (4-40X1 ⅛″ Rd. Hd.) |
| C1X2 | 26 | No. 1204 Lockwasher |
| C40X76 | 23 | Switch Assem. |

### PARTS OF SWITCH ASSEMBLY

| CAT. NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| C40X79 | | Upper Contact Spring Assem. |
| C40X80 | | Lower Contact Spring Assem. |
| C1X6 | | Screw (4-40X⅝″ Rd. Hd.) |
| C1X43 | | Hex Nut (4-40) |

## CLOCK INSTRUCTIONS

### 1. CONTACT ADJUSTMENT

A. Set switch to "Alarm" position so that cam follower rests on timing cam. Contacts shall be adjusted to .017″ min. gap.

B. With switch in "Off" position, contacts shall remain open as in "A" and there shall be clearance between cam follower and cam.

C. With switch in "On" position, contacts shall be closed.

D. Set switch to "Alarm" position, turn alarm set knob until cam follower drops into slot of timing cam. The contacts shall be closed.

E. Check for proper contact pressure by depressing lower contact strip, using a small pointed tool. If upper contact strip follows the lower a noticeable amount before the contacts separate, the pressure is sufficient.

F. To insure that contacts close, connect a small lamp in series with the switch assembly when testing.

### 2. TIMING

A. Set minute and hour hands to 12 o'clock.

B. Set timer dial so that the 12 o'clock mark lines up with small line on the dial. In this position the indicator on the hour hand should also line up with the line on the dial.

C. Adjust timer for contact closure at 6:55 o'clock when dial is set for alarm to operate at 7:00 o'clock. On repeat tests the contacts shall close at 6:55, plus or minus 3 minutes. At all other settings, the contacts shall close within 12 minutes ahead or 2 minutes after the time for which the dial is set.

### 3. VIBRATOR ADJUSTMENT

A. Vibrator shall start buzzing 10 minutes plus or minus 5 minutes after contact closure occurs.

B. When vibrator is in "Shut-off" position the shut-off spring shall lift the vibrator sufficiently above the cam, so that the cam will not contact vibrator in any position.

C. Adjust vibrator for maximum sound.

D. Vibrator shall be shut off before completion of buzzing period.

### 4. NOISE PREVENTION

Vistac has been applied to such parts as are specified in notes under exploded view of movement. When the parts specified are replaced, a very small amount of Vistac should be applied.

### 5. GENERAL

A. Alarm set knob to be sufficiently tight on shaft to permit setting of "Alarm" disc in clockwise or counter-clockwise direction, but shall loosen when cam is turned against vibrator.

B. Switch knob shall turn freely.

C. Alarm disc shall not rub against the dial in any position. Prongs must be fully seated in alarm set groove.

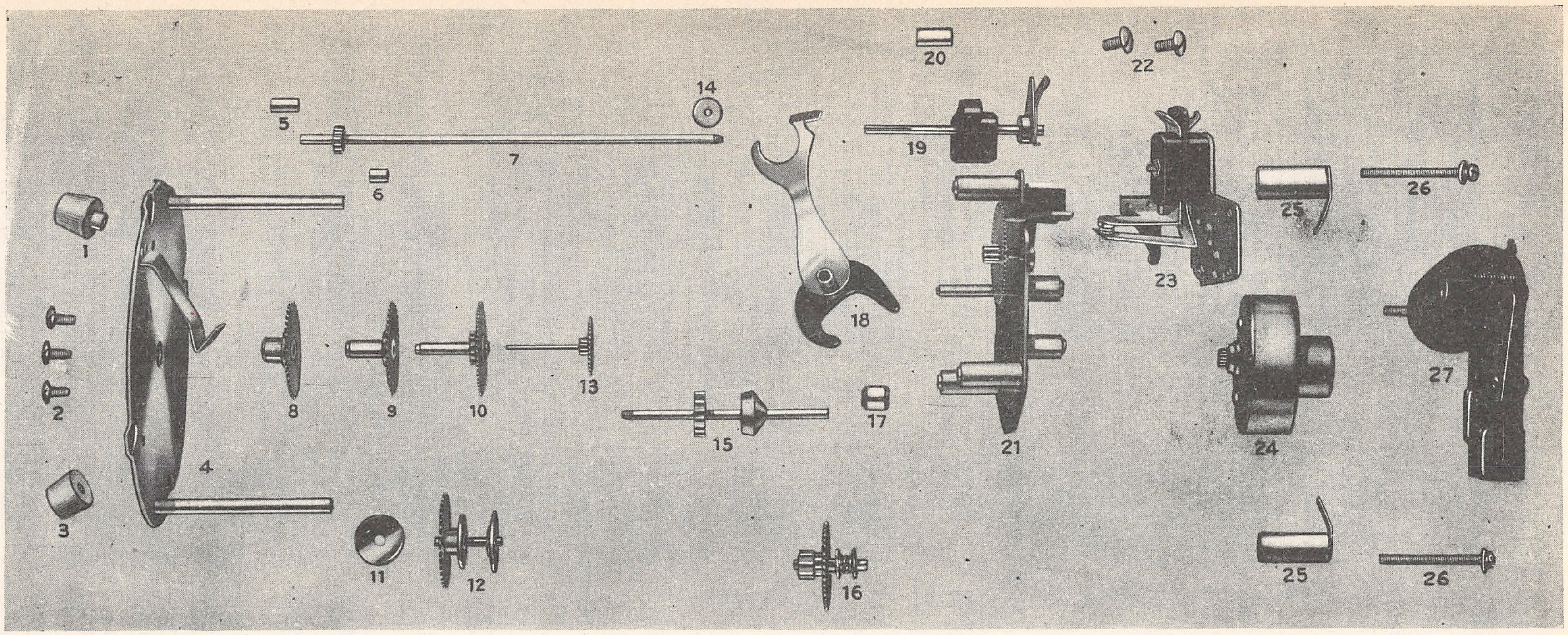
### 6. CAUTION

A. This radio alarm clock will operate satisfactorily only on a circuit supplied with regulated alternating current of the voltage and frequency stamped on name plate.

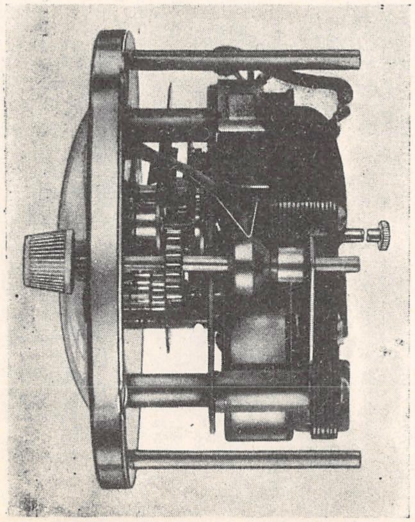
B. If clock loses time, or hour and minute hands fail to rotate, check clearance of time setting shaft from case back or any obstruction behind the Musalarm. This shaft must be allowed to rotate while clock is in operation.

C. It is common practice for people to disconnect their radios during a thunder storm, or to use the outlet for a vacuum cleaner, or when moving furniture in housecleaning. The clock will, of course, stop when disconnected and start immediately when plugged in again. However, it will be necessary to reset the clock to the proper time if disconnected for any reason.

TELECHRON, INC.



## EXPLODED VIEW OF H21 MOVEMENT



*H21 Movement Assembly*

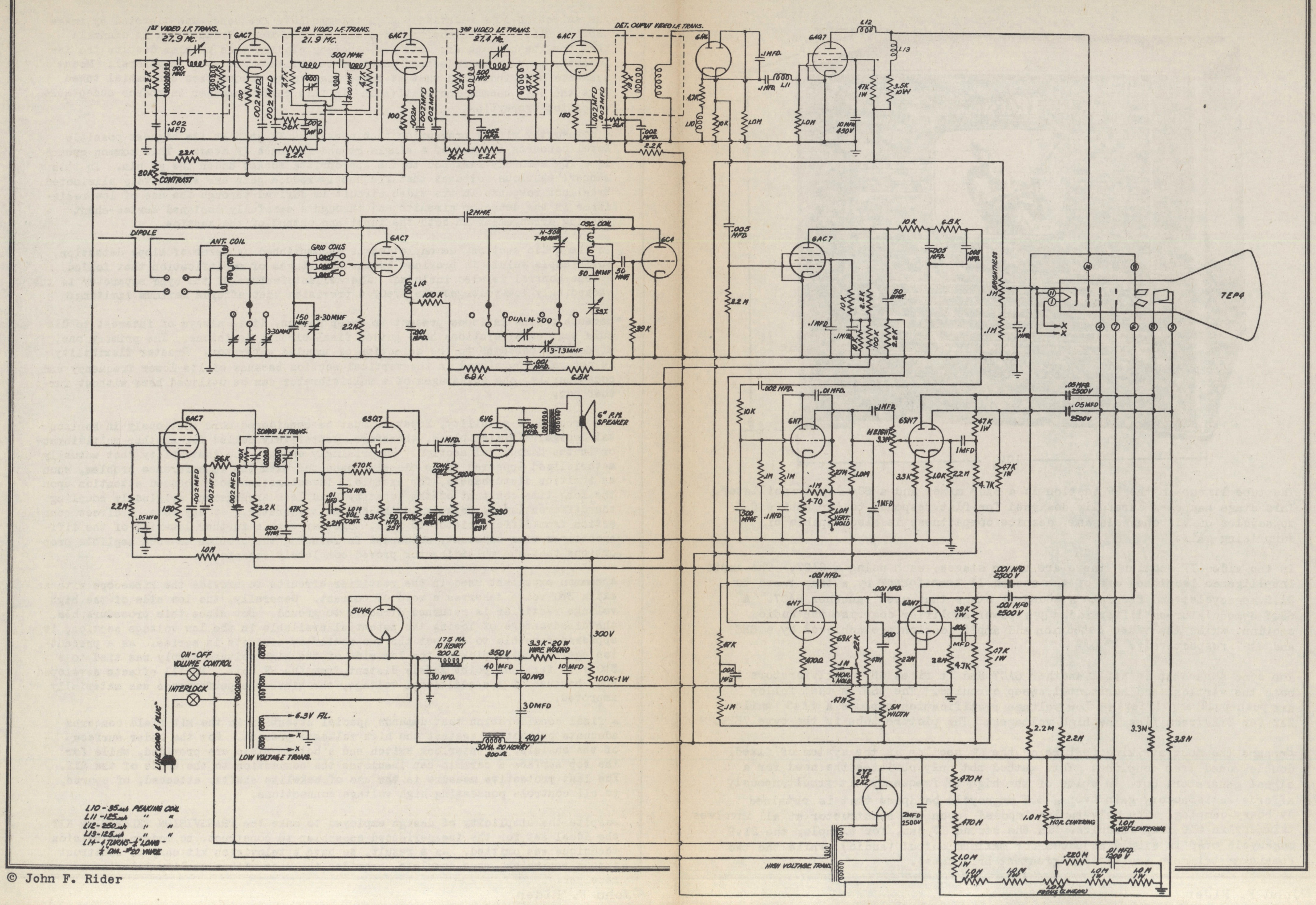
1. Switch Knob (C40X75)
2. Front Plate Screws (C64X1)
3. Alarm Set Knob (C4X6)
4. Front Plate Assem. (C34X111)
5. Time Set Shaft Spacer (C40X262)
6. Time Set Shaft Spacer (C40X261)
7. Time Set Shaft Assem. (C10X115)
8. Alarm Hand Sleeve Assem. (C15X3)
9. Hour Hand Sleeve Assem. (C13X11)
10. Minute Hand Sleeve Assem. (C14X15)
11. Cam Friction Washer (C40X252)
12. Cam Shaft Assem. (C17X8)
13. Sweep Second Shaft Assem. (C16X14)
14. Time Set Knob (C3X49)
15. Alarm Set Shaft Assem. (C11X8)
16. Intermediate Gear Shaft Assem. (C40X77)
17. Alarm Set Shaft Spacer (C40X263)
18. Switch Lever Assem. (C40X78)
19. Switch Shaft Assem. (C40X73)
20. Switch Shaft Spacer (C40X260)
21. Base Plate Assem. (C35X39)
22. Front Plate Screws (C64X1)
23. Switch Assem. (C40X76)
24. Rotor Unit M1630 (C44X38)
25. Spreader Posts (C40X202)
26. Motor Mtg. Screws (C1X1)
27. Field and Coil Assem. (C45X69)

"Vistac" has been applied to the following parts of the clock movement:

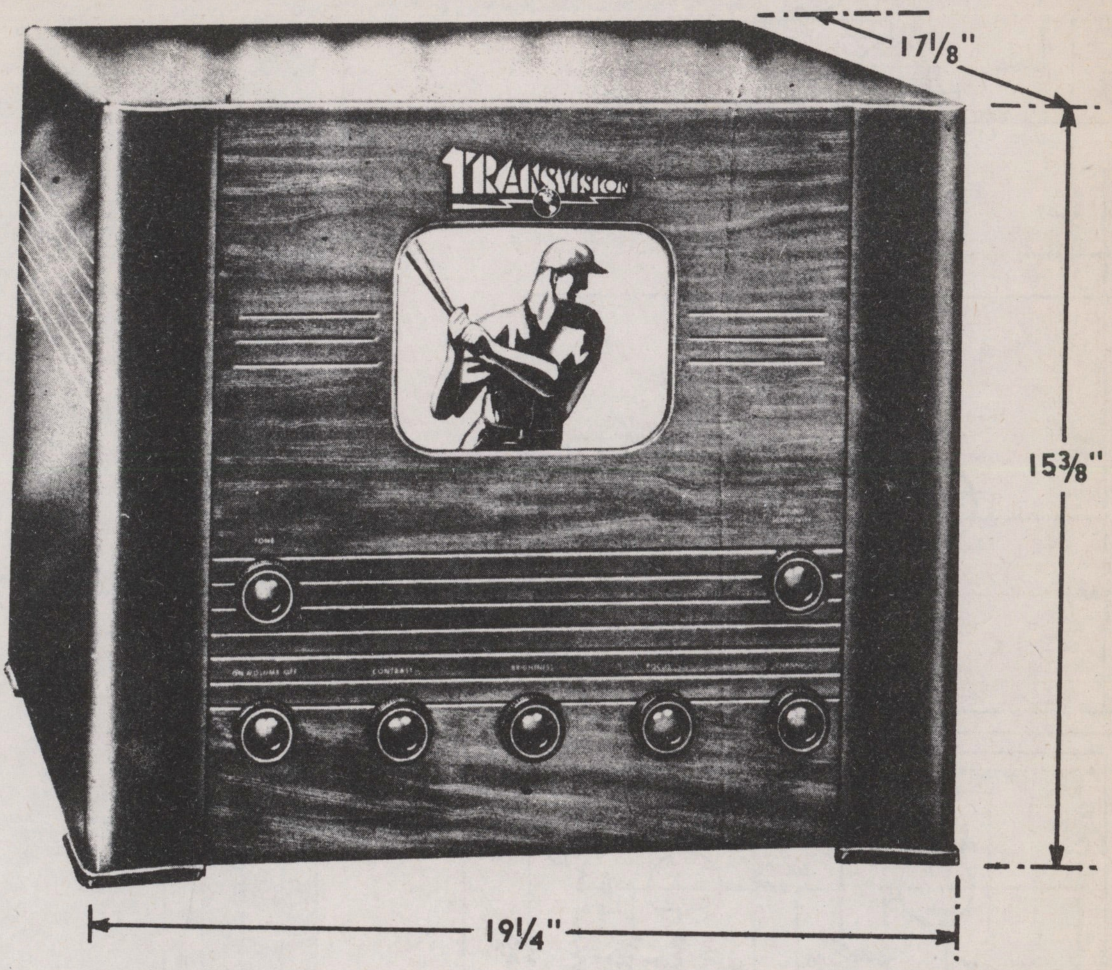
1. Time set shaft before assembling, and time set shaft spacers where they touch front plate and base plate.
2. Base plate stud where the switch lever touches it.
3. Both ends of the shaft for the intermediate gear and shaft assembly.
4. Switch lever assembly where it touches the front plate.

If it is necessary to replace any of the above parts, a very small amount of "Vistac" should be applied.

# TRANSVISION, INC.


1st VIDEO I.F. TRANS. 27.9 MC.
2nd VIDEO I.F. TRANS. 21.9 MC.
3rd VIDEO I.F. TRANS. 27.4 MC.
DET. OUPUT VIDEO I.F. TRANS.
6AC7
6H6
6AG7
20K CONTRAST
DIPOLE
ANT. COIL
GRID COILS
OSC. COIL
6C4
DUAL N-300
N-300 7-10 MMF
2 MMF
6AC7
SOUND I.F. TRANS.
6SQ7
6V6
6" P.M. SPEAKER
TONE CONT.
VOL. CONT.
BRIGHTNESS
7EP4
6H7
6SN7
HEIGHT 3.3M
VERT. HOLD
6H7
6SN7
HOR. HOLD
.5M WIDTH
5U4G
175 MA. 10 HENRY 200 Ω
30 MA. 20 HENRY 300 Ω
3.3K-20W WIRE WOUND
300V
350V
400V
100K-1W
ON-OFF VOLUME CONTROL
INTERLOCK
LINE CORD & PLUG
6.3V FIL.
LOW VOLTAGE TRANS.
2Y2 or 2X2
HIGH VOLTAGE TRANS.
HOR. CENTERING
VERT. CENTERING
FOCUS (CLARIFIER)
L10 - 35 µh PEAKING COIL
L11 - 125 µh " "
L12 - 250 µh " "
L13 - 125 µh " "
L14 - 4 TURNS - ½" LONG - ½" DIA. - #20 WIRE

# TRANSVISION, INC.



The tube lineup in the RF section is a 6AC7 mixer and a 6C4 local oscillator. This stage has been carefully designed for flat response to the entire 6.5 megacycles of all channels and, despite compactness is also capable of surprising gain.

In the video IF section there are three stages, each using a 6AC7. The Audio Intelligence is picked off of the second IF transformer by a trap tuned to 21.9 megacycles and fed into a sound IF stage that uses another 6AC7. A 6SQ7 demodulator-amplifier and a 6V6 power amplifier comprise the audio section, while the video detection and amplification are achieved by a 6H6 and 6AG7 respectively.

The sync separator is still another 6AC7 and it fires 6N7 multivibrators in both the vertical and horizontal sweep circuits. The 6SN7's that follow are push-pull amplifiers. Low voltage rectification employs a 5A4G while a 2X2 (or 2Y2) rectifies the high voltages. The picture tube is the type 7EP4.

Perhaps the most striking feature of the IF section is the system of fixed, double-tuned trap coupling. This method not only obviates the need for a signal generator, but, in spite of the high IF frequency, it simultaneously affords satisfactory gain over a 3.5 megacycle bandpass that is obtained by heavy damping. The only tuning imposed upon the constructor at all involves trimmers in the trap circuits. In the second IF can, for example, the 21.9 megacycle trap is simply adjusted for maximum output (audio), while the two remaining trimmers are set for greatest brightness.

## TRANSVISION, INC.

The selection of a relatively high intermediate frequency was dictated by image considerations. This choice fixes the various image frequencies in channels that for the present are inactive, thereby evading this problem despite the inherently poor image rejection power of television receivers in general. Measurements have indicated that at these high image frequencies convential tubes like the 6AC7 became inoperative and in this curious manner introduce acceptable rejection properties.

A noteworthy wiring precaution that preserves IF gain at its highest possible level concerns the use of a single ground for each IF stage. This common ground is a lug securely fastened to the appropriate socket under the #1 pin. In this manner, spurious voltages that frequently reduce gain are effectively eliminated. Excellent response in the video circuit is derived through the use of low resistance in the detector circuits and through a carefully designed series-shunt peaking arrangement in both the input and output of the section.

In the audio section, demodulation is accomplished by means of slope detection, while ample volume is provided by the two stages of amplification that follow. A tone control is also included. The salient feature of the sync separater is the exceedingly low voltages employed, a provision that affords maximum limiting.

Because of the latitude present in sweep design, it is always of interest to discuss what considerations have guided final circuit decisions. The primary one, of course, pertains to the selection of impulse generator. Greater flexibility is naturally permitted in the vertical section because of its lower frequency and, consequently, the advantages of a multivibrator can be utilized here without further ado.

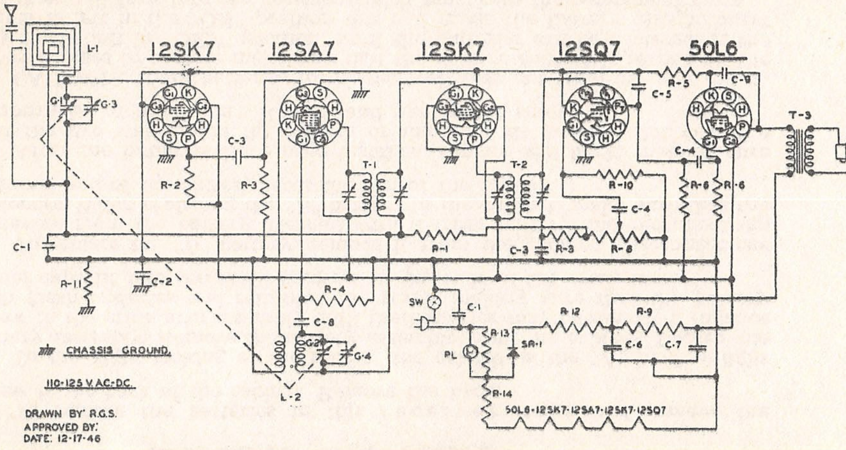
The problem of stability, however, must be considered more cautiously in horizontal design. Initial plans, therefore, tentatively called for another multivibrator in the horonzital section. Surprisingly enough, the instability that actually materialized appeared to be closely connected with the interference problem, such as ignition disturbances, for example. Investigation soon focused attention upon the long time constant of the capacity grid leak arrangement originally coupling the differentiating network to the 6N7 multivibrator. At any rate, a direct connection from differentiator to frid, together with a further lowering of the differentiator time constant, succeeded in reducing the problem to such neglible proportions that the multivibrator proved completely acceptable.

A common expedient used in the rectifier circuits to provide the kinescope with an extra 350 volts deserves a word of comment. Generally, the low side of the high voltage rectifier is returned directly to ground. But since this procedure has the disadvantage of losing the potential available in the low voltage section, it appeared sensible to connect the two rectifier circuits in series. As a precaution against noise pickup, the low side of the high voltage supply was tied to a 350 volt terminal point safely distant from the RF unit. No ill effects developed and, because of the additional voltage, the kinescope performance was materially improved.

A final consideration that demands special attention in the kit field concerns adequate protection against the high voltages present. For the under surface of the chassis, an interlock switch and a bottom plate are provided, while for the top surface a ceramic cap insulates the connection to the anode of the 2X2. The last protective measure is the use of bakelite shafts, attached, of course, to all controls possessing high voltage connections.

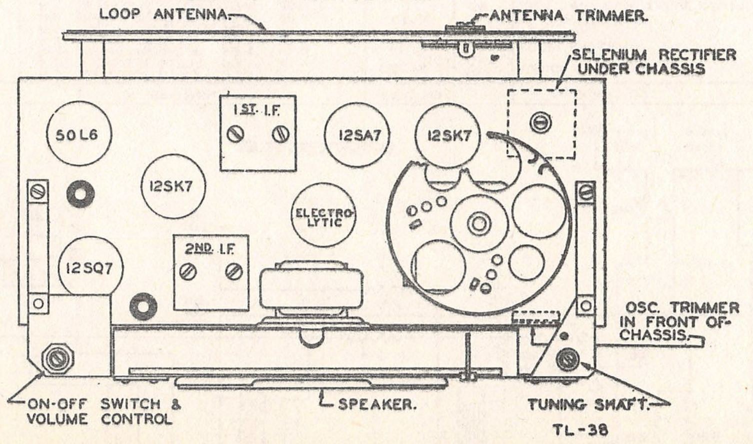
Despite the simplicity of design employed to make the TRANSVISION TELEVISION KIT the ideal set for the inexperienced assembler to construct, no modern television technique was omitted. As a result, we have a television kit easy to construct into a set which, when complete, provides the user with a quality television receiver.

# ALIGNMENT AND SERVICE DATA


C-0
L-1
G-1
G-3
12SK7
12SA7
12SK7
12SQ7
50L6
C-3
R-2
R-3
T-1
T-2
R-10
C-4
C-5
R-5
C-9
R-6
T-3
V.C.
S
C-1
R-11
C-2
R-1
C-3
R-3
R-8
R-4
C-8
G-4
L-2
SW
C-1
R-13
SR-1
PL
R-12
R-9
C-6
C-7
R-14
50L6-12SK7-12SA7-12SK7-12SQ7
CHASSIS GROUND.
110-125 V AC-DC.
DRAWN BY' R.G.S.
APPROVED BY:
DATE: 12-17-46

| PART NO. | | DESCRIPTION. | PART NO. | | DESCRIPTION. | PART NO. | | DESCRIPTION. |
|---|---|---|---|---|---|---|---|---|
| IR-23 | R-1 | 3.9 MEG. RESISTOR 1/2W. 20 | MC-5 | C-5 | .0005 MFD MICA. CONDENSER. | GC-2 | G-1<br>G-2 | GANG CONDENSER |
| IR-22 | R-2 | 3900 Ω RESISTOR. 1/2 W. 10 | EC-10 | C-6 | 40MFD } 150V. ELECTROLYTIC | | | |
| IR-10 | R-3 | 47M Ω RESISTOR. 1/2 W. 20 | | C-7 | 40MFD | | | |
| IR-9 | R-4 | 22M Ω RESISTOR 1/2 W. 20 | MC-4 | C-8 | .0005 MFD. MICA. CONDENSER | TC-7 | G-3 | ANT TRIMMER CONDENSER. |
| IR-14 | R-5 | 150 Ω RESISTOR 1/2 W. 20 | PC-7 | C-9 | .01 MFD CONDENSER 400V | TC-6 | G-4 | OSC. TRIMMER CONDENSER. |
| IR-11 | R-6 | 470M Ω RESISTOR 1/2 W. 20 | | | | | SW. | SWITCH ON VOLUME CONTROL |
| | | | LO-9 | L-2 | OSC COIL | TU-25 | | 2/12SK7-12SA7-12SQ7<br>50L6 |
| VC-4 | R-8 | 1 MEG. VOLUME CONTROL. | CO-1 | P | LINE CORD. | | | |
| IR-25 | R-9 | 2000 Ω RESISTOR. 1 W. 10 | PB-1 | PL | PILOT LITE #47 | | | |
| IR-13 | R-10 | 2 MEG Ω RESISTOR. 1/2 W. 20 | LI-1 | T1 | INPUT I.F TRANSFORMER | | | |
| IR-20 | R-11 | 220M Ω RESISTOR 1/2 W. 20 | LI-2 | T2 | OUTPUT I.F TRANSFORMER | WR-4 | R-13 | 30 Ω } 3W. 5% |
| IR-35 | R-12 | 75 Ω RESISTOR 2 W. 10 | LL-1 | L1 | LOOP ANTENNA | | R-14 | 90 Ω |
| PC-5 | C-1 | .05 MFD. CONDENSER. 400 V. | SPK-5 | T3 | SPK TRANSFORMER | SR-1 | SR-1 | SELENIUM RECTIFIER |
| PC-8 | C-2 | .1 MFD. CONDENSER. 400 V | | VC | VOICE COIL | | | |
| MC-2 | C-3 | .0001 MFD. MICA. CONDENSER. | | S | PM SPEAKER | | | |
| PC-10 | C-4 | .005 MFD. CONDENSER. 400 V | | | | | | |

TUBE AND TRIMMER LOCATION.


LOOP ANTENNA.
ANTENNA TRIMMER.
SELENIUM RECTIFIER UNDER CHASSIS
50L6
1ST. I.F.
12SA7
12SK7
12SK7
ELECTROLYTIC
2ND. I.F.
12SQ7
OSC. TRIMMER IN FRONT OF CHASSIS.
ON-OFF SWITCH & VOLUME CONTROL
SPEAKER.
TUNING SHAFT.
TL-38

POWER SOURCES: This receiver may be operated on alternating current (AC) of 110 to 125 volts at 60 cycles or on direct current (DC) of 110 to 125 volts. When used on DC, if the tubes light up but set does not play, reverse the cord plug in the power outlet.

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

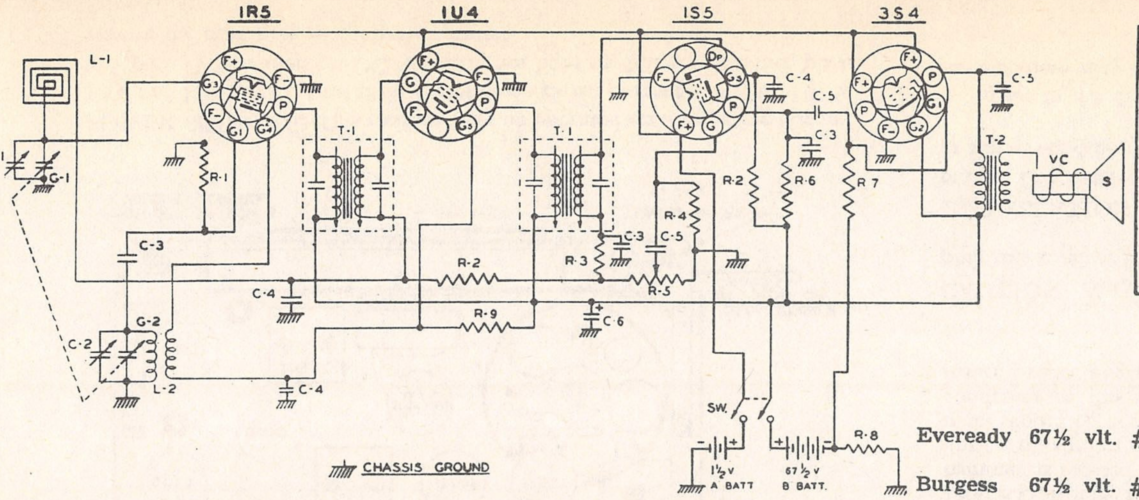
SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the back of the loop antenna. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

CAUTION: Always predetermine voltage of power source. Never try to plug this receiver into a 220 volt line, as this will cause serious damage.

INSTALLATION: Unwind the power cord and plug into a convenient outlet. This receiver is equipped with a sensitive loop antenna and under ordinary conditions no external antenna would be required.

Due to the directional qualities of the loop antenna the reception of some stations may be improved by placing the receiver in different positions.



| PART NO | | DESCRIPTION | PART NO | | DESCRIPTION |
|---|---|---|---|---|---|
| IR-20 | R-1 | 220M-Ω RESISTOR 1/2W 20 % | GC-4 | G-1 | GANG CONDENSER |
| IR-23 | R 2 | 3.3MEG. RESISTOR 1/2W 20 % | | G-2 | |
| IR-31 | R-3 | 82M-Ω RESISTOR 1/2W 10 % | LL-8 | L-1 | LOOP ANTENNA |
| IR-3 | R-4 | 10MEG RESISTOR 1/2W 20 % | LO-12 | L-2 | OSC COIL |
| VC-8 | R-5 | 1MEG VOLUME CONTROL | L1-5 | T-1 | I F TRANSFORMER |
| IR-12 | R-6 | 1MEG RESISTOR 1/2W 20 % | | SW | DPST. SWITCH ON VOLUME CONTROL |
| IR-13 | R-7 | 2.2MEG RESISTOR 1/2W. 20 % | | | |
| IR-5 | R-8 | 220 Ω RESISTOR 1/2W 10 % | SPK-8 | T-2 | SPEAKER TRANSFORMER |
| IR-37 | R-9 | 10M Ω RESISTOR 1/2W 20 % | | VC | VOICE COIL |
| | | | | S | PM SPEAKER |
| TC-7 | C-1 | ANT. TRIMMER | | | |
| | C-2 | OSC TRIMMER ON GANG | TU-29 | | IR5 · 1U4 · 1S5 · 3S4 |
| MC-2 | C-3 | 100MMFD MICA CONDENSER | | | |
| PC-7 | C-4 | .01 MFD 400 V. | | | |
| PC-6 | C-5 | .005MFD 600 V. | | | |
| EC-7 | C-6 | 20MFD. 80WV. | | | |

## BATTERY SERVICING

To replace the batteries in this receiver loosen and remove the screw in the back of the cabinet. Remove the back.

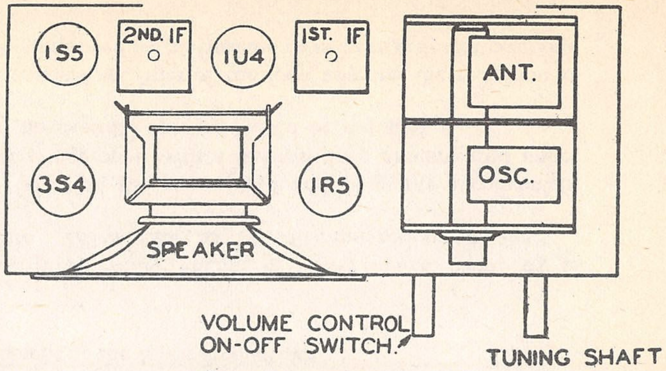
To the right looking at the rear of the cabinet is the "A" or flashlight battery assembly. Remove the battery assembly from the cabinet. Loosen the screw in the cross arm assembly until the batteries may be removed. Replace with fresh batteries and retighten the screw making sure that the battery center caps fit into the small recesses in the ends of the cross arm.

To replace the "B" battery, remove it from the cabinet. Disconnect the fasteners from the battery. Replace with a fresh battery and reconnect the fasteners. When replacing the "B" battery in the cabinet, make sure that the terminal end of the battery faces the end of the cabinet.

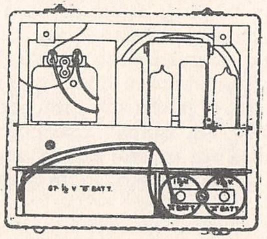
After the batteries have been installed, replace the back, making sure that the two washers in the bottom of the back fit into the slot near the bottom edge of the cabinet. Replace and tighten the screw.

**CAUTION:** If the batteries in the receiver wear out from use and the receiver refuses to operate make sure that the volume control is turned all the way to the left in "OFF" position, until the batteries can be replaced. If the switch is left in the "ON" position this will cause the battery cells to burst and they will leak into the receiver which may ruin the component parts.

TUBE AND TRIMMER LOCATION.



| | | | |
|---|---|---|---|
| Eveready | 67½ | vlt. | #467 |
| Burgess | 67½ | vlt. | #XX45 |
| General | 67½ | vlt. | #W45A |
| Ray-O-Vac | 67½ | vlt. | #4367 |



## ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment. A signal generator is required having the following frequencies: 455 KC and 1400 KC. An output meter should be connected across the speaker.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD. condenser. The ground lead from the generator may be connected to any spot on the metal chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable iron cores in the IF cans. These IF adjustments are made in the top and in the bottom of the can under the chassis. Adjust the cores until a maximum reading is noted on the output meter.

The volume control of the receiver should be turned to maximum during the IF and all subsequent alignment and the generator output as low as possible to prevent the AVC from working and giving false readings.

SECOND STEP: With the leads from the generator still connected as in IF alignment, adjust the generator to 1400 KC. Set the dial pointer to 1400 KC on the dial scale. Adjust the oscillator trimmer until the signal is tuned in.

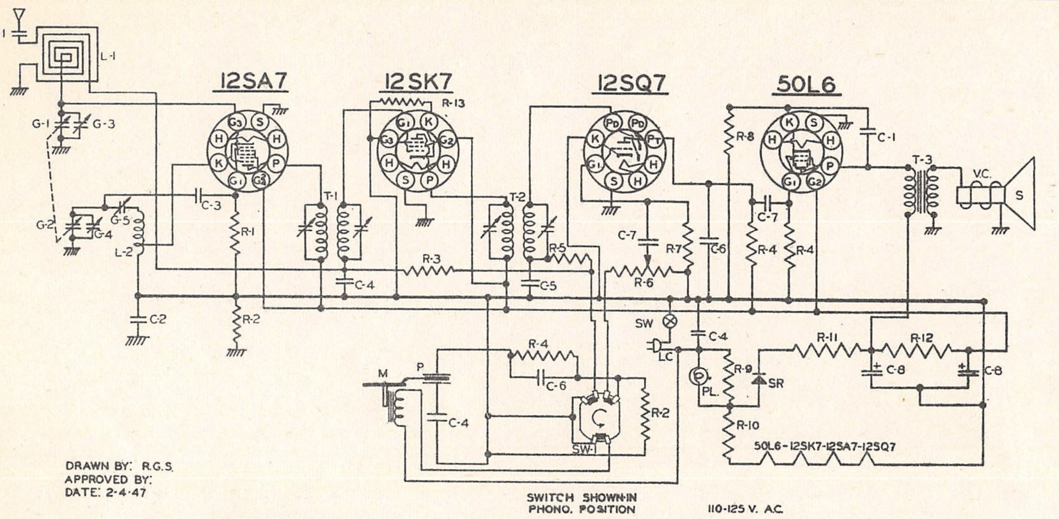
THIRD STEP: Remove the generator leads from the gang condenser.

Replace the chassis in the cabinet. Loosely couple the generator to the receiver loop by making a complete turn over the outside of the cabinet. With the receiver and the generator still set at 1400 KC increase the generator output. Adjust the Antenna trimmer through the back of the chassis until a maximum signal is noted on the output meter.

No further adjustment should be necessary as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

NOTE: When the antenna trimmer is adjusted at 1400 KC., the chassis as well as the "A" and "B" batteries must be in normal position in the cabinet to reflect the proper loop impedance.

# TRAV-LER RADIO & TELEV.


12SA7
12SK7
12SQ7
50L6
C-1
L-1
G-1
G-3
G-2
G-4
G-5
L-2
C-3
R-1
C-2
R-2
T-1
C-4
R-3
R-13
T-2
C-5
R-5
C-7
R-7
R-6
C-6
R-8
R-4
C-1
T-3
VC
S
SW
LC
PL
R-9
SR
R-10
R-11
R-12
C-8
M
P
R-4
C-6
C-4
SW-1
R-2
50L6-12SK7-12SA7-12SQ7

SWITCH SHOWN IN PHONO. POSITION

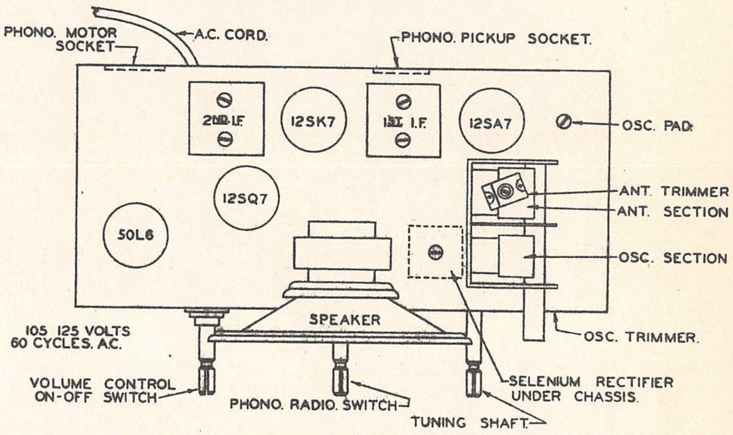
110-125 V. A.C.

DRAWN BY: R.G.S.
APPROVED BY:
DATE: 2-4-47

CHASSIS GROUND

| PART NO. | | DESCRIPTION | PART NO. | | DESCRIPTION | PART NO | | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| PC-7 | C-1 | .01MFD. CONDENSER 400V. | IR-13 | R-7 | 2MEG.Ω RESISTOR 1/2W. 20% | LI-1 | T-1 | INPUT IF TRANSFORMER |
| PC-8 | C-2 | .1MFD. CONDENSER 400V. | IR-14 | R-8 | 150 Ω RESISTOR 1/2W. 20% | LI-2 | T-2 | OUTPUT IF TRANSFORMER |
| MC-4 | C-3 | 50MMFD. MICA. COND. 500V. | WR-5 | R-9 | 30Ω WIREWOUND RESISTOR 5W.5% | | | |
| PC-5 | C-4 | .05MFD. CONDENSER 400V. | | R-10 | 165Ω | SPK-5 | T-3 | OUTPUT TRANSFORMER |
| MC-2 | C-5 | 100MMFD. MICA. COND. 500V. | IR-35 | R-11 | 82 Ω RESISTOR 2W 10% | | VC | VOICE COIL |
| MC-5 | C-6 | 500MMFD. MICA. COND. 500V. | IR-25 | R-12 | 2200Ω RESISTOR 1W. 10% | | S | SPEAKER |
| PC-10 | C-7 | .005MFD. CONDENSER 400V. | IR-1 | R-13 | 470 Ω RESISTOR. 1/2W. 20% | SR-1 | SR | SELENIUM RECTIFIER |
| EC-10 | C-8 | 40MFD 150V. ELECTROLYTIC. | | | | M-1 | M | 110V. 60 CYCLES MOTOR |
| | C-8 | 40MFD | | | | L-75 | P | CRYSTAL PICKUP |
| | | | GC-1 | G-1 | GANG CONDENSER | SW-1 | SW-1 | RADIO-PHONO. SWITCH |
| | | | | G-2 | | | SW | A.C. SWITCH ON VOLUME CONTROL |
| IR-9 | R-1 | 22000Ω RESISTOR 1/2W. 20% | TC-7 | G-3 | ANT. TRIMMER | PB-1 | PL | #47 PILOT BULB |
| IR-20 | R-2 | 220M Ω RESISTOR 1/2W. 20% | TC-6 | G-4 | OSC. TRIMMER | CO-1 | LC | LINE CORD. |
| IR-23 | R-3 | 3.9MEG.Ω RESISTOR 1/2W. 20% | TC-9 | G-5 | 600 K.C. TRIMMER | | | |
| IR-11 | R-4 | 470M Ω RESISTOR 1/2W. 20% | | | | TU-26 | — | 50L6-12SQ7-12SA7-12SK7 |
| IR-10 | R-5 | 47M Ω RESISTOR 1/2W. 20% | LL-7 | L-1 | LOOP | | | |
| VC-4 | R-6 | 1MEG. VOLUME CONTROL. | LO-7 | L-2 | OSC COIL. | | | |

TUBE AND TRIMMER LOCATION.
MODEL-5030-31


PHONO. MOTOR SOCKET
A.C. CORD.
PHONO. PICKUP SOCKET.
2ND I.F.
12SK7
1ST I.F.
12SA7
OSC. PAD.
12SQ7
50L6
ANT. TRIMMER
ANT. SECTION
OSC. SECTION
SPEAKER
OSC. TRIMMER.
105 125 VOLTS 60 CYCLES. A.C.
VOLUME CONTROL ON-OFF SWITCH
PHONO. RADIO. SWITCH
SELENIUM RECTIFIER UNDER CHASSIS.
TUNING SHAFT

## ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the top of the ANT. section of the gang condenser. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

POWER SOURCES: This combination will operate on an alternating (AC) current only, of 110 to 125 volts at 60 cycles.

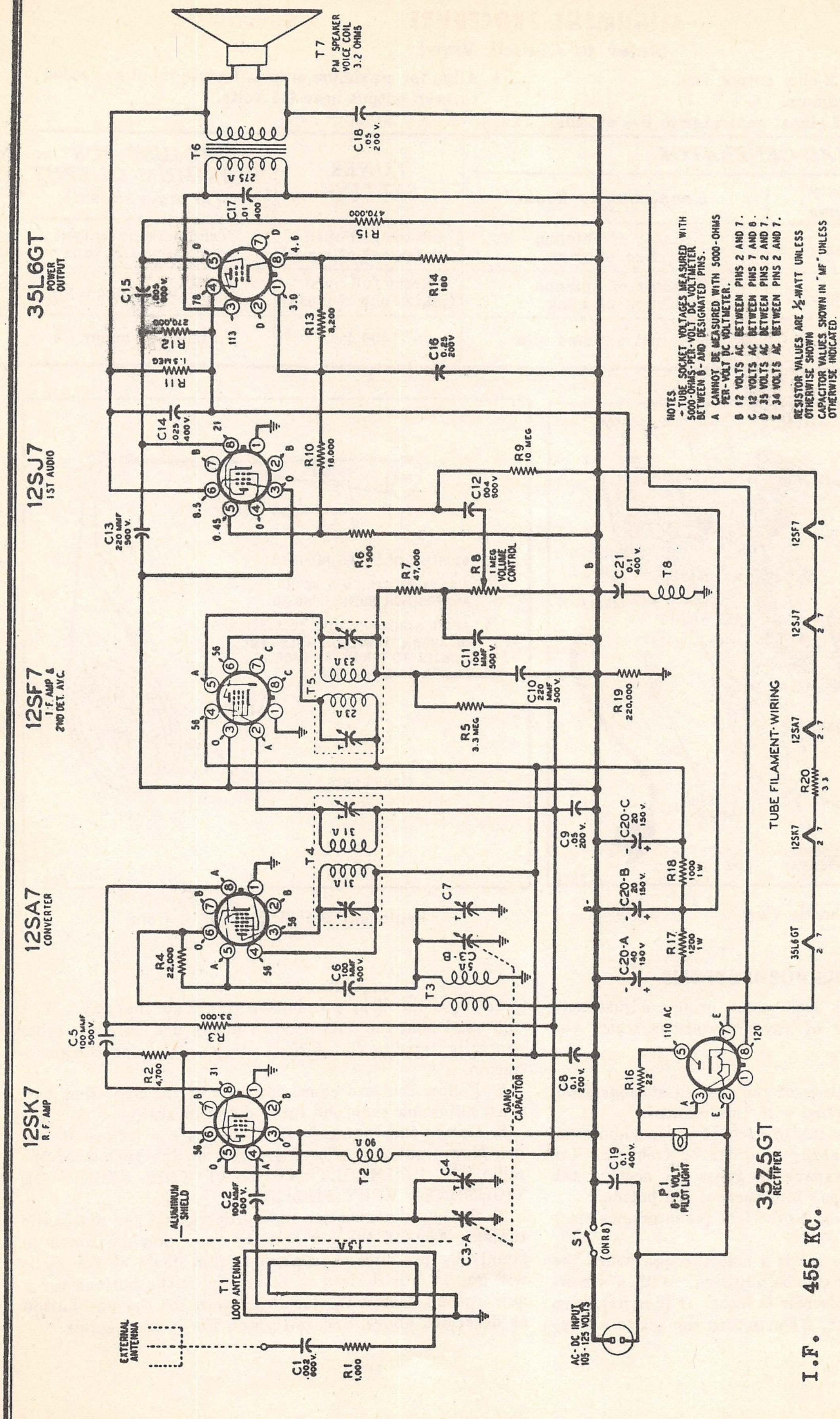
CAUTION: Always predetermine voltage of power source. Never try to plug this combination into a 220 volt line, as this will cause serious damage.

Never try to operate this combination on 50 cycle current, as this will cause the motor to rotate at an incorrect speed. The normal speed is 78 R.P.M., (revolutions per minute) and to insure proper reproduction of recordings 60 cycle current must be used.

Never plug this combination into a direct current (DC) source as this will seriously damage the motor which has been designed for AC operation only.

**MODEL D2616**

## WESTERN AUTO SUPPLY CO.


12SK7
R.F. AMP
12SA7
CONVERTER
12SF7
I.F. AMP & 2ND DET. AVC.
12SJ7
1ST AUDIO
35L6GT
POWER OUTPUT
35Z5GT
RECTIFIER
T7
PM SPEAKER VOICE COIL 3.2 OHMS
T6
275 Ω
C18 .05 200 V.
C17 .01 400
R15 470,000
C15 .005 600 V.
R12 270,000
R11 1.5 MEG
R14 180
R13 8,200
C16 0.25 200V
C14 .025 400 V.
R10 18,000
R9 10 MEG
C12 .004 600V
C13 220 MMF 500 V.
R6 1500
R7 47,000
R8 1 MEG VOLUME CONTROL
C21 0.1 400 V.
T8
C11 100 MMF 500 V.
T5
23 Ω
C10 220 MMF 500 V.
R5 3.3 MEG
R19 220,000
T4
31 Ω
C9 .05 200 V.
C20-C 20 150 V.
C20-B 20 150 V.
C20-A 40 150 V
R18 1000 1W
R17 1200 1W
C7
C3-B
T3
C6 MMF 500 V
R4 22,000
C5 100 MMF 500 V
R3 33,000
R2 4,700
C8 0.1 200 V.
GANG CAPACITOR
T2
90 Ω
C4
C3-A
C2 100 MMF 500 V.
ALUMINUM SHIELD
T1
LOOP ANTENNA
1.5 Ω
EXTERNAL ANTENNA
C1 .002 600 V.
R1 1,000
S1
(ON R8)
AC-DC INPUT 105-125 VOLTS
C19 0.1 400 V.
P1
6-8 VOLT PILOT LIGHT
R16 22
110 AC
120
TUBE FILAMENT-WIRING
35L6GT
12SK7
R20 33
12SA7
12SJ7
12SF7
B-
B

NOTES
- TUBE SOCKET VOLTAGES MEASURED WITH 5000-OHMS-PER-VOLT DC VOLTMETER BETWEEN B- AND DESIGNATED PINS.

A CANNOT BE MEASURED WITH 5000-OHMS PER-VOLT DC VOLTMETER.
B 12 VOLTS AC BETWEEN PINS 2 AND 7.
C 12 VOLTS AC BETWEEN PINS 7 AND 8.
D 35 VOLTS AC BETWEEN PINS 2 AND 7.
E 34 VOLTS AC BETWEEN PINS 2 AND 7.

RESISTOR VALUES ARE ½-WATT UNLESS OTHERWISE SHOWN

CAPACITOR VALUES SHOWN IN "MF" UNLESS OTHERWISE INDICATED.

I.F. 455 KC.

## Technical Data

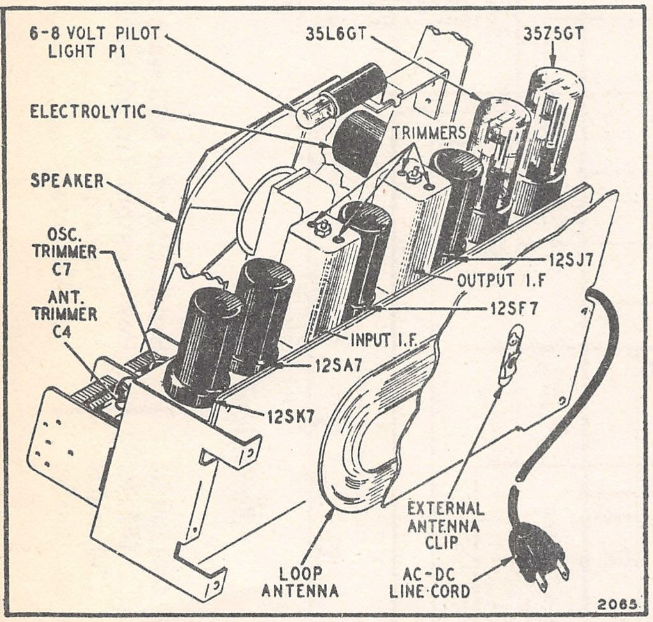
| | |
|---|---|
| Tuning range | 530 to 1600 kc |
| Intermediate frequency | 455 kc |
| Power consumption | 30 watts |
| Selectivity | 65 kc broad at 1000 x signal at 1000 kc |
| Sensitivity (for 0.05 watt output) | 14 microvolts average |
| Power output (in voice coil) | |
| Undistorted | 0.84 watts |
| Maximum | 1.5 watts |

## ALIGNMENT PROCEDURE

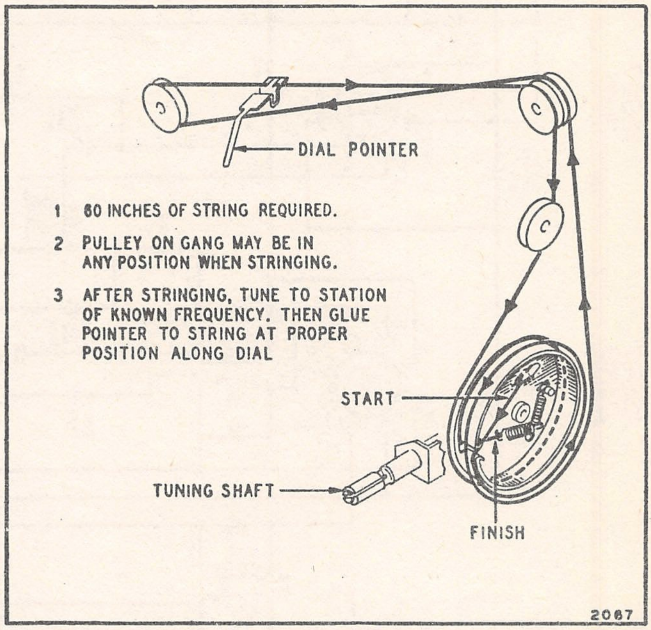
(Refer to Chassis View)

- Output meter across 3.2-ohm output load.
- Volume control at maximum.
- Connect ground post of signal generator to B— of radio.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

| *SIGNAL GENERATOR* | | | *TUNER SETTING* | *ADJUST FOR MAXIMUM OUTPUT (in order shown)* |
|---|---|---|---|---|
| *Frequency* | *Dummy Antenna* | *Connection to Radio* | | |
| 455 kc | 0.1 mf | Stator of antenna section of gang | Rotor full open (plates out of mesh) | Trimmers on output and input I.F. cans |
| 1600 kc | 0.1 mf | Stator of antenna section of gang | Rotor full open (plates out of mesh) | Oscillator trimmer C7 |
| 1400 kc | 200 mmf | External antenna clip | 1400 kc | Antenna trimmer C4 |


6-8 VOLT PILOT LIGHT P1
35L6GT
35Z5GT
ELECTROLYTIC
TRIMMERS
SPEAKER
OSC. TRIMMER C7
ANT. TRIMMER C4
12SJ7
OUTPUT I.F
12SF7
INPUT I.F.
12SA7
12SK7
EXTERNAL ANTENNA CLIP
LOOP ANTENNA
AC-DC LINE CORD
2065

Chassis View


DIAL POINTER
1 60 INCHES OF STRING REQUIRED.
2 PULLEY ON GANG MAY BE IN ANY POSITION WHEN STRINGING.
3 AFTER STRINGING, TUNE TO STATION OF KNOWN FREQUENCY. THEN GLUE POINTER TO STRING AT PROPER POSITION ALONG DIAL
START
TUNING SHAFT
FINISH
2067

Replacing Dial Pointer Drive Cord

### SETTING THE PUSHBUTTONS

The pushbuttons may be used, after proper adjustment, for the automatic tuning of any six stations which you select.

1. Turn on the radio.
2. Push out the call letters of the desired stations from the call-letter sheets supplied with this manual.
3. Insert one call letter tab in each of the pushbuttons, preferably but not necessarily in order of frequency (as obtained from your newspaper). Press an acetate tab (supplied in small envelope) into each of the buttons.
4. Rotate the tuning knob to the left (counterclockwise) as far as it will go.
5. On the bottom of the set is a hole through which the pushbutton locking screw can be adjusted. With a screwdriver, check to see if the screw is loose. If it is not, turn it several turns to the left. Then return the set to an upright position.
6. Press the first pushbutton down all the way. With one hand hold the button down firmly and with the other carefully tune in the desired station. Release the pushbutton.
7. Follow this procedure for each of the five other buttons, adjusting each one for a different station.
8. Rotate the tuning knob as far to the left as it will go. Now tighten the locking screw on the bottom of the radio. IT IS IMPORTANT THAT THIS SCREW BE TIGHTENED VERY FIRMLY.
9. The pushbuttons are now properly set for automatic tuning. Any of the six stations may now be tuned in simply by pressing the proper button down as far as it will go. If it is desired to reset any of the buttons for a new station, loosen the locking screw, set the pushbutton as described above, and re-tighten the locking screw.

## MODEL D 2616 WESTERN AUTO SUPPLY CO.

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| | | **CAPACITORS*** |
| C1 | C-8D-10778 | .002 mf. 600 volts, +40% —15% |
| C2,C5<br>C6,C11 | C-8F3-8 | 100 mmf, 500 volts, 20%, mica |
| C-3A,B<br>C4,C7 | B-8A-10827 | Two-gang condenser assembly, including antenna and oscillator trimmers. Range of gang: 15-452 mmf (ant.), 10-162 mmf (osc.). |
| C8 | C-8D-10771 | .1 mf, 200 volts, +20% —10% |
| C9,C18 | C-8D-10770 | .05 mf, 200 volts, 20% |
| C10,C13 | C-8F3-10 | 220 mmf, 500 volts, 20%, mica |
| C12 | C-8D-10788 | .004 mf, 600 volts, 20% |
| C14 | C-8D-10997 | .025 mf, 400 volts, 10% |
| C15 | C-8D-10935 | .005 mf, 600 volts, +40% —15% |
| C16 | C-8D-10775 | .25 mf, 200 volts, +20% —10% |
| C17 | C-8D-10761 | .01 mf, 400 volts, 20% |
| C19,C21 | C-8D-10760 | .1 mf, 400 volts, +20% —10% |
| C20-A,B,C | A-8C-10077 | Electrolytic, for 60-cycles; 40 mf x 150 volts, 20 mf x 150 volts, 20 mf x 150 volts |
| C20-A,B,C | A-8C-10946 | Electrolytic, for 25 cycles; 60 mf x 150 volts, 40 mf x 150 volts, 40 mf x 150 volts |
| | | **RESISTORS*** |
| R1 | C-9B1-62 | 1000 ohms, ½ watt, 10% |
| R2 | C-9B1-70 | 4700 ohms, ½ watt, 10% |
| R3 | C-9B1-80 | 33,000 ohms, ½ watt, 10% |
| R4 | C-9B1-78 | 22,000 ohms, ½ watt, 10% |
| R5 | C-9B1-34 | 3.3 megohms, ½ watt, 20% |
| R6 | C-9B1-64 | 1500 ohms, ½ watt, 10% |
| R7 | C-9B1-82 | 47,000 ohms, ½ watt, 10% |
| R8,S1 | A-10A-10642 | Volume control (1 megohm) and on-off switch |
| R9 | C-9B1-37 | 10 megohms, ½ watt, 20% |
| R10 | C-9B1-77 | 18,000 ohms, ½ watt, 10% |
| R11 | C-9B1-32 | 1.5 megohms, ½ wat, 20% |
| R12 | C-9B1-91 | 270,000 ohms, ½ watt, 10% |
| R13 | C-9B1-73 | 8200 ohms, ½ watt, 10% |
| R14 | C-9B1-53 | 180 ohms, ½ watt, 10% |
| R15 | C-9B1-94 | 470,000 ohms, ½ watt, 10% |
| R16 | C-9B1-3 | 22 ohms, ½ watt, 20% |
| R17 | C-9B2-63 | 1200 ohms, 1 watt, 10% |
| R18 | C-9B2-62 | 1000 ohms, 1 watt, 10% |
| R19 | C-9B1-90 | 220,000 ohms, ½ watt, 10% |
| R20 | C-9B2-44 | 33 ohms, 1 watt, 10% |
| | | **COILS AND TRANSFORMERS** |
| T1 | C-201-10908 | Loop antenna assembly (includes cabinet back, capacitor C1 and resistor R1) |
| T2 | A-16A-12161 | R.F. choke coil |
| T3 | A-13D-10661 | Oscillator coil |
| T4 | B-13B-10091-1 | Input I.F. transformer complete in can. Range of trimmers: 45-85 mmf each. |
| T5 | B-13B-10794 | Output I.F. transformer complete in can. Range of trimmers: 43-79 mmf each. |
| T6 | B-12C-10623 | Output transformer for speaker |
| T8 | A-16A-10792 | I.F. choke coil |

### NOTE ON TUBE REPLACEMENT

**Replace a defective metal 12SK7 tube with another metal tube. Replace a glass 12SK7 tube with a metal tube or with an exact duplicate of the tube now in the set.**

| *Ref. No.* | *Part No.* | *Description* |
|---|---|---|
| | | **DIAL AND TUNING PARTS** |
| | B-6D-10650 | Dial scale |
| | A-6A-10609 | Diffuser |
| | B-2M-7758 | Snap-in rivet, for diffuser (2 used) |
| | A-2G-10639 | Dial pointer |
| | B-53A-10989 | String for dial pointer (60") |
| | A-49A-10887 | Spring for dial pointer string |
| | A-55A-10093 | Socket assembly, for dial light |
| P1 | A-46A-10793 | Dial light bulb, 6-8 volts, T-47 |
| | A-3C-10641 | Spacer, brass (on extreme left) |
| | A-3C-10640 | Spacer, brass (5 used) |
| | A-2C-10658 | Cam |
| | A-2C-10611 | Washer, D-D, on sides of cams |
| | 29E-1812 | Spring washer, on cam shaft |
| | A-3F-10656 | Locking screw for cams |
| | A-2C-10654 | Retainer yoke |
| | A-2C-10655 | Cam yoke |
| | A-2L-10610 | Stop arm |
| | 200-10653 | Lever assembly (arm and roller) |
| | A-2C-10607 | Gear segment |
| | A-3B-10643 | Gear bushing |
| | A-3C-10636 | Coupling pin on gear segment |
| | A-49A-10646 | Drum spring, on gear coupling pin |
| | A-3A-10651 | Tuning shaft |
| | A-3L-7192 | Pinion gear on tuning shaft |
| | A-49A-10628 | Lever spring |
| | | **MISCELLANEOUS** |
| T7 | B-18A-10647 | P.M., 6" x 4" oval |
| | A-15B-10440 | Socket, octal (for all tubes but 12SK7) |
| | A-15C-11201 | Socket, octal, laminated (for 12SK7) |
| | B-15B-10076 | Mounting plate, for electrolytic |
| | B-14M-10088 | Line cord and plug |
| | B-2M-11205 | Snap-in rivets, for mounting back (5 used) |
| | A-2M-10096 | Split tee-pins, for mounting back (2 used) |
| | 5C-10010-9 | Cabinet |
| | B-5B-10016-8 | Knob, volume and tuning |
| | B-5A-10648-8 | Pushbutton |
| | A-25B-10736 | Rubber feet for cabinet |
| | A-23L-10934 | Station call letters, one set |
| | A-6C-10819 | Acetate tabs, for pushbuttons |
| | A-2H-10715 | Tube shield (used with metal-base 12SA7GT tube) |
| | A-2H-11271 | Tube shield (used with bakelite-base 12SA7GT tube) |

*The values of the resistors and mica capacitors listed above are based on RMA standards. Due to conditions beyond our control some receivers have been shipped with components of pre-standardized values. This receiver will operate equally well with components of either group. An illustration of the differences in both resistors and capacitors follows:

Pre-standardized value—50,000 ohms, 1/3 watt, 10%
RMA value—47,000 ohms, 1/2 watt, 10%
Pre-standardized value—200 mmf, 500 volts, 20%
RMA value—220 mmf, 500 volts, 20%

---

NOTICE: There is a power rating label on the cabinet. This label specifies the power supply on which the radio may be used, and identifies it as to stock number and model. When ordering parts or writing, give ALL information appearing on label.

| | |
|---|---|
| H-244A | Speaker 5" PM |
| S-608A | Tube Socket Octal (8 prong) |
| E-164A | Knob-tuning and volume |
| A-2131 | Line Cord and plug |

### COILS

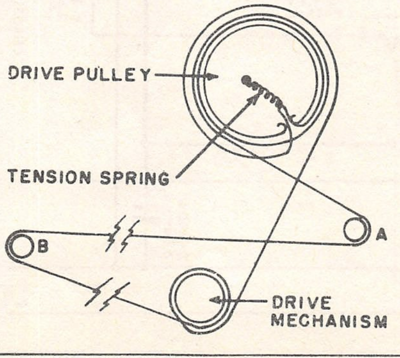
| | | |
|---|---|---|
| A-2154B | Antenna & Back Cover Assembly | |
| T-1361A | 1st I.F. Transformer | 456 KC |
| T-1362A | 2nd I.F. Transformer | 456 KC |
| T-1365A | R. F. Choke Coil | 1.4 MH |
| T-1368A | Audio Transformer | |
| T-1372A | R.F. Choke Coil | 3.0 MH |

### CAPICATORS

| | | |
|---|---|---|
| C-471A | 0.1 mfd, 400 V | Tubular |
| C-493A | 1000 mmf, 350 V | Ceramic |
| C-494A | 250 mmf, 350 V | Ceramic |
| C-495A | 50 mmf, 500 V | Ceramic |
| C-480A | 0.005 mfd, 400 V | Tubular |
| C-466A | 40-40 mfd, 150 V | Electrolytic |
| C-483A | 10-160 mmf | Trimmer |
| C-496A | 0.02 mfd, 200 V | Tubular |
| C-460A | 0.1 mfd, 200 V | Tubular |
| C-497A | 0.2 mfd, 400 V | Tubular |
| C-500A | 0.01 mfd, 400 V | Molded |

## MODEL D2619

| | | | |
|---|---|---|---|
| W-43A | 50 ohm, | 10 Watt | Wire wound |
| W-415A | 150 ohm, | 0.5 Watt | Carbon |
| W-452A | 4700 ohm, | 0.5 Watt | Carbon |
| W-433A | 1000 ohm, | 1.0 Watt | Carbon |
| W-437A | 22,000 ohm, | 0.25 Watt | Carbon |
| W-438A | 47,000 ohm, | 0.25 Watt | Carbon |
| W-439A | 100,000 ohm, | 0.25 Watt | Carbon |
| W-440A | 220,000 ohm, | 0.25 Watt | Carbon |
| W-441A | 470 ohm, | 0.25 Watt | Carbon |
| W-442A | 2.2 megohm, | 0.25 Watt | Carbon |
| W-443A | 10 megohm, | 0.25 Watt | Carbon |
| W-444A | Switch & Pot,500,000 ohm, | | Carbor |



### TUNER & DRIVE PARTS

| | |
|---|---|
| A-2143E | Tuner Assembly |
| L-2450A | Pulley-Drive |
| L-2451A | Pulley-Idler |
| U-1442A | Shoulder Rivet |
| H-247B | Glass Dial |
| H-246A | Translucent Screen |
| U-1445A | Snaps for Screen |
| U-1461A | Pointer |
| J-1444A | Spring |
| S-599A | Pilot Light Socket Assembly |
| A-2155A | Dial Drive Assembly |

## DRIVE CORD REPLACEMENT

Turn the tuner to the fully open position. Use a new cord 50" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in pulley ring; add spring tension and continue one and one-half turns counterclockwise over top of pulley. Then pass cord around idler pulley A, starting over top and going around clockwise. Pass cord over idler pulley B, starting over top and going around counter clockwise. Wind one full turn counterclockwise around drive mechanism. Then wind one full turn counterclockwise around drive pulley, pass through slot in pulley and tie string to tension spring. Cut off excess string.

Attach dial pointer to cord.

## WESTERN AUTO SUPPLY CO.

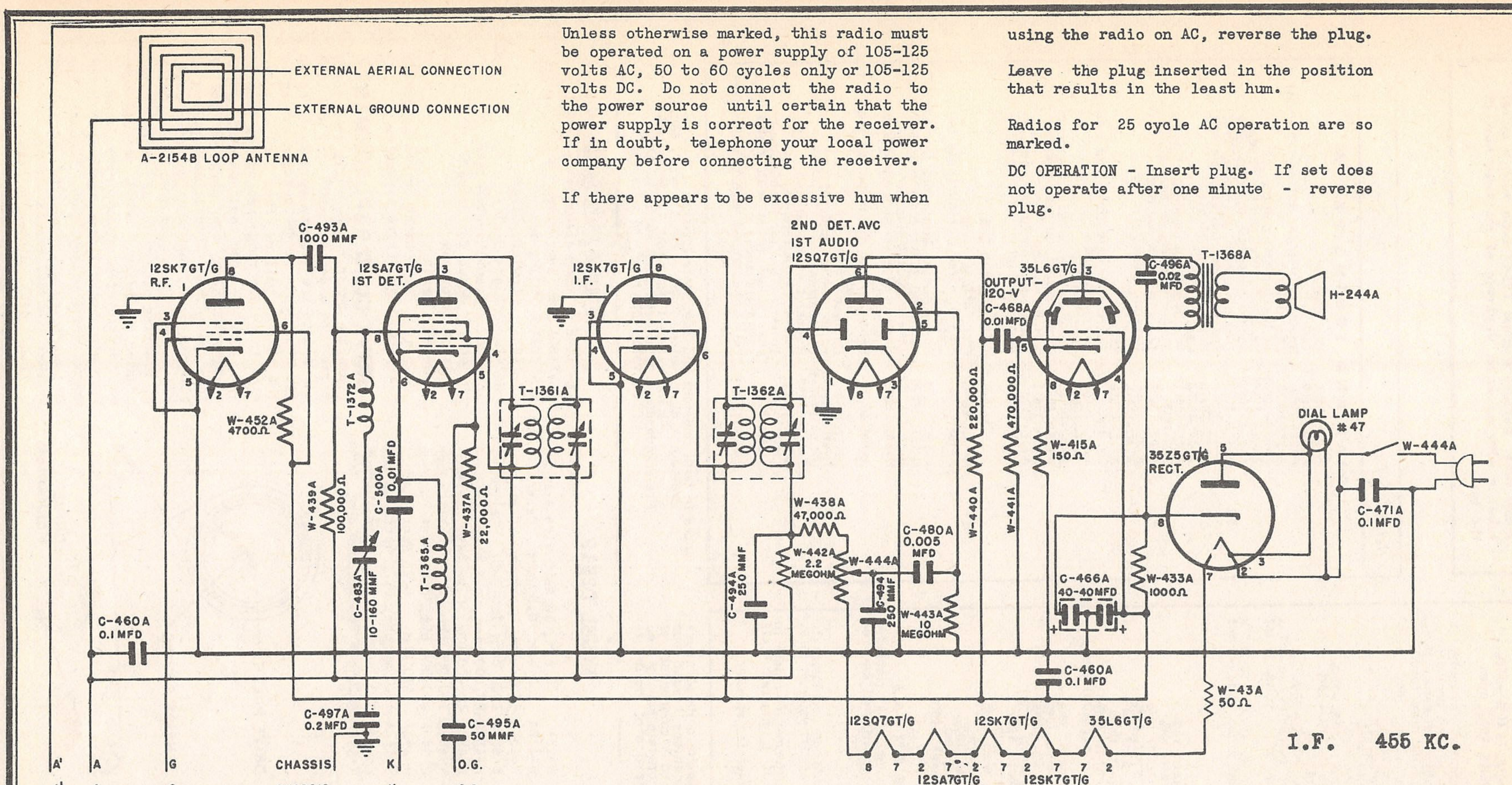
Unless otherwise marked, this radio must be operated on a power supply of 105-125 volts AC, 50 to 60 cycles only or 105-125 volts DC. Do not connect the radio to the power source until certain that the power supply is correct for the receiver. If in doubt, telephone your local power company before connecting the receiver.

If there appears to be excessive hum when using the radio on AC, reverse the plug.

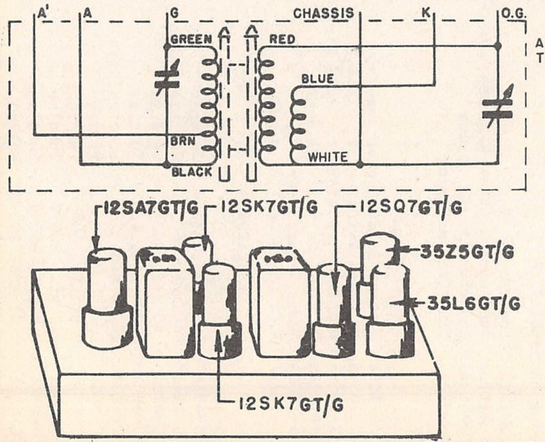
Leave the plug inserted in the position that results in the least hum.

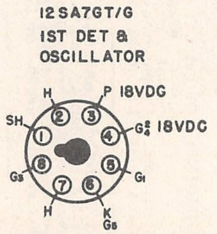
Radios for 25 cycle AC operation are so marked.

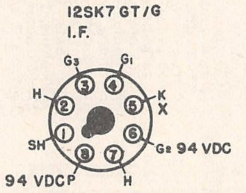
DC OPERATION - Insert plug. If set does not operate after one minute - reverse plug.

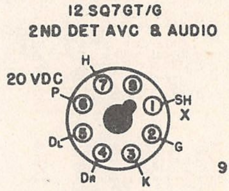

EXTERNAL AERIAL CONNECTION
EXTERNAL GROUND CONNECTION
A-2154B LOOP ANTENNA
12SK7GT/G R.F.
C-493A 1000 MMF
W-452A 4700Ω
W-439A 100,000Ω
C-460A 0.1 MFD
12SA7GT/G IST DET.
T-1372A
C-500A 0.01 MFD
C-483A 10-160 MMF
T-1365A
W-437A 22,000Ω
C-497A 0.2 MFD
C-495A 50 MMF
T-1361A
12SK7GT/G I.F.
T-1362A
2ND DET. AVC
IST AUDIO
12SQ7GT/G
W-438A 47,000Ω
W-442A 2.2 MEGOHM
W-444A
C-494A 250 MMF
C-494 250 MMF
C-480A 0.005 MFD
W-443A 10 MEGOHM
W-440A 220,000Ω
W-441A 470,000Ω
OUTPUT-120-V
C-468A 0.01 MFD
35L6GT/G
W-415A 150Ω
C-466A 40-40 MFD
C-460A 0.1 MFD
C-496A 0.02 MFD
T-1368A
H-244A
35Z5GT/G RECT.
W-433A 1000Ω
DIAL LAMP #47
W-444A
C-471A 0.1 MFD
W-43A 50Ω
12SQ7GT/G
12SK7GT/G
35L6GT/G
12SA7GT/G
12SK7GT/G
A'
A
G
CHASSIS
K
O.G.
GREEN
RED
BLUE
WHITE
BRN
BLACK
A-2143E TUNING UNIT

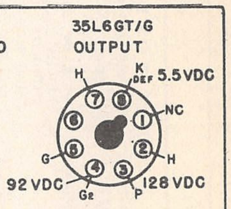
I.F. 455 KC.

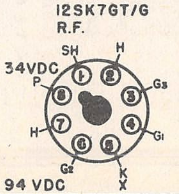

12SA7GT/G
12SK7GT/G
12SQ7GT/G
35Z5GT/G
35L6GT/G
12SK7GT/G

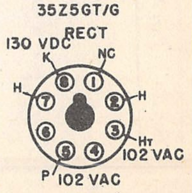

12SA7GT/G
IST DET &
OSCILLATOR
P 18VDG
G2 18VDC
H
SH
G3
G1
K
G5


12SK7 GT/G
I.F.
G3
G1
H
K
X
SH
G2 94 VDC
94 VDCP
H


12 SQ7GT/G
2ND DET AVC & AUDIO
20 VDC
P
H
SH
X
DL
DR
G
K


35L6GT/G
OUTPUT
H
K
DEF
5.5VDC
NC
G
92 VDC
G2
H
P
128 VDC


12SK7GT/G
R.F.
34VDC
SH
H
P
G3
H
G1
G2
K
X
94 VDC


35Z5GT/G
RECT
130 VDC
K
NC
H
H
HT
102 VAC
P
102 VAC

MEASUREMENTS TAKEN WITH AC LINE VOLTAGE OF 117 VOLTS.— READINGS TAKEN WITH NO SIGNAL INPUT.— USE 1000Ω PER VOLT METER BETWEEN INDICATED POINTS & ELECTRICAL GND., INDICATED BY "X" ON SOCKET LAYOUT. NO MEASUREMENTS MADE TO CHASSIS GROUND.

### STANDARD TUBE SOCKET SYMBOLS

| | | | |
|---|---|---|---|
| DEF | DEFLECTOR PLATES | G5 | GRID NO.5 |
| DL | DIODE PLATE-LEFT | H | HEATER |
| DR | DIODE PLATE-RIGHT | HT | HEATER TAP |
| G | GRID | K | CATHODE |
| G1 | GRID NO.1 | NC | NO CONNECTION |
| G2 | GRID NO.2 | P | PLATE |
| G3 | GRID NO.3 | SH | SHELL |
| G4 | GRID NO.4 | | |

## ALIGNMENT PROCEDURE

Volume Control-Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas-.01 mf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR ANTENNA CONNECTION | COUPLING | DUMMY ANTENNA | TUNER SETTING | TRIMMER ADJUSTMENT (SEE DIAGRAM) | NOTES |
|---|---|---|---|---|---|---|
| I.F. 455 KC | Grid of RF tube 12SK7 | Ground generator to chassis | 0.01 mfd | Out | Adjust for Max. 1, 2, 3 and 4 | No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting |
| I.F. 455 KC | Grid of RF tube 12SK7 | Ground generator to chassis | 0.01 mfd | Out | Trim condenser under chassis for Min. output. | If it is found that regeneration prevails when the loop antenna is put in its normal position close to the tubes, then the under chassis trimmer is incorrectly set, and should be adjusted to prevent the regenerative condition. |
| 1620 KC | Inductive Coupling to Loop | Loop coupling with leads brought out | 400 ohms in series with Antenna & Gnd.leads | Out | Adjust Osc. #5 per Max. signal | |
| 1400 KC | Inductive Coupling to Loop | Loop coupling with leads brought out | 400 ohms in series with Antenna & Gnd.leads | Dial set for 1400KC | Adjust RF trimmer #6 per Max. Signal. | |
| 700 KC | Inductive Coupling to Loop | Loop Coupling with leads brought out | 400 ohms in series with Antenna & Gnd.leads | Dial set for 700KC | Adjust RF tuning core #7 for Max. (care should be taken not to disturb carriage position of tuner) | If more than one turn is required, the trimming 1400 KC should be repeated and the 700 KC padding of the tuning core also repeated until correct alignment has been reached |

## ALIGNMENT NOTES

A. MECHANICAL ALIGNMENT:- The following mechanical adjustments should be made before alignment:

1. Rotate shaft of tuning unit until carriage is against top stop position.
2. Space oscillator coil slug 1-5/32" out from top of oscillator coil form.
3. Space R.F. coil slug 1-29/64" out from top end of R.F.coil winding. (Note:-The distance 1 and 2 should be measured from mounted end of the slug)
4. Adjust screw on trimmer of wave trap towards open position so that condenser plates are open at least 1/32".

B. I.F. ALIGNMENT PROCEDURE

1. Feed I.F. frequency from the signal generator through a 0.01 mfd condenser to the control grid of the R. F. tube.
2. No signal will be heard unless trimmer condenser under chassis is unscrewed and reduced from original setting.
3. Turn volume control full on.
4. Make preliminary I.F.adjustment with signal level approximately 50 Mv.
5. Tune I.F. trimmers for maximum signal, reducing I.F. signal input to coupling loop to keep output voltage less than 0.5 V.
6. When maximum output has been secured, adjust trimmer condenser in the I.F. trap (under chassis) by turning clockwise to the minimum signal.

C. R.F. ALIGNMENT PROCEDURE

1. Volume control full on.
2. Adjust tuning unit to top stop position.
3. Feed 1620 kc signal into external loop. Hold audio output below 0.5 V. Adjust the oscillator trimmer condenser to maximum output.
4. Move slugs in by means of tuning dial so that pointer is approximately 1" from the stop end, and a signal received from the external loop on a frequency of 1400 kc. Adjust lower trimmer (R.F. trimmer) to maximum output. Reduce R.F.input to keep signal output voltage below 0.5 V.
5. Rotate tuning shaft until pointer is approximately 1" from the other end of the scale. Feed to the external loop a test signal at 700 kc. Adjust the R.F.coil slug by rotation in the Timmerman nut to maximum output.

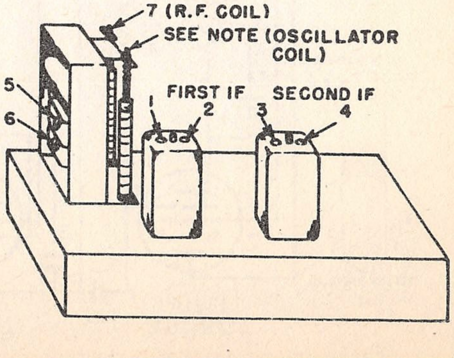
NOTE: If more than one complete turn of the slug is required to obtain maximum signal, return tuner to 1400 kc. position and repeat steps 4 and 5.

If less than one turn is required to obtain the maximum 700 kc. audio output, the R.F. alignment may be considered complete.

CAUTION: Extreme care should be taken in the 700 kc. position to make sure that the tuner carriage is not moved by the adjusting tools or hand pressure on the slug screw. Carriage should not be held against the frame, but should be allowed to assume its normal position when adjusting the R.F. coil slug.

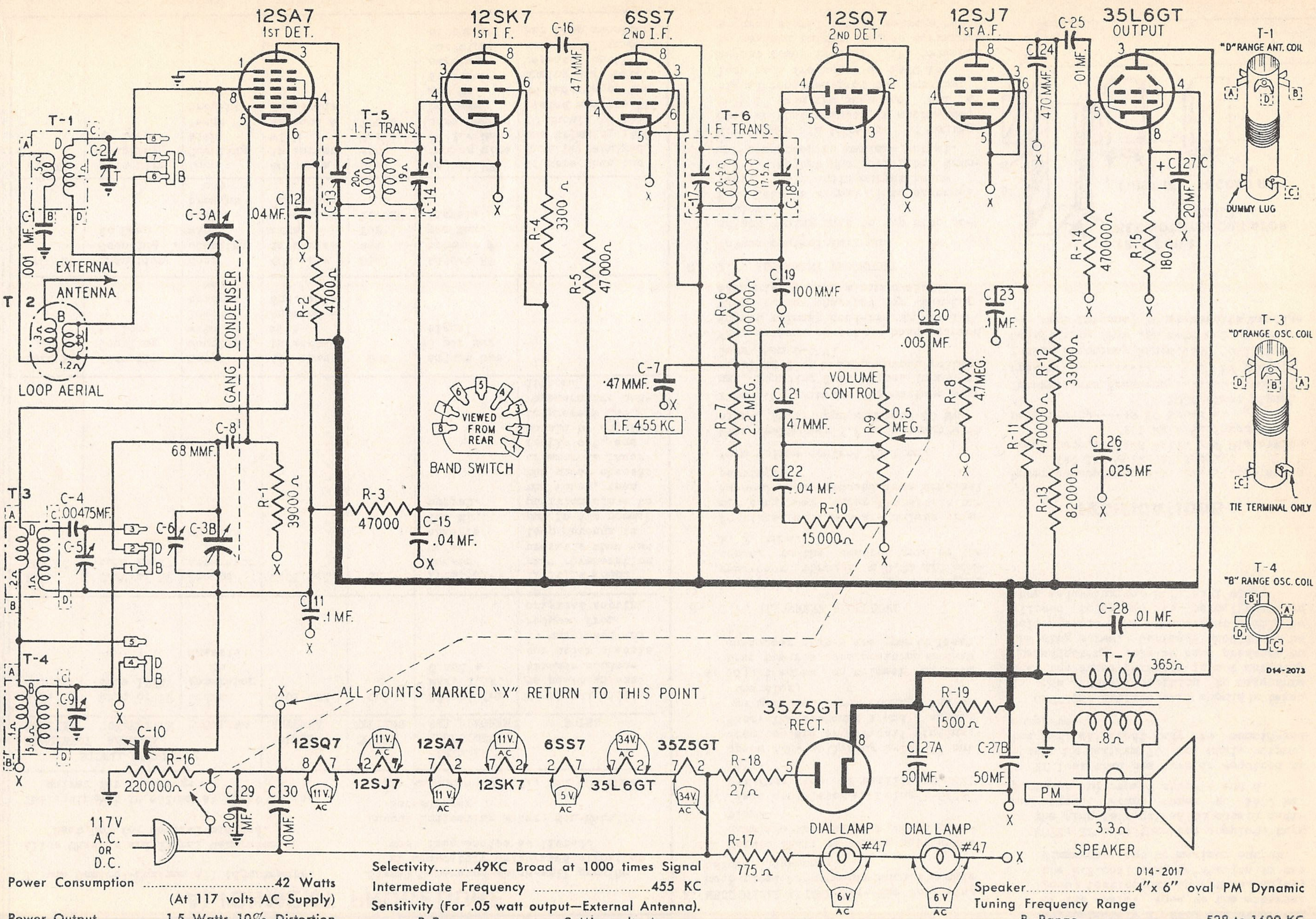
## SPECIFICATIONS

Power consumption............. 35 Watts
(At 117 volts AC Supply)
Power Output- 1.6 Watts 10% Distortion
1.1 Watt Undistorted
Selectivity----49 KC Broad at
1000 times Signal
Intermediate Frequency......... 455 KC
Speaker................. 5" PM Dynamic
Tuning Frequency Range..540 to 1620 KC
Sensitivity (For .05 Watt output-external Antenna) 20 microvolts average



**MODELS D2624 Early,
D2630**

# WESTERN AUTO SUPPLY CO.


12SA7 1ST DET.
12SK7 1ST I.F.
6SS7 2ND I.F.
12SQ7 2ND DET.
12SJ7 1ST A.F.
35L6GT OUTPUT
T-1 "D" RANGE ANT. COIL
DUMMY LUG
T-3 "D" RANGE OSC. COIL
TIE TERMINAL ONLY
T-4 "B" RANGE OSC. COIL
D14-2073
T-5 I.F. TRANS.
T-6 I.F. TRANS.
T-7 365Ω
C-1 .001 MF.
C-2
EXTERNAL ANTENNA
T 2
LOOP AERIAL
C-3A
GANG CONDENSER
C-3B
C-4 .00475MF.
C-5
C-6
C-8 68 MMF.
C-9
C-10
C-11 .1 MF.
C-12 .04 MF.
C-13
C-14
C-15 .04 MF.
C-16 47 MMF
C-17
C-18
C-19 100 MMF
C-20 .005 MF
C-21 47 MMF.
C-22 .04 MF.
C-23 .1 MF.
C-24 470 MMF.
C-25 .01 MF.
C-26 .025 MF
C-27A 50 MF.
C-27B 50 MF.
C-27C 20 MF
C-28 .01 MF.
C-29 20 MF.
C-30 10 MF.
C-7 47 MMF.
I.F. 455 KC
R-1 39000Ω
R-2 4700Ω
R-3 47000
R-4 3300Ω
R-5 47000Ω
R-6 100000Ω
R-7 2.2 MEG.
R-8 47 MEG.
R-9 0.5 MEG.
VOLUME CONTROL
R-10 15000Ω
R-11 470000Ω
R-12 33000Ω
R-13 82000Ω
R-14 470000Ω
R-15 180Ω
R-16 220000Ω
R-17 775Ω
R-18 27Ω
R-19 1500Ω
VIEWED FROM REAR
BAND SWITCH
ALL POINTS MARKED "X" RETURN TO THIS POINT
35Z5GT RECT.
117V A.C. OR D.C.
11V AC
5V AC
34V AC
DIAL LAMP #47
6V AC
.8Ω
3.3Ω
PM
SPEAKER
D14-2017

Power Consumption ................................42 Watts
(At 117 volts AC Supply)

Power Output ..............1.5 Watts 10% Distortion
.9 Watt Undistorted

Selectivity..........49KC Broad at 1000 times Signal

Intermediate Frequency ............................455 KC

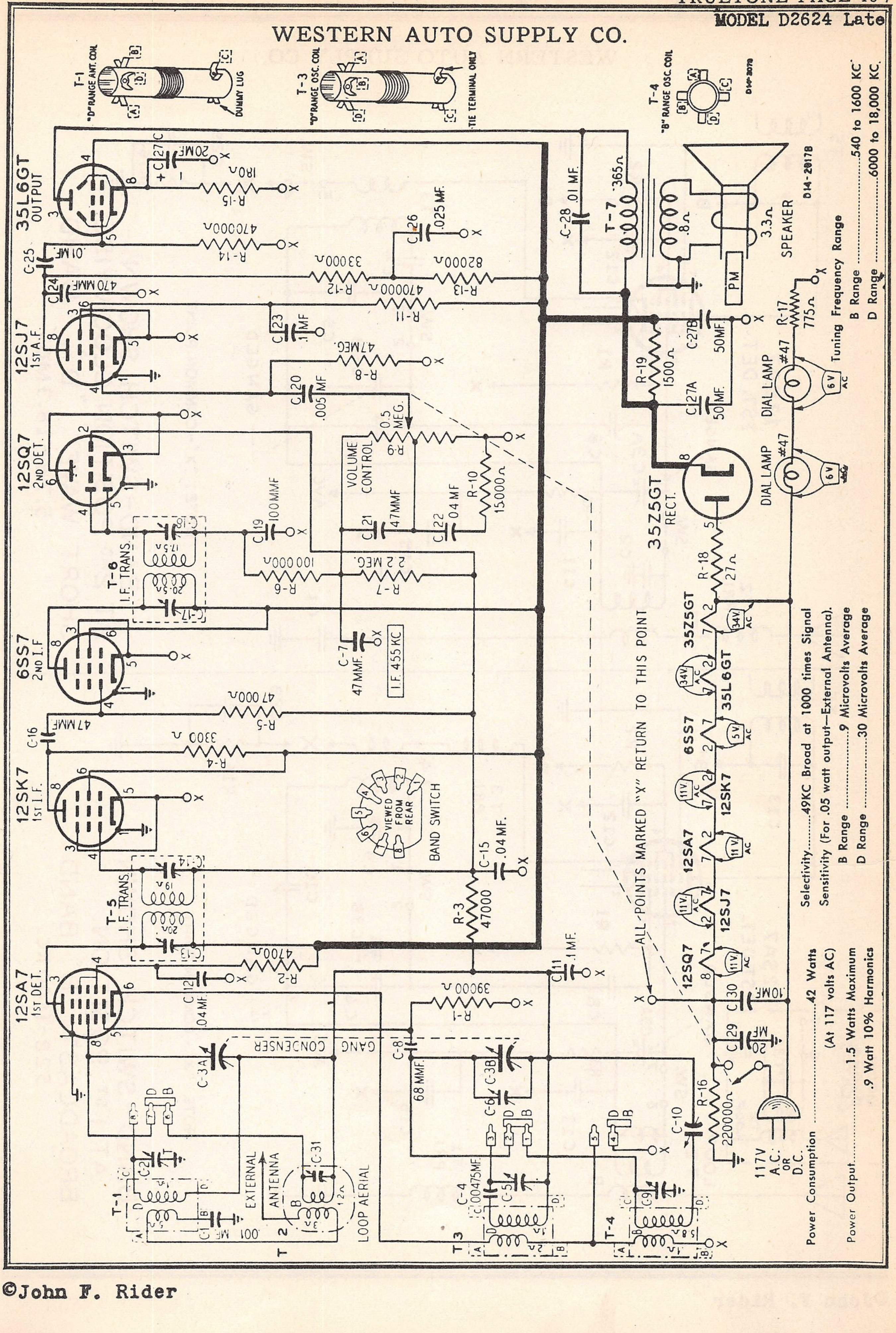
Sensitivity (For .05 watt output—External Antenna).
B Range ........................9 Microvolts Average
D Range ........................30 Microvolts Average

Speaker...............................4"x 6" oval PM Dynamic

Tuning Frequency Range
B Range ..........................................528 to 1600 KC
D Range .......................................5750 to 18,300 KC

**MODEL D2624 Late**

# WESTERN AUTO SUPPLY CO.


T-1 "D" RANGE ANT. COIL
DUMMY LUG
T-3 "D" RANGE OSC. COIL
TIE TERMINAL ONLY
T-4 "B" RANGE OSC. COIL
D14-2078
D14-2017B
35L6GT OUTPUT
12SJ7 1ST A.F.
12SQ7 2ND DET.
6SS7 2ND I.F.
12SK7 1ST I.F.
12SA7 1ST DET.
35Z5GT RECT.
C-27C 20MF
R-15 180Ω
R-14 470000Ω
C-25 .01MF.
C-24 470MMF
R-12 33000Ω
R-13 82000Ω
C-26 .025MF.
R-11 470000Ω
C-23 .1MF
R-8 47MEG.
C-20 .005MF
R-9 0.5 MEG. VOLUME CONTROL
R-10 15000Ω
C-21 47MMF
C-22 .04MF
C-19 100MMF
T-6 I.F. TRANS.
C-18 17.5Ω 20.5Ω C-17
R-6 100000Ω
R-7 2.2 MEG.
C-7 47MMF.
I.F. 455 KC
R-5 47000Ω
C-16 47MMF
R-4 3300Ω
BAND SWITCH VIEWED FROM REAR
C-15 .04MF.
R-3 47000
T-5 I.F. TRANS.
C-14 19Ω 20Ω C-13
R-2 4700Ω
C-12 .04MF.
C-11 .1MF.
R-1 39000Ω
C-8 68MMF.
GANG CONDENSER
C-3A C-3B C-6
C-28 .01MF.
T-7 365Ω .8Ω
SPEAKER 3.3Ω PM
C-27B 50MF.
R-19 1500Ω
C-27A 50MF.
DIAL LAMP #47 6V AC
R-17 775Ω
R-18 27Ω
34V AC 11V AC 5V AC
C-30 .10MF.
C-29 20MF
R-16 220000Ω
C-10
117V A.C. OR D.C.
ALL POINTS MARKED "X" RETURN TO THIS POINT
EXTERNAL ANTENNA
LOOP AERIAL 1.2Ω
C-31
C-1 .001MF
C-2
C-4 .00475MF.
C-5
C-9
T-1 T-2 T-3 T-4
A B C D

Selectivity.......49KC Broad at 1000 times Signal

Sensitivity (For .05 watt output—External Antenna).

B Range ....................9 Microvolts Average

D Range ....................30 Microvolts Average

Power Consumption ..........42 Watts

(At 117 volts AC)

Power Output..........1.5 Watts Maximum

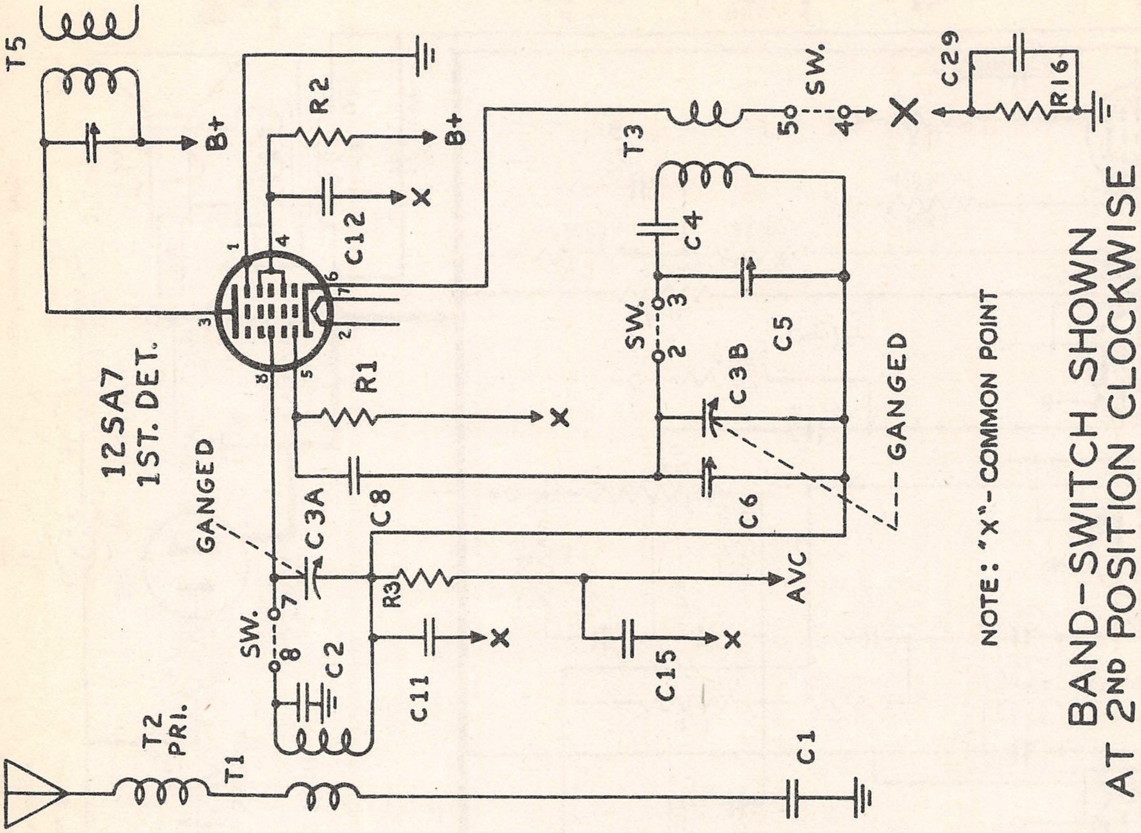
.9 Watt 10% Harmonics

Tuning Frequency Range

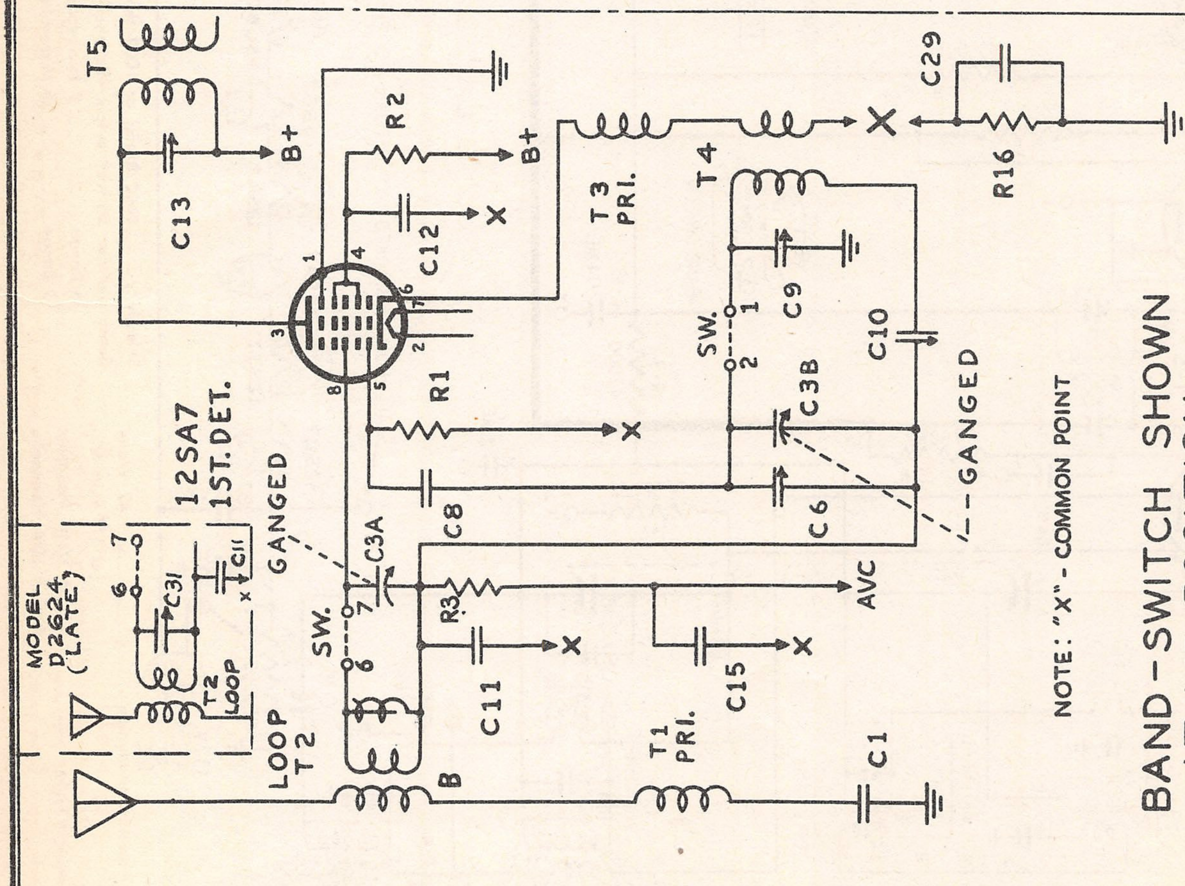
B Range ..............540 to 1600 KC

D Range ..............6000 to 18,000 KC.

## WESTERN AUTO SUPPLY CO.


T5
B+
R2
B+
C12
X
12SA7
1ST. DET.
1
3
4
6
7
2
8
5
R1
X
GANGED
C3A
C8
SW.
7
8
C2
R3
AVC
C11
X
C15
X
T2
PRI.
T1
C1
T3
SW.
5
4
X
C29
R16
C4
SW.
2
3
C5
C3B
C6
GANGED
NOTE: "X"-COMMON POINT

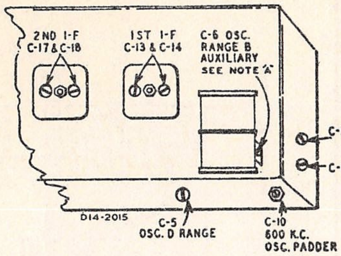
BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE
SHORT WAVE "D" BAND
5.75-18.3 MC.


T5
B+
C13
R2
B+
C12
X
12SA7
1ST. DET.
1
3
4
6
7
2
8
5
R1
X
MODEL
D2624
(LATE)
6
7
C31
C11
X
T2
LOOP
GANGED
C3A
C8
SW.
7
6
R3
AVC
C11
X
C15
X
LOOP
T2
B
T1
PRI.
C1
T3
PRI.
T4
X
C29
R16
SW.
2
1
C9
C10
C3B
C6
GANGED
NOTE: "X"-COMMON POINT

BAND-SWITCH SHOWN AT 1ST POSITION.
BROADCAST "B" BAND
528-1600 KC.

MODELS D2624 Early,
Late,D2630

# WESTERN AUTO SUPPLY CO.


2ND I-F C-17 & C-18
1ST I-F C-13 & C-14
C-6 OSC. RANGE B AUXILIARY SEE NOTE "A"
C-2 ANT. D RANGE
C-9 OSC. B RANGE
C-5 OSC. D RANGE
C-10 600 K.C. OSC. PADDER
D14-2015

## ALIGNMENT NOTES

NOTE A—Adjust Oscillator Range B (C9) trimmer on side of chassis. Oscillator Range B (C6) auxiliary trimmer on gang condenser is adjusted at factory and ordinarily need not be readjusted in the field.

NOTE B—Index line is on dial background strip. See DIAL CALIBRATION paragraph.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—A "gimmick" capacity is used on the loop antenna in place of a trimmer. This normally requires no adjustment. However, if a new loop is installed it may be necessary to adjust the "gimmick" by increasing or decreasing the number of turns in the "gimmick." Complete the oscillator adjustment (C9) at 1400 KC, then adjust the "gimmick" at the same frequency.

## ALIGNMENT PROCEDURE

Check Dial Pointer position, see DIAL CALIBRATION paragraph.

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for Aligning:

Signal Generator which will provide an accurately calibrated signal at test frequencies as listed.

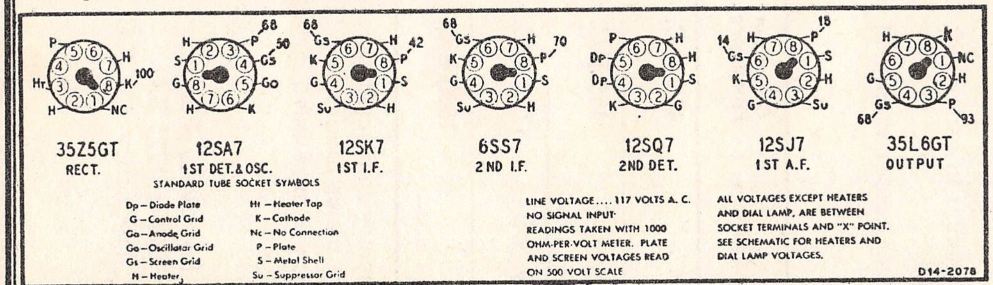
Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohm.

| SIGNAL GENERATOR |  |  |  |  |  | ADJUST TRIMMERS |
|---|---|---|---|---|---|---|
| FREQUENCY SETTING | ANTENNA CONNECTION | GROUND CONNECTION | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER SETTING | TO MAXIMUM (See Trimmer Illustration) |
| I.F. 455 KC | Signal Grid of 1st. Det. Connect at Stator of Large Gang Section. | Point "X" 12SK7—1st I-F Prong No. 3 | .1 mf. | B Range | Turn Rotor to Full Open | 1st I.F. (C13) & (C14)<br>2nd I.F. (C17) & (C18) |
| RANGE B 1400 KC | External Antenna Clip | Point "X" | 200 mmf. | B Range | Turn Rotor to 1400 KC Index Line. See Note B | Oscillator Range B (C9) See Note A |
| SEE NOTE D |  |  |  |  |  |  |
| 600 KC | External Antenna Clip | Point "X" | 200 mmf. | B Range | Turn Rotor to Max. Output and Rock | 600 KC Padder (C10) Rock Rotor See Note C |
| 1400 KC | External Antenna Clip | Point "X" | 200 mmf. | B Range | Turn Rotor to 1400 KC Index Line. See Note B | Oscillator Range B (C9) |
| Repeat above steps at 1400 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output. |  |  |  |  |  |  |
| RANGE D 16 MC | External Antenna Clip | Point "X" | 400 Ohm | D Range | Turn Rotor to 1400 KC Index Line. See Note B | Oscillator Range D (C5) |
| 16 MC | External Antenna Clip | Point "X" | 400 Ohm | D Range | Turn Rotor to 1400 KC Index Line. See Note B | Ant. Range D (C2) |

Notes: In late models note D is not used in the alignment procedure. All other data is the same for both models.

BC. Band Early 528 to 1600 KC
BC. Band Late 540 to 1600 KC
SW. Band Early 5.75 to 18.3 MC
SW. Band Late 6 to 18 MC


35Z5GT RECT.
12SA7 1ST DET. & OSC.
12SK7 1ST I.F.
6SS7 2ND I.F.
12SQ7 2ND DET.
12SJ7 1ST A.F.
35L6GT OUTPUT
100
68
50
42
70
14
18
93
STANDARD TUBE SOCKET SYMBOLS
Dp – Diode Plate
G – Control Grid
Ga – Anode Grid
Go – Oscillator Grid
Gs – Screen Grid
H – Heater
Ht – Heater Tap
K – Cathode
Nc – No Connection
P – Plate
S – Metal Shell
Su – Suppressor Grid
D14-2078

LINE VOLTAGE....117 VOLTS A. C. NO SIGNAL INPUT. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE AND SCREEN VOLTAGES READ ON 500 VOLT SCALE

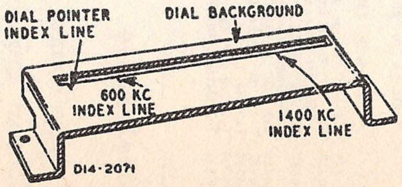
ALL VOLTAGES EXCEPT HEATERS AND DIAL LAMP, ARE BETWEEN SOCKET TERMINALS AND "X" POINT. SEE SCHEMATIC FOR HEATERS AND DIAL LAMP VOLTAGES.

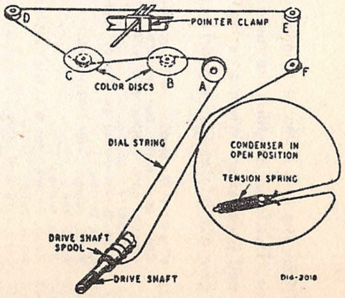
In order to align the receiver, the dial pointer must be positioned on the dial string correctly with reference to the dial. Index lines are provided on the dial background for this purpose.

To position the dial pointer, turn the gang condenser to the fully closed position. The dial pointer should be directly over the dial pointer index line. (See illustration.)

The 600 KC and 1400 KC index lines are for use when aligning the receiver.

| | |
|---|---|
| 16 Meter Band | 17.1—17.9 MC |
| 19 Meter Band | 15.1—15.3 MC |
| 25 Meter Band | 11.7—11.9 MC |
| 31 Meter Band | 9.5— 9.7 MC |
| 49 Meter Band | 6— 6.2 MC |


DIAL POINTER INDEX LINE
DIAL BACKGROUND
600 KC INDEX LINE
1400 KC INDEX LINE
D14-2071


D
E
F
POINTER CLAMP
C
B
A
COLOR DISCS
DIAL STRING
CONDENSER IN OPEN POSITION
TENSION SPRING
DRIVE SHAFT SPOOL
DRIVE SHAFT
D14-2018

## DRIVE CORD REPLACEMENT

Turn the gang condenser to the fully open position. Use a new cord 60" long and tie one end to the tension spring. Fasten the other end of the tension spring to the drive pulley. Pass cord through slot in the pulley rim and continue one half turn counterclockwise, over top of pulley. Wind 3 turns clockwise around wooden drive shaft spool. Turns must progress toward chassis.

Pass cord around idler pulley A, over color disc pulley B, under color disc pulley C, and around idler pulleys D, E, and F.

Wind ¾ turn counterclockwise around drive pulley. Pass cord through slot in rim, stretch tension spring and tie cord to it. Cut off the excess string.

Attach dial pointer to cord and position the pointer directly over the Dial Pointer Index Line on the dial background.

MODELS D2624 Early,
Late,D2630
MODEL D2644

## WESTERN AUTO SUPPLY CO.

# REPLACEMENT PARTS LIST

NOTICE: There is a Model Number label on the chassis. This label identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

| | |
|---|---|
| 12A430 | 4" x 6" P.M. speaker—with mounting bracket |
| | Cone and voice coil assembly for speaker (specify part number and letters stamped on speaker) |
| 3A303 | Tube Socket—octal (8 prong) molded |
| 10A520 | Knob, tuning } for IVORY cabinet |
| 10A521 | Knob, volume } for IVORY cabinet |
| 10A522 | Knob, band } for IVORY cabinet |
| 10A467 | Knob, tuning } for WALNUT cabinet |
| 10A468 | Knob, volume } for WALNUT cabinet |
| 10A469 | Knob, band } for WALNUT cabinet |
| 13X546 | Line cord and plug |
| 2A206 | Band change switch |
| 28X292 | Snap button (mounting antenna to cabinet) |
| | No. 6x⅜" P.K. Type "Z" screws (mounting antenna to chassis) |

### TRANSFORMERS AND COILS

| | |
|---|---|
| 9A1443 | T-1 "D" Range Antenna Coil Assembly |
| 26A386 | T-2 "B" Band Loop Antenna Assembly with Trimmer (for Walnut Cabinet) |
| 26A387 | T-2 "B" Band Loop Antenna Assembly with Trimmer (for Ivory Cabinet) |
| 9A1444 | T-3 "D" Range Oscillator Coil Assembly |
| 9A1442 | T-4 "B" Band Oscillator Coil Assembly |
| 9A1793 | T-5 1st I-F coil assembly |
| 9A1794 | T-6 2nd I-F coil assembly |
| 51X118 | T-7 Output transformer |

### CAPACITORS

| | | | | |
|---|---|---|---|---|
| B67102 | C-1 | .001 mf | 200 V | Tubular |
| 17A152 | C-2<br>C-9 | 2-25 mmf Ant. Range "D"<br>2-25 mmf. Osc. Range "B" | | Trimmer |
| 14A148 | C-3A<br>C-3B | Gang capacitor and pulley | | |
| 46X289 | C-4 | .00475 mf | 180 V | Tubular |
| 17A174 | C-5 | 2-25 mmf Osc. Range "D" | | Trimmer |
| | C-6 | Part of C-3 | | |
| 47X463 | C-7 | 47 mmf | | Molded |
| 47X466 | C-8 | 68 mmf | | Molded |
| 17A234 | C-10 | 250-525 mmf | | 600 K.C. Padder |
| B66104 | C-11<br>C-23 | .1 mf | 200 V | Tubular |
| B66403 | C-12<br>C-15<br>C-22 | .04 mf | 200 V | Tubular |
| | C-13, C-14 | Part of T-5 (1st I-F coil assembly) | | |
| 47X446 | C-16, C-21 | 47 mmf | | Molded |
| | C-17, C-18 | Part of T-6 (2nd I-F coil assembly) | | |
| 47X476 | C-19 | 100 mmf | | Molded |
| B66502 | C-20 | .005 mf | 200 V | Tubular |
| 47X467 | C-24 | 470 mmf | | Molded |
| B66103 | C-25<br>C-28 | .01 mf | 200 V | Tubular |
| B67253 | C-26 | .025 mf | 200 V | Tubular |
| 45X342 | C-27A<br>C-27B<br>C-27C | 50 mf<br>50 mf<br>20 mf | 150 V<br>150 V<br>25 V | Dry electrolytic |
| D67204 | C-29 | .20 mf | 400 V | Tubular |
| D66104 | C-30 | .10 mf | 400 V | Tubular |
| 17A123 | C-31 | 1-12 mmf | Antenna | Range B Trimmer |

### RESISTORS

| | | Ohms | Watts | |
|---|---|---|---|---|
| B84393 | R-1 | 39,000 | 0.5 | Carbon |
| B84472 | R-2 | 4700 | 0.5 | Carbon |
| B85473 | R-3 R-5 | 47,000 | 0.5 | Carbon |
| B84332 | R-4 | 3300 | 0.5 | Carbon |
| B85104 | R-6 | 100,000 | 0.5 | Carbon |
| B85225 | R-7 | 2.2 meg | 0.5 | Carbon |
| B85475 | R-8 | 4.7 meg | 0.5 | Carbon |
| 36X309 | R-9 | Volume control and switch 0.5 megohms | | |
| B84153 | R-10 | 15,000 | 0.5 | Carbon |
| B85474 | R-11, R-14 | 470,000 | 0.5 | Carbon |
| B84333 | R-12 | 33,000 | 0.5 | Carbon |
| B84823 | R-13 | 82,000 | 0.5 | Carbon |
| B84181 | R-15 | 180 | 0.5 | Carbon |
| B85224 | R-16 | 220,000 | 0.5 | Carbon |
| 43X214 | R-17 | 775 | 28 | Wire wound |
| B84270 | R-18 | 27 | 0.5 | Carbon |
| C85152 | R-19 | 1500 | 1.0 | Carbon |

### DIAL AND DRIVE ASSEMBLY

| | |
|---|---|
| 6X21 | Rubber grommet } Mounting gang capacitor |
| 20X329 | Cond. cushion stud } Mounting gang capacitor |
| 15A128 | Color disc assembly |
| 58X588 | Dial scale |
| 58X587 | Dial background |
| 26A384 | Pointer bracket assembly complete with pulleys and studs |
| 15X220 | Pointer |
| | 5 ft. Drive cord |
| 28X113 | Drive cord tension spring |
| 25X580 | Drive shaft bracket |
| 26X465 | Drive shaft |
| 19X192 | "C" Washer (for drive shaft) |
| 24X564 | Drive shaft spool |
| 7A193 | Pilot light socket assembly |
| | No. 47 Pilot light |

Model D2644

# ALIGNMENT PROCEDURE

Volume control—Maximum: all adjustments.

Connect ground lead of signal generator to radio chassis.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil of speaker.

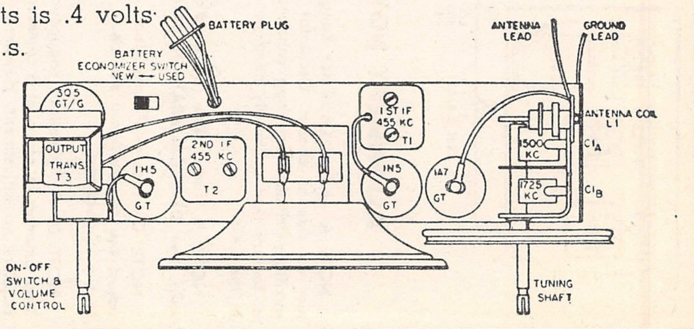
The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed, 30% modulated, 400 c.p.s.
Output meter.
Non metallic screwdriver.
Dummy antennas... .1 mfd., 00025 mfd.

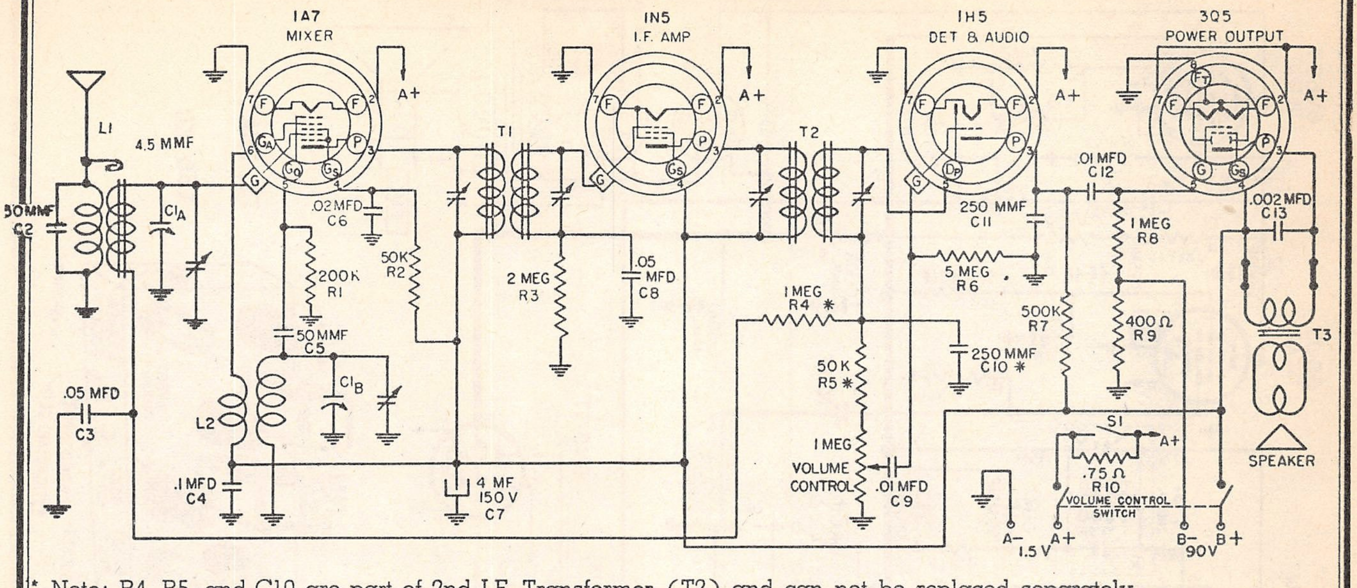
| Variable Condenser Setting | Generator Frequency | Dummy Antenna Mfd. | Connection to Radio | Trimmer Adjustment | Trimmer Function |
|---|---|---|---|---|---|
| Minimum Capacity (Fully Opened) | 455 K.C. | .1 | Grid of 1A7GT Tube | Two Trimmers on Top of T2 | Output I.F. |
| Minimum Capacity (Fully Opened) | 455 K.C. | .1 | Grid of 1A7GT Tube | Two Trimmers on Top of T1 | Input I.F. |
| Minimum Capacity (Fully Opened) | 1725 K.C. | .00025 | Antenna Lead | C1B | Oscillator Trimmer |
| Tune in signal From Generator | 1500 K.C. | .00025 | Antenna Lead | C1A | Antenna Trimmer |

With an output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 30% at 400 c.p.s.

Frequency Range
540 to 1725 K.C.
I.F. Frequency 455 K.C.



# WESTERN AUTO SUPPLY CO.


1A7
MIXER
1N5
I.F. AMP
1H5
DET & AUDIO
3Q5
POWER OUTPUT
A+
L1
4.5 MMF
30 MMF
C2
C1A
T1
T2
.02 MFD
C6
200K
R1
50K
R2
2 MEG
R3
.05
MFD
C8
50 MMF
C5
C1B
.05 MFD
C3
L2
.1 MFD
C4
4 MF
150 V
C7
1 MEG
R4 *
250 MMF
C11
5 MEG
R6
.01 MFD
C12
1 MEG
R8
500K
R7
400 Ω
R9
250 MMF
C10 *
50 K
R5 *
1 MEG
VOLUME
CONTROL
.01 MFD
C9
S1
.75 Ω
R10
VOLUME CONTROL
SWITCH
.002 MFD
C13
T3
SPEAKER
A−
A+
1.5 V
B−
B+
90V

* Note: R4, R5, and C10 are part of 2nd I.F. Transformer (T2) and can not be replaced separately.

IF PEAK 455 KC

## PARTS LIST

### CONDENSERS

| Circuit Diagram Reference | Part No. | Description |
|---|---|---|
| C1A, C1B | B19-185 | Variable condenser with Drum |
| C3, C8 | A16-152 | .05 mfd. 200 volt tubular condenser |
| C4 | A16-157 | .1 mfd. 200 volt tubular condenser |
| C5 | A15-175 | 50 mmfd mica condenser |
| C6 | A16-150 | .02 mfd. 400 volt tubular condenser |
| C7 | A18-273 | 4 mfd. 150 volt electrolytic condenser |
| C9, C12 | A16-156 | .01 mfd. 400 volt tubular condenser |
| C11 | A15-176 | 250 mmfd mica condenser |
| C13 | A16-155 | .002 mfd. 600 volt tubular condenser |

### RESISTORS

| | | |
|---|---|---|
| R1 | A60-667 | 200 K Ohm 1/3 watt resistor—20% |
| R2 | A60-685 | 50 K Ohm 1/3 watt resistor—20% |
| R3 | A60-684 | 2 Megohm 1/3 watt resistor—20% |
| R6 | A60-669 | 5 Megohm 1/3 watt resistor—20% |
| R7 | A60-662 | 500 K Ohm 1/3 watt resistor—20% |
| R8 | A60-668 | 1 Megohm 1/3 watt resistor—20% |
| R9 | A60-665 | 400 Ohm 1/3 watt resistor—10% |
| R10 | A60-691 | .75 Ohm 1 watt resistor |

### COILS

| | | |
|---|---|---|
| L1 | A10-414 | Antenna Coil |
| L2 | A10-415 | Oscillator coil |
| T1 | B10-416 | 1st I.F. Transformer |
| T2 | B10-417 | 2nd I.F. Transformer |

### MISCELLANEOUS

| | | |
|---|---|---|
| T3 | A80-218 | Speaker output transformer |
| S1 | A69-164 | Battery Economizer switch |
| | A24-165 | Volume control and switch |
| | B79-335 | 6¼ inch P.M. Speaker |
| | D42-382 | Wood cabinet |
| | B67-484 | Dial scale |
| | A52-182 | Knobs, Walnut Bakelite |
| | B58-59 | Dial pointer |
| | A84-35 | Dial drive shaft and pulley assembly |
| | A45-118 | Battery plug, 4 prong |

### VOLTAGE CHART

All voltages measured with a 1000 ohm per volt meter on the 150 volt scale. For the following voltages the "B" battery section of the power pack should read 90 volts under load. Where no voltages are shown the voltage is O or is to low to be read with this type of voltmeter.

| 1A7GT TUBE | PIN NO. | VOLTS |
|---|---|---|
| Plate-P—to ground | 3 | 85 |
| Screen-G3 & G5—to ground | 4 | 37 |
| Grid-G2—to ground | 6 | 85 |
| **1N5GT TUBE** | | |
| Plate-P—to ground | 3 | 85 |
| Screen-G2—to ground | 4 | 85 |
| **1H5GT TUBE** | | |
| Plate-P—to ground | 3 | 17 |
| **3Q5GT TUBE** | | |
| Plate-P—to ground | 3 | 83 |
| Screen-G2—to ground | 4 | 85 |

### SERVICE NOTES

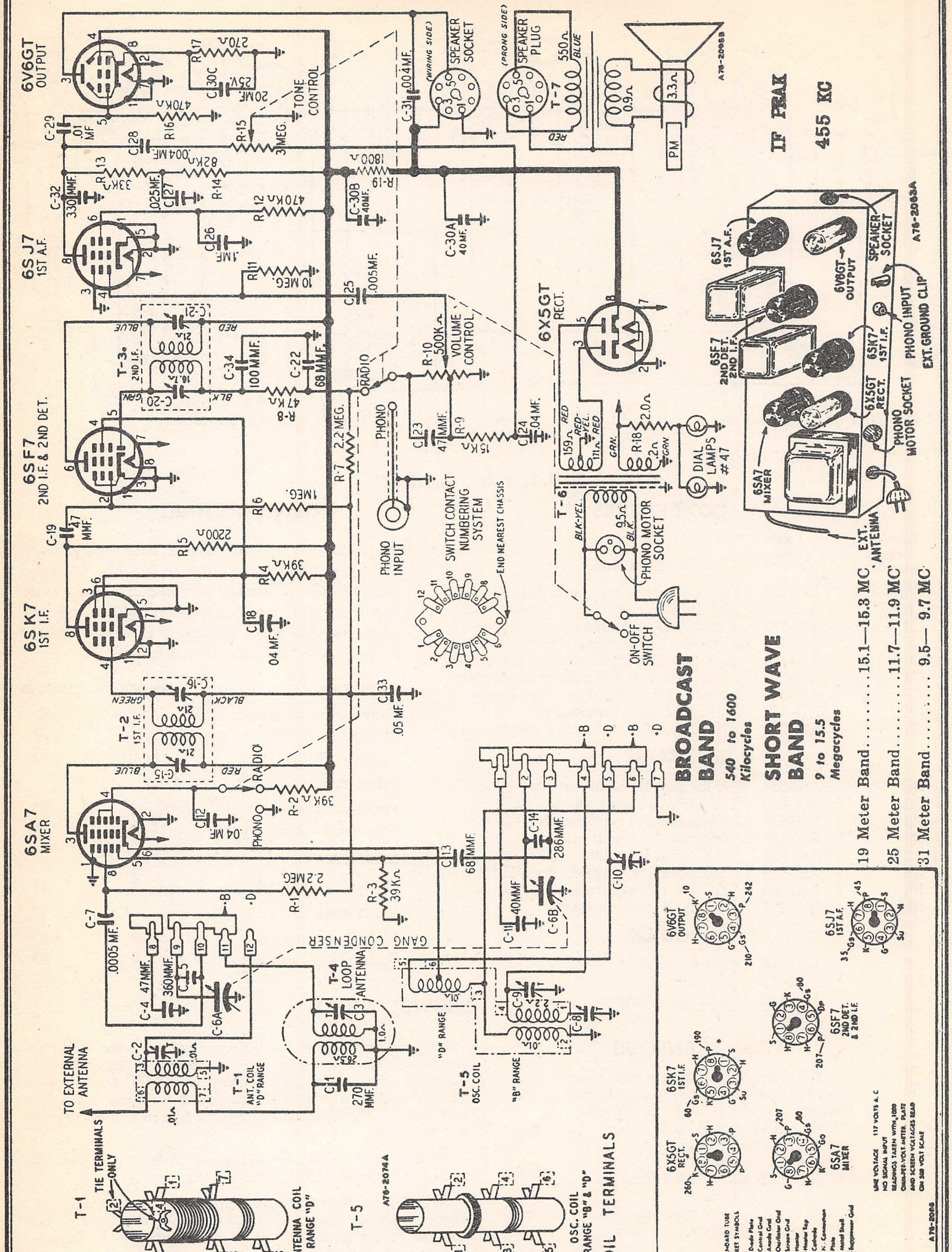
Voltages taken from the different points of the circuit to the chassis are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 1000 ohms per volt, using the 150 volt scale. These voltages are clearly indicated on the voltage chart.

All voltages should be measured with a new battery or one that gives 90 volts under load.

To check for open by-pass condensers, shunt each condenser with another one having the same capacity and voltage rating which is known to be good until the defective unit is located.

**MODEL D2645**

## WESTERN AUTO SUPPLY CO.


6V6GT OUTPUT
6SJ7 1ST A.F.
6SF7 2ND I.F. & 2ND DET.
6SK7 1ST I.F.
6SA7 MIXER
6X5GT RECT.
TONE CONTROL
VOLUME CONTROL
SPEAKER SOCKET (WIRING SIDE)
SPEAKER PLUG (PRONG SIDE)
T-7
PM
PHONO INPUT
SWITCH CONTACT NUMBERING SYSTEM
END NEAREST CHASSIS
DIAL LAMPS #47
PHONO MOTOR SOCKET
ON-OFF SWITCH
T-6
T-3 2ND I.F.
T-2 1ST I.F.
T-4 LOOP ANTENNA
T-5 OSC. COIL
T-1 ANT. COIL "D" RANGE
GANG CONDENSER
"D" RANGE
"B" RANGE
TO EXTERNAL ANTENNA
TIE TERMINALS ONLY
ANTENNA COIL RANGE "D"
OSC. COIL RANGE "B" & "D"
COIL TERMINALS
PHONO MOTOR SOCKET
PHONO INPUT
EXT. GROUND CLIP
EXT. ANTENNA
SPEAKER SOCKET
STANDARD TUBE SOCKET SYMBOLS
LINE VOLTAGE 117 VOLTS A.C.

IF PEAK

455 KC

**BROADCAST BAND**

540 to 1600 *Kilocycles*

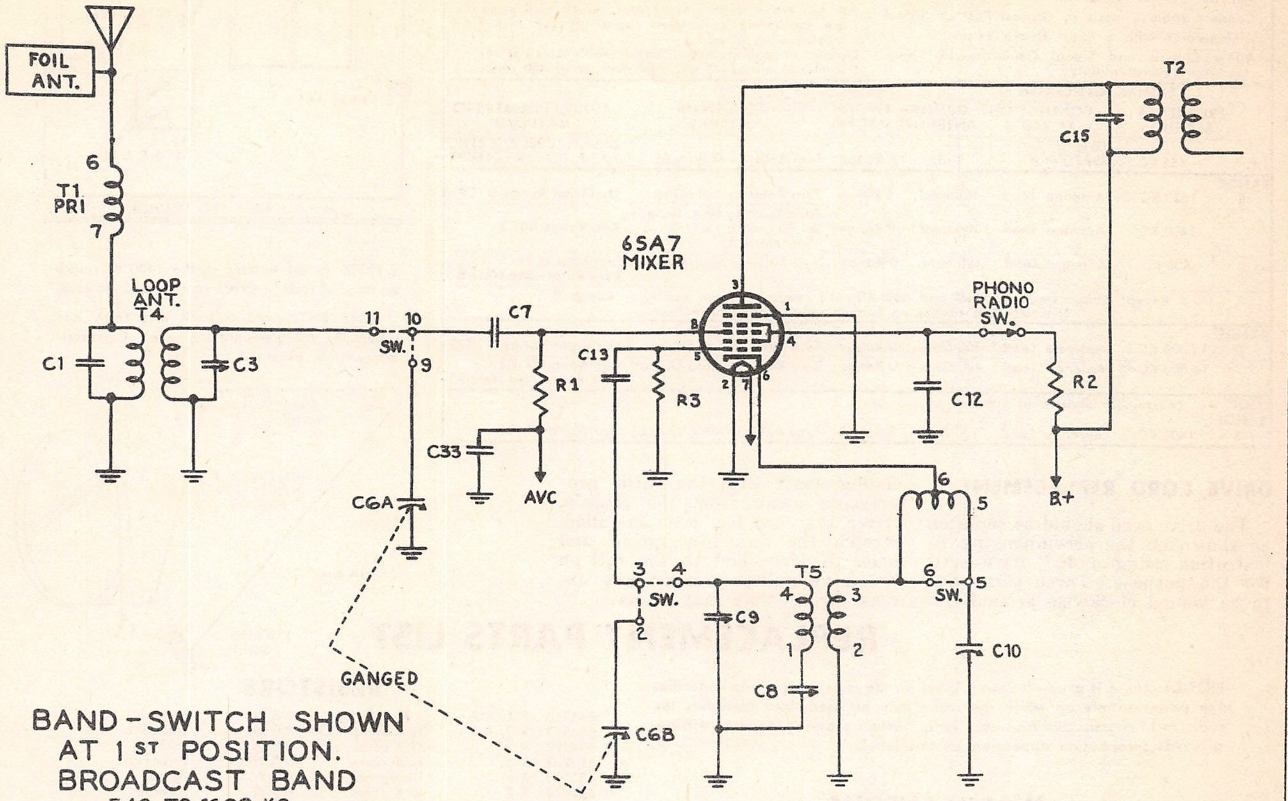
**SHORT WAVE BAND**

9 to 15.5 *Megacycles*

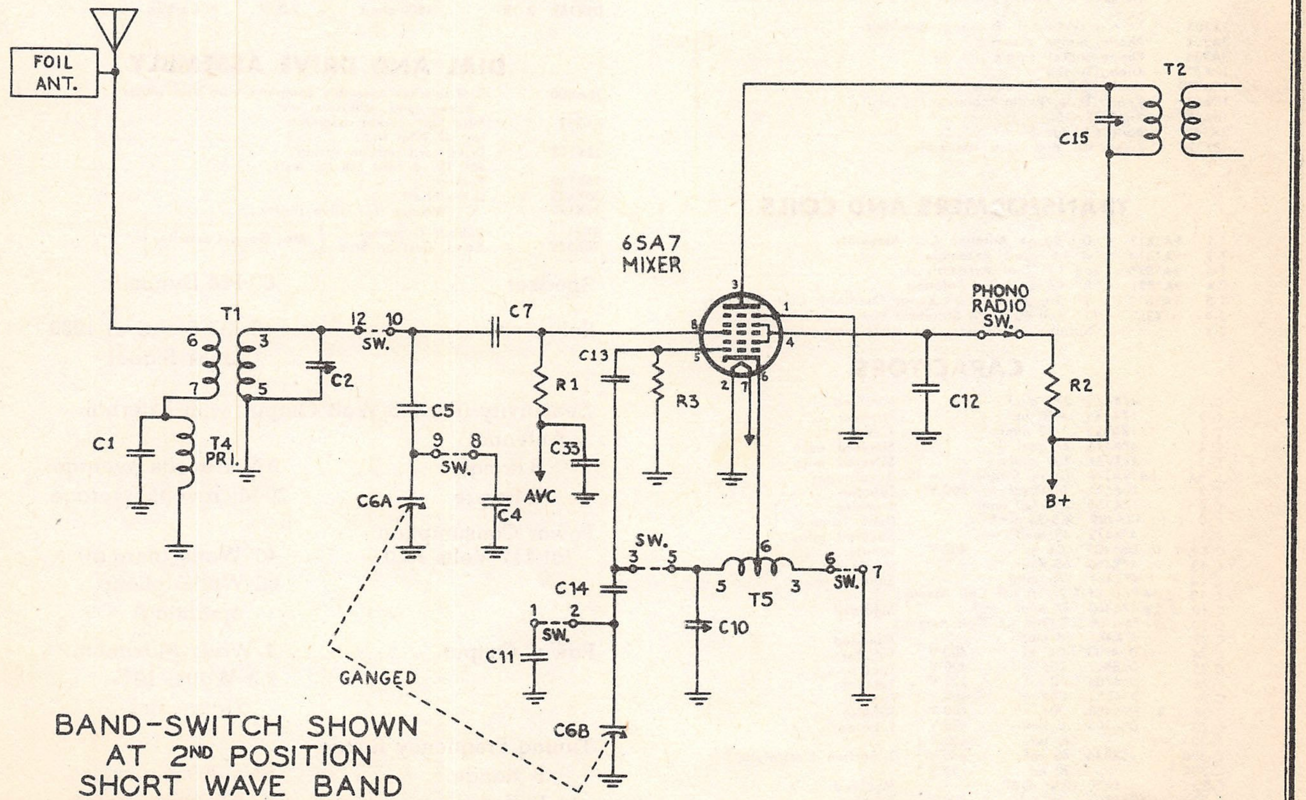
19 Meter Band..........15.1—15.3 MC
25 Meter Band..........11.7—11.9 MC
31 Meter Band..........9.5— 9.7 MC

Record Changer: General Instrument Model 205

## WESTERN AUTO SUPPLY CO.


FOIL ANT.
6
T1 PRI
7
LOOP ANT. T4
C1
C3
11
10
SW.
9
C7
C6A
C33
R1
AVC
C13
R3
6SA7 MIXER
3
1
8
4
5
2
7
6
PHONO RADIO SW.
C12
R2
B+
T2
C15
6
5
3
4
SW.
2
T5
4
1
3
2
C9
C8
6
5
SW.
C10
C6B
GANGED

BAND-SWITCH SHOWN AT 1ST POSITION. BROADCAST BAND
540 TO 1600 KC


FOIL ANT.
T1
6
7
3
5
C2
C1
T4 PRI.
12
10
SW.
C5
9
8
SW.
C4
C6A
C7
R1
C33
AVC
C13
R3
6SA7 MIXER
3
1
8
4
5
2
7
6
C12
PHONO RADIO SW.
R2
B+
T2
C15
SW.
3
5
6
5
T5
3
6
SW.
7
C14
1
2
SW.
C11
C10
C6B
GANGED

BAND-SWITCH SHOWN AT 2ND POSITION SHORT WAVE BAND
9 TO 15.6 MC.

# WESTERN AUTO SUPPLY CO.

## ALIGNMENT PROCEDURE

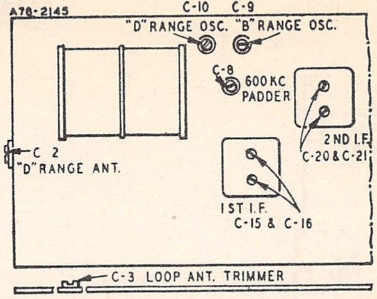
Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

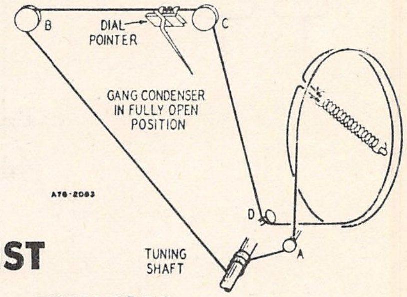
The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

| | SIGNAL GENERATOR | | | | | |
|---|---|---|---|---|---|---|
| | FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM |
| I.F. | 455 KC | Grid of 6SA7 Pin 8 | .1 mf. | B Range | Turn Rotor to Full Open | 2nd I.F. (C20) & (C21)<br>1st I.F. (C15) & (C16) |
| RANGE B | 1620 KC | Antenna Lead | 100 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C9) |
| | 1400 KC | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output Set Pointer to 1400 KC (See Note A) | Ant. Range B (C3) |
| | 600 KC | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output | Oscillator (C8) Rock Rotor—See Note B |
| | Repeat above steps at 1620 and 600 KC until readjusting the oscillator Range B Trimmer (C9) causes no further improvement of output. | | | | | |
| RANGE D | 15,600 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C10) |
| | 14,000 KC | Antenna Lead | 400 Ohm | D Range | Tune Rotor to Max. Output | Ant. Range D (C2) Rock Rotor—See Note B |
| LOOP RANGE B | Reassemble chassis in cabinet. | | | | | |
| | 1400 KC | Antenna Lead | 100 mmf. | B Range | Tune Rotor to Max. Output | Ant. Range B (C3) |



NOTE A—Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn Rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.



### DRIVE CORD REPLACEMENT

The drive cord should be replaced as shown on the accompanying illustration using a 46" drive cord for the purpose. Three turns are to be wound clockwise around the tuning shaft with the turns progressing away from the chassis. After the cord has been installed, stretch the tension spring and hook the free end to the tab on the drive pulley. Cut off any excess string that may remain.

## REPLACEMENT PARTS LIST

NOTICE: There is a power rating label on the chassis. This label specifies the power supply on which the radio may be used, and identifies the radio as to chassis, dial and issue letter. When ordering parts or writing, give ALL information appearing on this label.

### MISCELLANEOUS

| | |
|---|---|
| 12A442 | 6" P.M. Speaker Complete with Output Transformer |
| | Cone and Voice Coil Assembly (Specify part number and letters stamped on speaker) |
| | Output Transformer (Specify part number and letters stamped on speaker) |
| 3A303 | Tube socket-octal (8 prong) moulded |
| 3A304 | Phono motor socket |
| 3A305 | Phono socket—single pin tip |
| 10A578 | Knob (Tuning) |
| 10A579 | Knob (Off-On, Volume) |
| 10A581 | Knob (Tone, Radio-Phono) |
| 10A580 | Knob (SW-BC) |
| 2A359 | Band Change Switch |
| 13X328 | Line cord and plug assembly |

### TRANSFORMERS AND COILS

| | | |
|---|---|---|
| T-1 | 9A1812 | "D" Range Antenna Coil Assembly |
| T-2 | 9A1814 | 1st I.F. Coil Assembly |
| T-3 | 9A1815 | 2nd I.F. Coil Assembly |
| T-4 | 9A1831 | "B" Range Loop Antenna |
| T-5 | 9A1813 | "B" Range and "D" Range Oscillator Coil Assembly |
| T-6 | 53X282 | 117 Volt 60 Cycle Standard Power Transformer |
| T-7 | | Output Transformer (See Miscellaneous) |

### CAPACITORS

| | | | | |
|---|---|---|---|---|
| C-1 | 47X445 | 270 mmf | | Moulded |
| C-2 | 17A164 | 5-50 mmf | | Trimmer |
| C-3 | 17A123 | 1-12 mmf | | Trimmer |
| C-4 | 47X473 | 47 mmf | | Silvered mica |
| C-5 | 47X474 | 360 mmf | | Silvered mica |
| C-6A, C-6B | 14A178 | Gang Capacitor with drive pulley | | |
| C-7 | B66501 | .0005 mf | 200 V | Tubular |
| C-8 | 17A155 | 350-430 mmf | | Trimmer |
| C-9, C-10 | 17A109 | 2.5-35 mmf | | Dual Trimmer |
| C-11 | 47X472 | 40 mmf | | Silvered mica |
| C-12, C-18 | D66403 | .04 mf | 400 V | Tubular |
| C-13 | 47X466 | 68 mmf | | Moulded |
| C-14 | 47X481 | 286 mmf | | Silvered mica |
| C-15, C-16 | Part of T-2 (1st I.F. Coil Assem.) | | | |
| C-19, C-23 | 47X463 | 47 mmf | | Moulded |
| C-20, C-21 | Part of T-3 (2nd I.F. Coil Assem.) | | | |
| C-22 | 47X471 | 68 mmf | | Moulded |
| C-24 | D'4403 | .04 mf | 400 V | Tubular |
| C-25 | D66502 | .005 mf | 400 V | Tubular |
| C-26 | D66104 | .10 mf | 400 V | Tubular |
| C-27 | D54253 | .025 mf | 400 V | Tubular |
| C-28, C-31 | D66402 | .004 mf | 400 V | Tubular |
| C-29 | D56103 | .01 mf | 400 V | Tubular |
| C-30A | 45X346 | 40 mf | 450 V | 3 Section Electrolytic |
| C-30B | | 40 mf | 450 V | |
| C-30C | | 20 mf | 25 V | |
| C-32 | 47X470 | 330 mmf | | Moulded |
| C-33 | B66503 | .05 mf | 200 V | Tubular |
| C-34 | 47X476 | 100 mmf | | Moulded |

### RESISTORS

| | | | | |
|---|---|---|---|---|
| B85225 | R-1, R-7 | 2.2 megohms | 0.5 W | Carbon |
| C84393 | R-2, R-4 | 39 K ohms | 1.0 W | Carbon |
| B84393 | R-3 | 39 K ohms | 0.5 W | Carbon |
| B84222 | R-5 | 2200 ohms | 0.5 W | Carbon |
| B85105 | R-6 | 1 megohm | 0.5 W | Carbon |
| B85473 | R-8 | 47 K ohms | 0.5 W | Carbon |
| B84153 | R-9 | 15 K ohms | 0.5 W | Carbon |
| 36X358 | R-10 | .5 megohm | Volume control and line switch | |
| B85106 | R-11 | 10 megohms | 0.5 W | Carbon |
| B85474 | R-12, R-16 | 470 K ohms | 0.5 W | Carbon |
| B84333 | R-13 | 33 K ohms | 0.5 W | Carbon |
| B84823 | R-14 | 82 K ohms | 0.5 W | Carbon |
| *40X276 | R-15 | 3.0 megohms | Tone control & Radio-Phono switch | |
| C84271 | R-17 | 270 ohms | 1.0 W | Carbon |
| 43X213 | R-18 | 2.0 ohms | 0.5 W | Wire wound |
| D84182 | R-19 | 1800 ohms | 2.0 W | Carbon |

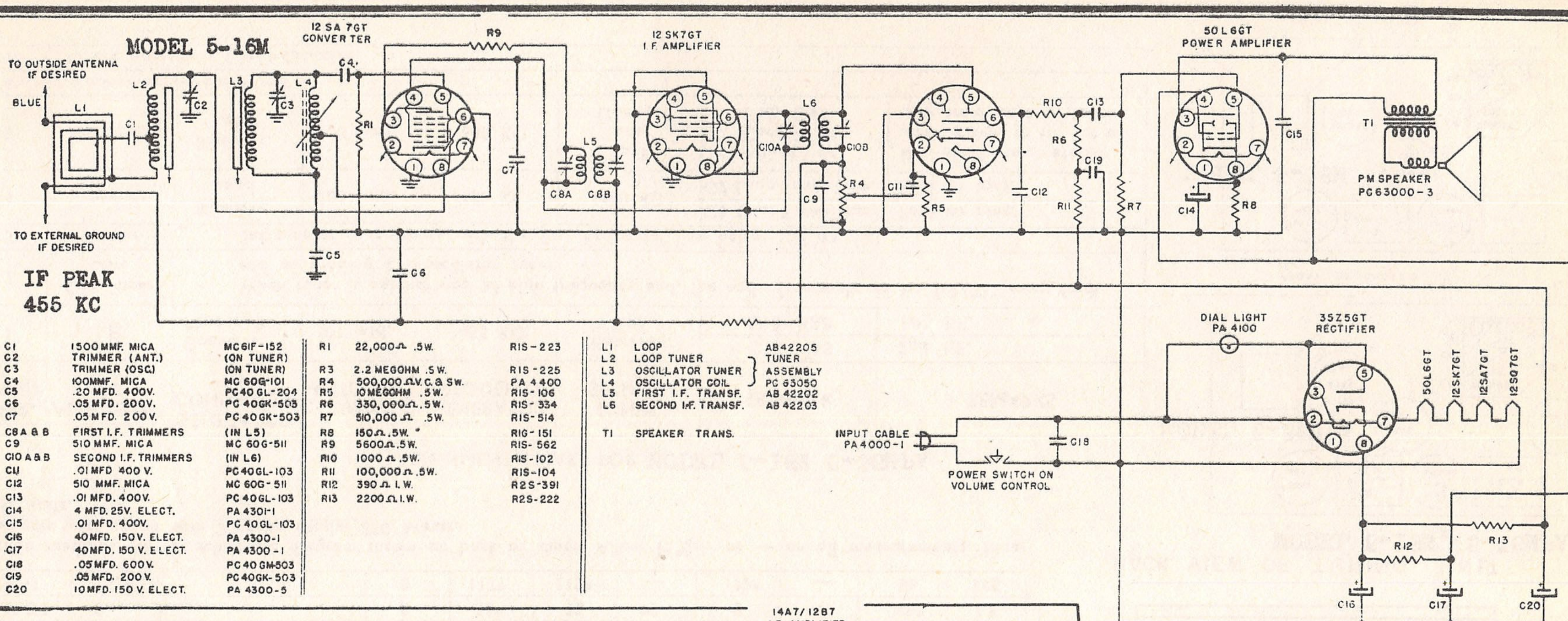
### DIAL AND DRIVE ASSEMBLY

| | |
|---|---|
| 26A400 | Dial bracket assembly complete with dial glass, background, diffusers, etc. |
| 7A202 | Pilot light socket assembly |
| | No. 47 Pilot light |
| 28X113 | Drive cord tension spring |
| | 46" Drive cord (18 lb. test) |
| 15X150 | Pointer |
| 26X485 | Drive Shaft |
| 19X192 | "C" Washer (for drive shaft) |
| 6X21 | Rubber Grommet } Mtg. Gang Capacitor |
| 20X329 | Cond. Cushion Stud } Mtg. Gang Capacitor |

| | |
|---|---|
| Speaker | 6" PM Dynamic |
| Selectivity | 40 KC Broad at 1000 Times Signal |
| Sensitivity (For 0.5 Watt Output, with External Antenna) | |
| B Range | 9 Microvolts Average |
| D Range | 20 Microvolts Average |
| Power Consumption (at 117 Volts AC) | 40 Watts (normal)<br>60 Watts (phono operating) |
| Power Output | 4 Watts Maximum<br>2.3 Watts, 10% Harmonics |
| Tuning Frequency Range | |
| B Range | 540-1600 Kilocycles |
| D Range | 9-15.5 Megacycles |

# U. S. TELEV. MFG. CORP.

## MODEL 5-16M


TO OUTSIDE ANTENNA IF DESIRED
BLUE
L1
C1
L2
C2
L3
C3
L4
C4
12 SA 7GT CONVERTER
R1
R9
C5
C6
C7
L5
C8A
C8B
12 SK7GT I.F. AMPLIFIER
L6
C10A
C10B
C9
R4
C11
R5
R10
C13
R6
C19
R11
C12
R7
50L6GT POWER AMPLIFIER
C14
R8
C15
T1
PM SPEAKER PC63000-3
TO EXTERNAL GROUND IF DESIRED
DIAL LIGHT PA 4100
35Z5GT RECTIFIER
50L6GT
12SK7GT
12SA7GT
12SQ7GT
INPUT CABLE PA4000-1
C18
POWER SWITCH ON VOLUME CONTROL
R12
R13
C16
C17
C20

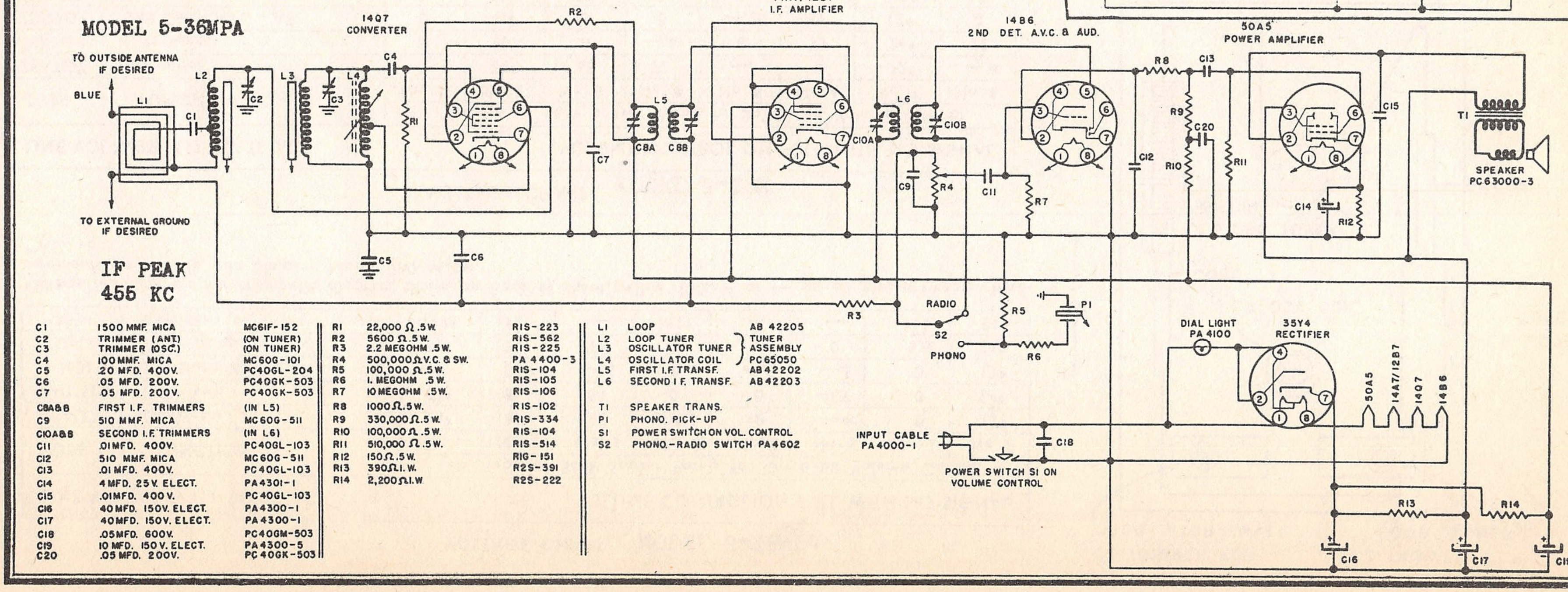
IF PEAK
455 KC

| | | |
|---|---|---|
| C1 | 1500 MMF. MICA | MC6IF-152 |
| C2 | TRIMMER (ANT.) | (ON TUNER) |
| C3 | TRIMMER (OSC.) | (ON TUNER) |
| C4 | 100MMF. MICA | MC 60G-101 |
| C5 | .20 MFD. 400V. | PC40 GL-204 |
| C6 | .05 MFD. 200V. | PC 40GK-503 |
| C7 | .05 MFD. 200V. | PC 40GK-503 |
| C8 A & B | FIRST I.F. TRIMMERS | (IN L5) |
| C9 | 510 MMF. MICA | MC 60G-511 |
| C10 A & B | SECOND I.F. TRIMMERS | (IN L6) |
| C11 | .01 MFD 400 V. | PC40GL-103 |
| C12 | 510 MMF. MICA | MC 60G-511 |
| C13 | .01 MFD. 400V. | PC 40GL-103 |
| C14 | 4 MFD. 25V. ELECT. | PA 4301-1 |
| C15 | .01 MFD. 400V. | PC 40GL-103 |
| C16 | 40MFD. 150V. ELECT. | PA 4300-1 |
| C17 | 40MFD. 150 V. ELECT. | PA 4300-1 |
| C18 | .05MFD. 600V. | PC 40 GM-503 |
| C19 | .05 MFD. 200 V. | PC 40GK-503 |
| C20 | 10MFD. 150 V. ELECT. | PA 4300-5 |

| | | |
|---|---|---|
| R1 | 22,000Ω .5W. | RIS-223 |
| R3 | 2.2 MEGOHM .5W. | RIS-225 |
| R4 | 500,000Ω V.C. & SW. | PA 4400 |
| R5 | 10 MEGOHM .5W. | RIS-106 |
| R6 | 330,000Ω .5W. | RIS-334 |
| R7 | 510,000Ω .5W. | RIS-514 |
| R8 | 150Ω .5W. | RIG-151 |
| R9 | 5600Ω .5W. | RIS-562 |
| R10 | 1000Ω .5W. | RIS-102 |
| R11 | 100,000Ω .5W. | RIS-104 |
| R12 | 390Ω 1.W. | R2S-391 |
| R13 | 2200Ω 1.W. | R2S-222 |

| | | |
|---|---|---|
| L1 | LOOP | AB42205 |
| L2 | LOOP TUNER | TUNER |
| L3 | OSCILLATOR TUNER | ASSEMBLY |
| L4 | OSCILLATOR COIL | PC 65050 |
| L5 | FIRST I.F. TRANSF. | AB 42202 |
| L6 | SECOND I.F. TRANSF. | AB 42203 |
| T1 | SPEAKER TRANS. | |

## MODEL 5-36MPA


TO OUTSIDE ANTENNA IF DESIRED
BLUE
L1
C1
L2
C2
L3
C3
L4
C4
14Q7 CONVERTER
R1
R2
C5
C6
C7
L5
C8A
C8B
14A7/12B7 I.F. AMPLIFIER
C10A
L6
C10B
C9
R4
C11
R7
14B6 2ND DET. A.V.C. & AUD.
C12
R8
C13
R9
C20
R10
R11
50A5 POWER AMPLIFIER
C14
R12
C15
T1
SPEAKER PC63000-3
TO EXTERNAL GROUND IF DESIRED
R3
RADIO
S2
PHONO
R5
P1
R6
DIAL LIGHT PA 4100
35Y4 RECTIFIER
50A5
14A7/12B7
14Q7
14B6
INPUT CABLE PA4000-1
C18
POWER SWITCH S1 ON VOLUME CONTROL
R13
R14
C16
C17
C19

IF PEAK
455 KC

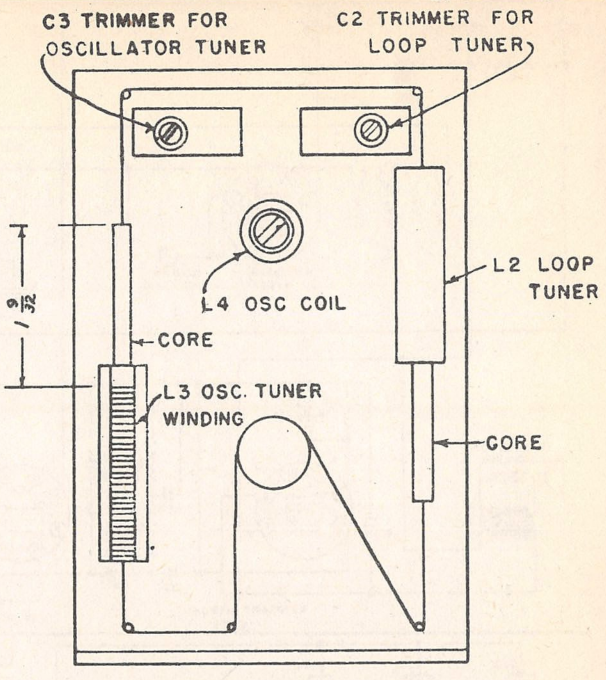
| | | |
|---|---|---|
| C1 | 1500 MMF. MICA | MC6IF-152 |
| C2 | TRIMMER (ANT.) | (ON TUNER) |
| C3 | TRIMMER (OSC.) | (ON TUNER) |
| C4 | 100 MMF. MICA | MC60G-101 |
| C5 | .20 MFD. 400V. | PC40GL-204 |
| C6 | .05 MFD. 200V. | PC40GK-503 |
| C7 | .05 MFD. 200V. | PC40GK-503 |
| C8A&B | FIRST I.F. TRIMMERS | (IN L5) |
| C9 | 510 MMF. MICA | MC60G-511 |
| C10A&B | SECOND I.F. TRIMMERS | (IN L6) |
| C11 | .01 MFD. 400V. | PC40GL-103 |
| C12 | 510 MMF. MICA | MC60G-511 |
| C13 | .01 MFD. 400V. | PC40GL-103 |
| C14 | 4 MFD. 25 V. ELECT. | PA4301-1 |
| C15 | .01 MFD. 400 V. | PC40GL-103 |
| C16 | 40 MFD. 150V. ELECT. | PA4300-1 |
| C17 | 40 MFD. 150V. ELECT. | PA4300-1 |
| C18 | .05 MFD. 600V. | PC40GM-503 |
| C19 | 10 MFD. 150 V. ELECT. | PA4300-5 |
| C20 | .05 MFD. 200V. | PC 40GK-503 |

| | | |
|---|---|---|
| R1 | 22,000 Ω .5W. | RIS-223 |
| R2 | 5600 Ω .5W. | RIS-562 |
| R3 | 2.2 MEGOHM .5W. | RIS-225 |
| R4 | 500,000Ω V.C. & SW. | PA 4400-3 |
| R5 | 100,000 Ω .5W. | RIS-104 |
| R6 | 1. MEGOHM .5W. | RIS-105 |
| R7 | 10 MEGOHM .5W. | RIS-106 |
| R8 | 1000Ω .5W. | RIS-102 |
| R9 | 330,000Ω .5W. | RIS-334 |
| R10 | 100,000Ω .5W. | RIS-104 |
| R11 | 510,000 Ω .5W. | RIS-514 |
| R12 | 150Ω .5W. | RIG-151 |
| R13 | 390Ω 1.W. | R2S-391 |
| R14 | 2,200Ω 1.W. | R2S-222 |

| | | |
|---|---|---|
| L1 | LOOP | AB 42205 |
| L2 | LOOP TUNER | TUNER |
| L3 | OSCILLATOR TUNER | ASSEMBLY |
| L4 | OSCILLATOR COIL | PC65050 |
| L5 | FIRST I.F. TRANSF. | AB42202 |
| L6 | SECOND I F. TRANSF. | AB42203 |
| T1 | SPEAKER TRANS. | |
| P1 | PHONO. PICK-UP | |
| S1 | POWER SWITCH ON VOL. CONTROL | |
| S2 | PHONO.-RADIO SWITCH PA4602 | |

MODEL 5-16M
MODEL 5-36MPA

# U. S. TELEV. MFG. CORP.


C3 TRIMMER FOR
OSCILLATOR TUNER
C2 TRIMMER FOR
LOOP TUNER
L2 LOOP
TUNER
L4 OSC COIL
CORE
L3 OSC. TUNER
WINDING
CORE
$1\frac{9}{32}$

BACK VIEW OF TUNING UNIT
**MODEL 5-16M, 5-36MPA**

## VOLTAGE CHART **MODEL 5-36MPA**

| LINE VOLTAGE: 117 VOLTS AC | | VOLUME CONTROL ON FULL WITH NO SIGNAL | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Voltage of Each Socket Prong to Switch on Volume Control | | | | | | | |
| TUBE | FUNCTION | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 |
| 14Q7 | Converter | 24* | 67 | 85 | —5.5 | 0 | —.4 | 0 | 13* |
| 14A7/12B7 | I. F. Amp. | 37* | 84 | 84 | 0 | 0 | —.5 | 0 | 24* |
| 14B6 | 2nd Det. - AVC - AF | 0 | 55 | —.5 | 0 | —.5 | —.6 | 0 | 13* |
| 50A5 | Power Amp. | 37* | 76 | 83 | — | — | 0 | 5.6 | 84* |
| 35Y4 | Rectifier | 117* | 112* | — | 112* | — | — | 114. | 84* |

Voltage readings are for schematic diagram shown on back of sheet. Allow 15%+ or — on all measurements. Measurements were made with Simpson Model 260 Meter.
* AC volts.

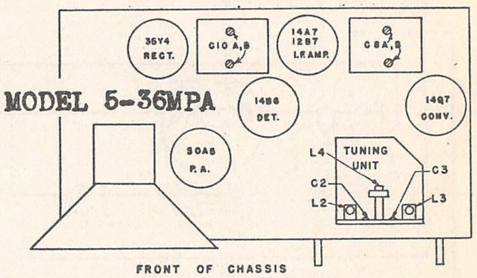
## VOLTAGE CHART **MODEL 5-16M**

| LINE VOLTAGE: 117 VOLTS AC | | VOLUME CONTROL ON FULL WITH NO SIGNAL | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Voltage of Each Socket Prong to Switch on Volume Control | | | | | | | |
| TUBE | FUNCTION | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 |
| 12SA7GT | Converter | 0 | 24* | 65 | 72 | —6 | 0 | 12* | —.4 |
| 12SK7GT | I. F. Amp. | 0 | 36* | 0 | —.4 | 0 | 72 | 24* | 72 |
| 12SQ7GT | 2nd Det. - AVC - AF | 0 | —.4 | 0 | 0 | —.25 | 49 | 12* | 0 |
| 50L6LGT | Power Amp. | 0 | 36* | 92 | 99 | 0 | — | 86* | 6.5 |
| 35Z5GT | Rectifier | 0 | 117* | 112* | — | 112* | — | 86 | 115 |

Voltage readings are for schematic diagram shown on back of sheet. Allow 15%+ or — on all measurements. Measurements were made with Simpson Model 230 Meter.
* AC volts.

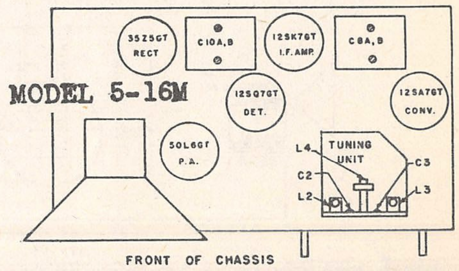
## ALIGNMENT CHART FOR **MODEL 5-16M 5-36MPA**

| OPER-ATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | TUNER SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | I.F. | Converter Pin No. 8 | .01 mfd. | 455 KC | High Freq. End | C10 A&B | 2nd I.F. |
| | | | | | | C 8 A&B | 1st I.F. |
| 2 | Osc. Tuner Core | When tuner is against stop at high frequency end, the end of core should be 1-9/32" away from end of winding L3, oscillator tuner | | | | | |
| 3 | Pointer | Set pointer to coincide with the first horizontal line below 160 on dial | | | | | |
| 4 | Trimmers | Blue Ant. Lead | 200 mmf. | 1400 KC | 1400 KC | C3 Osc. Tuner Trim. | Peak at max. |
| | | | | | | C2 Loop Tuner Trim. | Peak at max. |
| 5 | Oscillator | Blue Ant. Lead | 200 mmf. | 600 KC | Rock Tuner Control | Adjust Iron Core in L4 Osc. Coil | Use short non-metallic screw driver to fit slot of core from back of tuner |
| 6 | Repeat operations 4 and 5 | | | | | | |
| 7 | Check operations 1 to 6 inclusive | | | | | | |


35Y4
RECT.
C10 A,B
14A7
12B7
I.F.AMP.
C8A,B
14B6
DET.
14Q7
CONV.
50A5
P.A.
TUNING
UNIT
L4
C2
L2
C3
L3

**MODEL 5-36MPA**

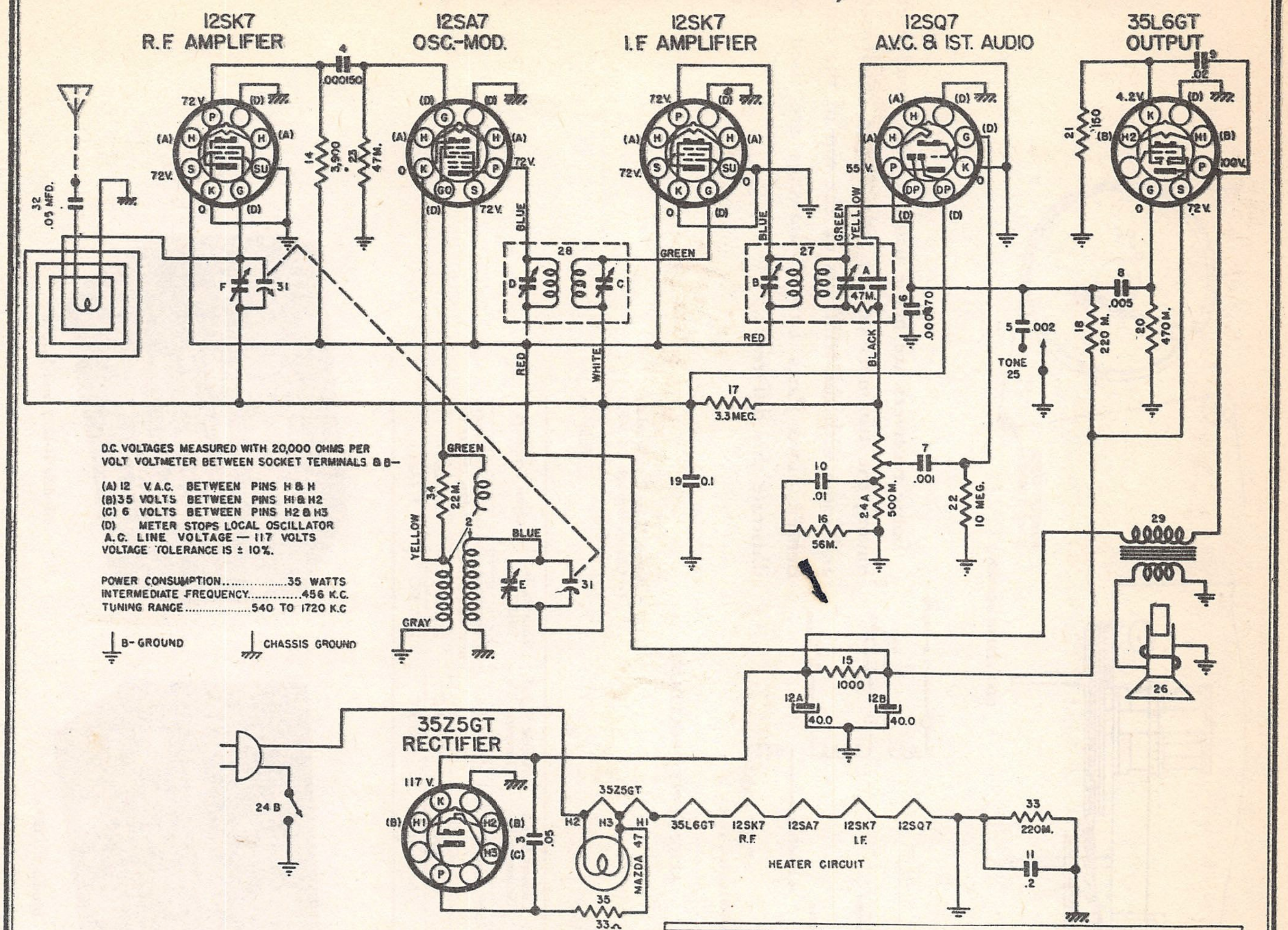
FRONT OF CHASSIS


35Z5GT
RECT
C10A,B
12SK7GT
I.F.AMP.
C8A,B
12SQ7GT
DET.
12SA7GT
CONV.
50L6GT
P.A.
TUNING
UNIT
L4
C2
L2
C3
L3

**MODEL 5-16M**

FRONT OF CHASSIS

# UNITED MOTORS SERVICE CORP. MODELS R-1227, R-1228, R-1229
## (DIV. OF GEN. MOTORS)

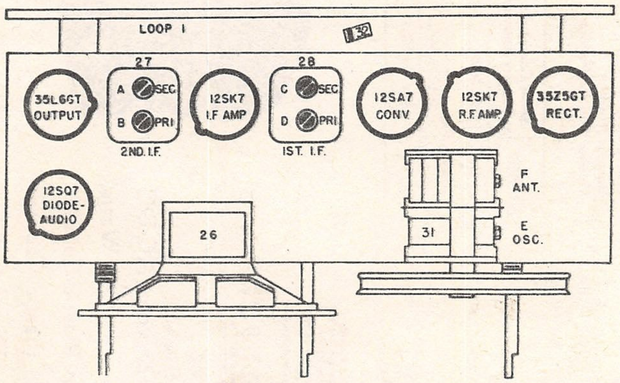

12SK7
R.F. AMPLIFIER
12SA7
OSC.-MOD.
12SK7
I.F. AMPLIFIER
12SQ7
A.V.C. & IST. AUDIO
35L6GT
OUTPUT
4 .000150
14 3,900
23 47M.
32 .05 MFD.
31
28
27
9 .02
21 150
4.2V.
100V.
72V.
55V.
BLUE
GREEN
YELLOW
RED
WHITE
BLACK
GRAY
6 .000470
47M.
5 .002
TONE 25
8 .005
18 220 M.
20 470 M.
17 3.3 MEG.
19 0.1
10 .01
16 56M.
24A 500 M.
7 .001
22 10 MEG.
34 22M.
29
26
15 1000
12A 40.0
12B 40.0
35Z5GT
RECTIFIER
117 V.
24 B
3 .05
H2 H3 H1
MAZDA 47
35 33
35L6GT 12SK7 R.F. 12SA7 12SK7 I.F. 12SQ7
HEATER CIRCUIT
33 220M.
11 .2

D.C. VOLTAGES MEASURED WITH 20,000 OHMS PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B–

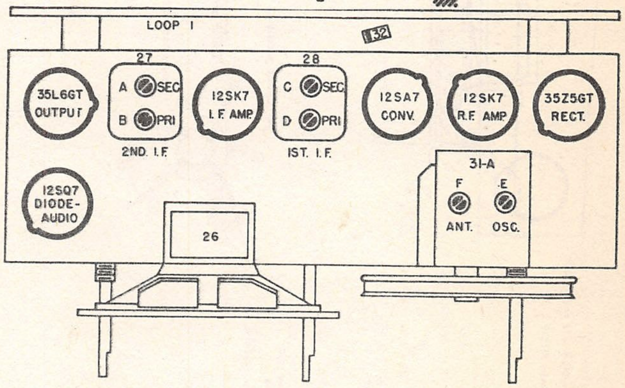
(A) 12 V.A.C. BETWEEN PINS H & H
(B) 35 VOLTS BETWEEN PINS H1 & H2
(C) 6 VOLTS BETWEEN PINS H2 & H3
(D) METER STOPS LOCAL OSCILLATOR
A.C. LINE VOLTAGE — 117 VOLTS
VOLTAGE TOLERANCE IS ± 10%.

| | |
|---|---|
| POWER CONSUMPTION | 35 WATTS |
| INTERMEDIATE FREQUENCY | 456 K.C. |
| TUNING RANGE | 540 TO 1720 K.C |

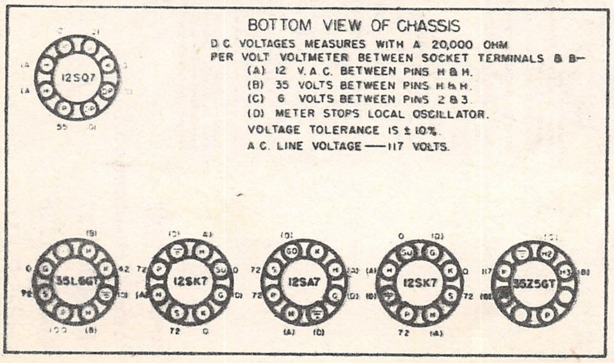
B-GROUND
CHASSIS GROUND


LOOP 1
32
27
A SEC
B PRI
2ND. I.F.
28
C SEC
D PRI
IST. I.F.
35L6GT OUTPUT
12SK7 I.F. AMP
12SA7 CONV.
12SK7 R.F. AMP.
35Z5GT RECT.
12SQ7 DIODE-AUDIO
26
31
F ANT.
E OSC.

PARTS LAYOUT — TUBE VIEW
TRIMMERS ON SIDE OF TUNING CONDENSER


LOOP 1
32
27
A SEC
B PRI
2ND. I.F.
28
C SEC
D PRI
IST. I.F.
35L6GT OUTPUT
12SK7 I.F. AMP.
12SA7 CONV.
12SK7 R.F. AMP.
35Z5GT RECT.
12SQ7 DIODE-AUDIO
31-A
F ANT.
E OSC.
26

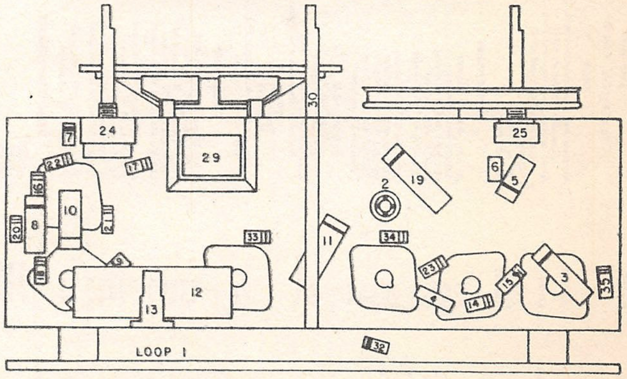
PARTS LAYOUT — TUBE VIEW
TRIMMERS ON TOP OF TUNING CONDENSER


12SQ7
35L6GT
12SK7
12SA7
12SK7
35Z5GT

BOTTOM VIEW OF CHASSIS

D.C. VOLTAGES MEASURES WITH A 20,000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B–
(A) 12 V.A.C. BETWEEN PINS H & H.
(B) 35 VOLTS BETWEEN PINS H & H.
(C) 6 VOLTS BETWEEN PINS 2 & 3.
(D) METER STOPS LOCAL OSCILLATOR.
VOLTAGE TOLERANCE IS ± 10%.
A.C. LINE VOLTAGE —— 117 VOLTS.

TUBE SOCKET VOLTAGE CHART

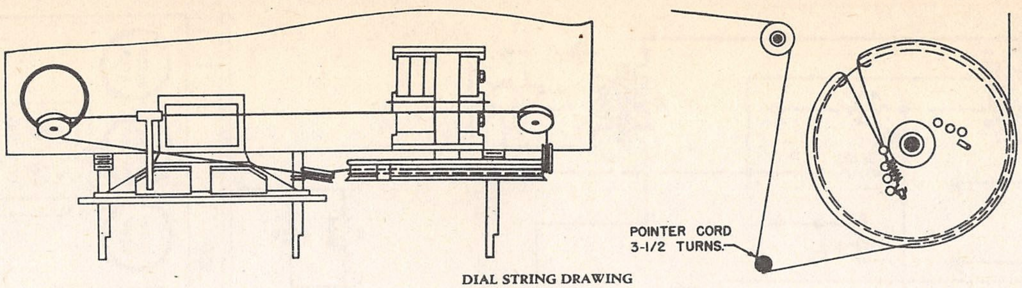

30
24
25
7
29
22
17
16
10
21
6
5
2
19
8
20
11
33
34
18
9
12
13
23
4
14
15
3
35
LOOP 1
32

PARTS LAYOUT — CHASSIS VIEW

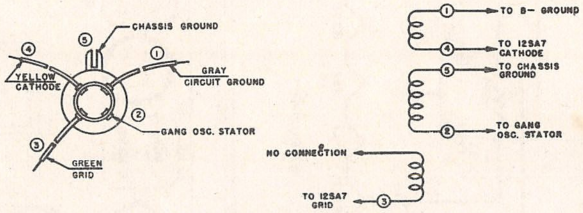
# MODELS R-1227, R-1228, R-1229 UNITED MOTORS SERVICE CORP.
## (DIV. OF GEN. MOTORS)

| Illus. No. | Service Part No. | Description |
|---|---|---|
| | | **ELECTRICAL PARTS** |
| | | **COILS** |
| 1 | 1217138 | Antenna Assy. — Loop and Back Cover — Models R-1227 and R-1228, (Includes Condenser #32) |
| 1A | 1216937 | Antenna Assy. — Loop and Back Cover — Model R-1229 (Includes Condenser #32) |
| 2 | 1216915 | Oscillator Coil Complete |
| 27 | 1216570 | 2nd I. F. Assy. |
| 28 | 1216605 | 1st I. F. Assy. |
| | | **CONDENSERS** |
| 3 | E503 | .05 Mfd. 600 V. Tubular |
| 4 | G151 | .000150 Mfd. Molded |
| 5 | E202 | .002 Mfd. 600 V. Tubular |
| 6 | G471 | .000470 Mfd. Molded |
| 7 | E102 | .001 Mfd. 600 V. Tubular |
| 8 | E502 | .005 Mfd. 600 V. Tubular |
| 9 | E203 | .02 Mfd. 600 V. Tubular |
| 10 | E103 | .01 Mfd. 600 V. Tubular |
| 11 | E204 | .20 Mfd. 400 V. Tubular |
| 12 | J908 | 2 Section Electrolytic |
| 12A | | 40 Mfd. 150 V. |
| 12B | | 40 Mfd. 150 V. |
| 19 | E104 | .10 Mfd. 600 V. Tubular |
| 31 | 1217414 | Condenser and Pulley Parts Pkg.<br>Variable Condenser and Pulley Assy.<br>Grommet (3) Lockwasher (2)<br>Spacer - Sleeve (3) Solder Lug<br>Screw (3) |
| 31A | 1217415 | Condenser and Pulley Parts Pkg. (Alternate for 1217414) |
| 32 | E503 | .05 Mfd. 600 V. Tubular |
| | | **RESISTORS** |
| 14 | A392 | 3,900 Ohms ½ W. Insulated |
| 15 | B102 | 1,000 Ohms 1 W. Insulated |
| 16 | A563 | 56,000 Ohms ½ W. Insulated |
| 17 | A335 | 3.3 Megohm ½ W. Insulated |
| 18 | A224 | 220,000 Ohms ½ W. Insulated |
| 20 | A474 | 470,000 Ohms ½ W. Insulated |
| 21 | A151 | 150 Ohms ½ W. Insulated |
| 22 | A106 | 10 Megohm ½ W. Insulated |
| 23 | A473 | 47,000 Ohms ½ W. Insulated |
| 33 | A224 | 220,000 Ohms ½ W. Insulated |
| 34 | A223 | 22,000 Ohms ½ W. Insulated |
| 35 | A330 | 33 Ohms ½ W. Insulated |
| | | **TUBE COMPLEMENT** |
| | 1213813 | 12SQ7 |
| | 1213809 | 12SA7 |
| | 1213812 | 12SK7 |
| | 1213818 | 35L6GT |
| | 1213848 | 35Z5GT — Rectifier |
| | | **MISCELLANEOUS ELECTRICAL PARTS** |
| 13 | 1216559 | Clip — Condenser |
| 24 | 1216505 | Control — Volume Control and Switch |
| 24A | | Volume Control |
| 24B | | Switch |
| 25 | 1216544 | Control — Tone |
| | 47 | Lamp — Dial Light (Mazda #47) |
| 26 | 1216563 | Speaker — 5" PM |
| 29 | 1216557 | Transformer — Output |
| | | **MISCELLANEOUS CHASSIS PARTS** |
| | 7241702 | Cord — Dial Drive (72" Length) |
| | 1216512 | Cord — Power |
| | 1216562 | Pointer — Dial |
| | 1216650 | Shaft — Drive |
| | 1217323 | Spring — Cord Tension |
| | 1217819 | Socket — Dial Light Assy. (Less Lamp) |
| | 7236279 | Socket — Octal Base Tube |
| | 7245333 | Washer — "C" (Use With Drive Shaft) |
| | | **CABINET PARTS** |
| | 1217724 | Cabinet Assy. — Model R-1227 — Brown Plastic (Complete With Dial Glass, Clamps and Screws) |
| | 1217725 | Cabinet Assy. — Model R-1228 — White Plastic (Complete With Dial Glass, Clamps and Screws) |
| | 1217723 | Cabinet Assy. — Model R-1229 — Wood (Complete With Dial Glass, Clamps and Screws) |
| | 1217191 | Clamp — Dial Glass — Model R-1229 |
| | 1216583 | Clamp — R. H. — Dial Glass — Models R-1227 and R-1228 |
| | 1216582 | Clamp — L. H. — Dial Glass — Models R-1227 and R-1228 |
| | 1217156 | Dial Glass — Models R-1227, R-1228 and R-1229 |
| | 1217575 | Knob — Brown — Control — Model R-1227 |
| | 1217571 | Knob — Ivory — Control — Model R-1228 |
| | 1216878 | Knob — Ivory — Control — Model R-1229 |
| | 1217192 | Rubber Band — Model R-1229 |
| | 1217169 | Screw — Self Tapping — Models R-1227 and R-1228 |

Power Supply ........ 105/125 volts AC-DC
Power Consumption ........ 35 Watts
Model R-1227 ........ Brown Plastic Cabinet
Model R-1228 ........ White Plastic Cabinet
Model R-1229 ........ Wood Cabinet



DIAL STRING DRAWING



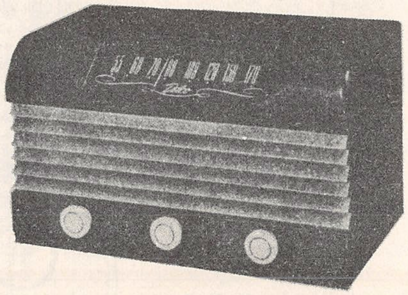
OSCILLATOR COIL

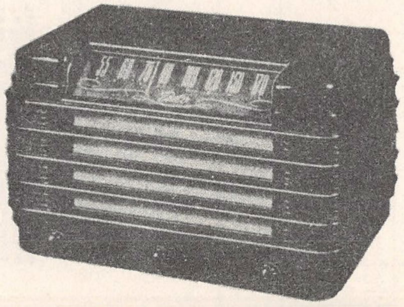
Some receivers are made using a gang condenser having the trimmers on the side of the condenser and some with the trimmers on the top of the condenser. Two Parts Layout drawings are used to illustrate this difference.

## ALIGNMENT PROCEDURE

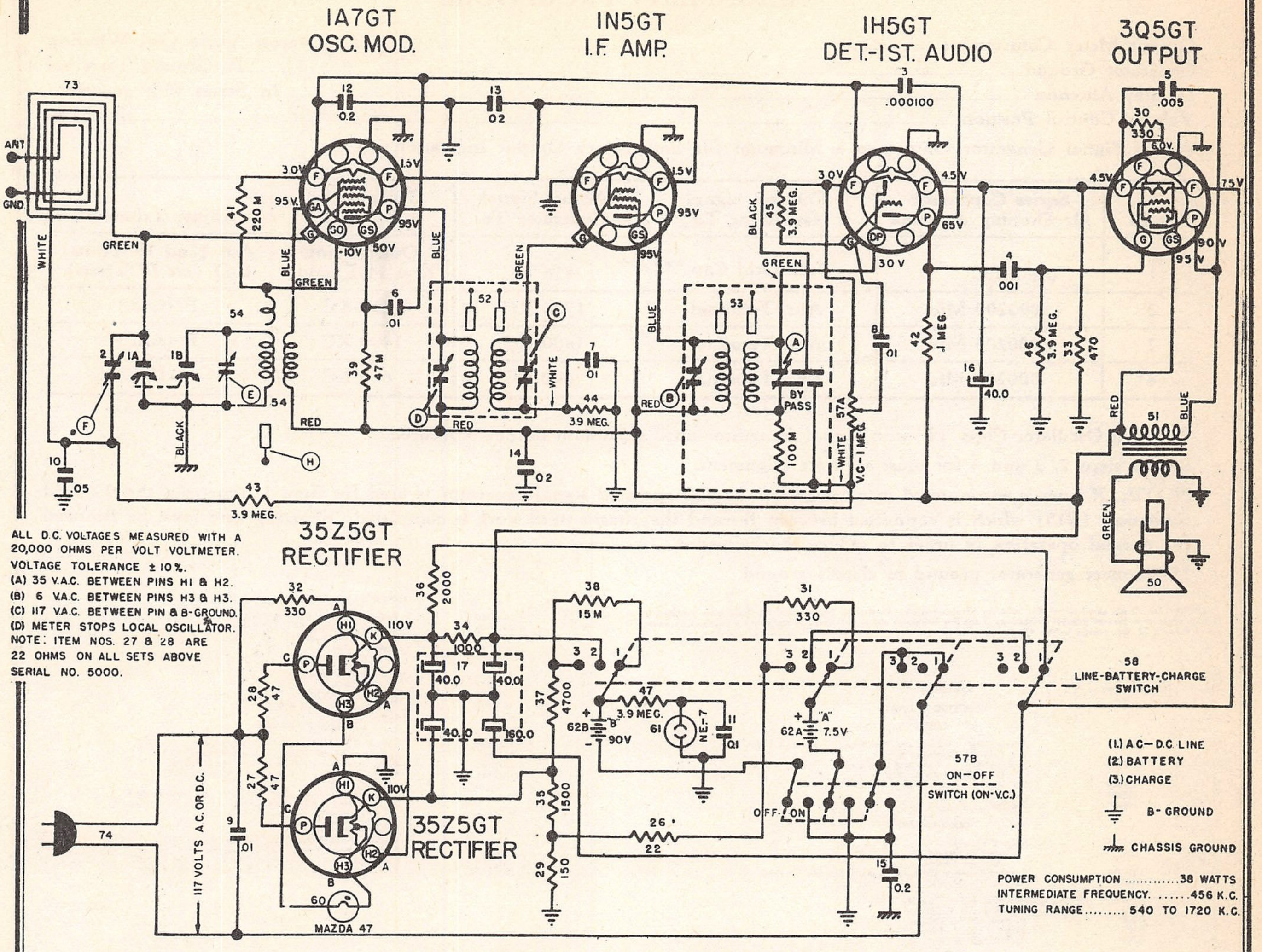
Output Meter Connections ........ Across Voice Coil Winding
Generator Ground ........ To Chassis through .01 MFD
Dummy Antenna ........ In Series with generator
Volume Control Position ........ Fully on

| Steps | Series Condenser or Dummy Antenna | Connect Signal Generator To | Adjust Signal Generator To | Turn Radio Dial To | Adjust Trimmers |
|---|---|---|---|---|---|
| 1 | .02 Mfd. | 12SA7 Grid (Pin #8) | 456 KC | Quiet Point near H. F. end | A-B (2nd IF Trans)<br>C-D (1st IF Trans) |
| 2 | .000200 Mfd. | Ant. lead | 1720 KC | 1720 KC | E (Osc.) |
| 3 | .000200 Mfd. | Ant. lead | 1400 KC | 1400 KC | F (Ant.) |


Model R-1229

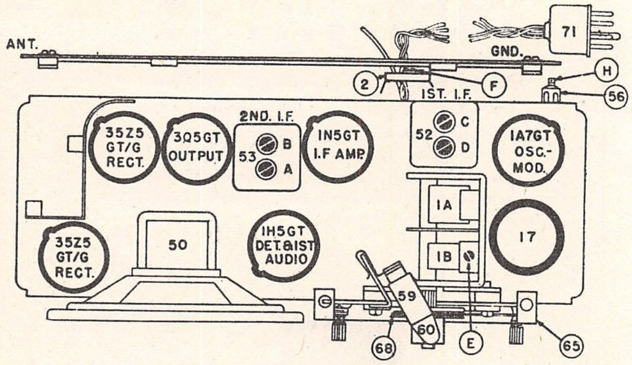

Models R-1227 and R-1228

# UNITED MOTORS SERVICE CORP. MODELS R-1408, R-1409
## (DIV. OF GEN. MOTORS)

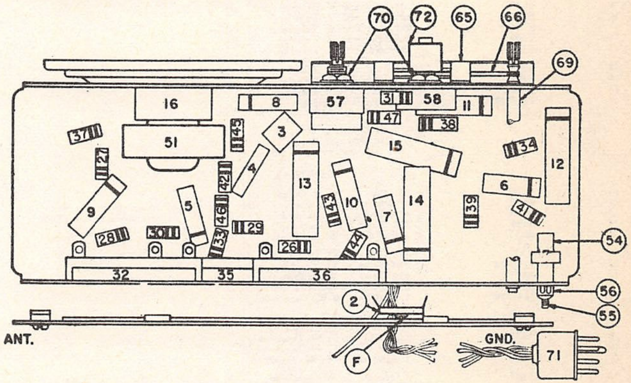

1A7GT
OSC. MOD.
1N5GT
I.F. AMP.
1H5GT
DET.-1ST. AUDIO
3Q5GT
OUTPUT
35Z5GT
RECTIFIER
35Z5GT
RECTIFIER
ANT.
GND.
WHITE
GREEN
BLUE
RED
BLACK
BY PASS
V.C.-1 MEG.
MAZDA 47
117 VOLTS A.C. OR D.C.
58
LINE-BATTERY-CHARGE SWITCH
57B
ON-OFF SWITCH (ON-V.C.)
OFF
ON
"B" 90V
"A" 7.5V
NE-7
(1.) A.C.-D.C. LINE
(2.) BATTERY
(3.) CHARGE
B- GROUND
CHASSIS GROUND

ALL D.C. VOLTAGES MEASURED WITH A 20,000 OHMS PER VOLT VOLTMETER.
VOLTAGE TOLERANCE ±10%.
(A) 35 V.A.C. BETWEEN PINS H1 & H2.
(B) 6 V.A.C. BETWEEN PINS H3 & H3.
(C) 117 V.A.C. BETWEEN PIN & B-GROUND.
(D) METER STOPS LOCAL OSCILLATOR.
NOTE: ITEM NOS. 27 & 28 ARE 22 OHMS ON ALL SETS ABOVE SERIAL NO. 5000.

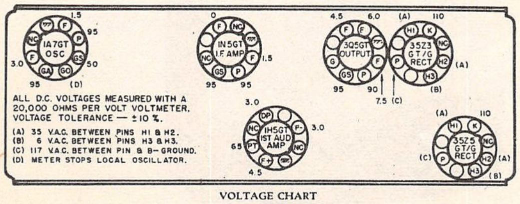
POWER CONSUMPTION ............38 WATTS
INTERMEDIATE FREQUENCY. ......456 K.C.
TUNING RANGE.........540 TO 1720 K.C.


ANT.
GND.
1ST. I.F.
2ND. I.F.
35Z5 GT/G RECT.
3Q5GT OUTPUT
1N5GT I.F. AMP.
1A7GT OSC.-MOD.
1H5GT DET & 1ST AUDIO
35Z5 GT/G RECT.
1A
1B
50
17
52
53
59
60
65
68
71
56

**PARTS LAYOUT - TUBE VIEW**

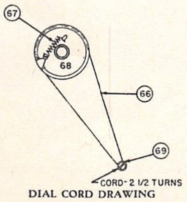

70
72
65
66
69
16
8
57
58
51
3
13
15
12
14
9
5
54
56
55
32
35
36
ANT.
GND.
71

**PARTS LAYOUT - CHASSIS VIEW**

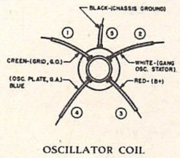

1A7GT OSC
1N5GT I.F. AMP
3Q5GT OUTPUT
35Z3 GT/G RECT
1H5GT 1ST AUD AMP
35Z5 GT/G RECT
1.5
95
50
3.0
95
(D)
0
1.5
95
95
4.5
6.0
95
90
7.5 (C)
(A)
110
(A)
(B)
3.0
3.0
65
4.5
(A)
110
(C)
(A)
(B)

ALL D.C. VOLTAGES MEASURED WITH A 20,000 OHMS PER VOLT VOLTMETER.
VOLTAGE TOLERANCE — ±10 %.
(A) 35 V.A.C. BETWEEN PINS H1 & H2.
(B) 6 V.A.C. BETWEEN PINS H3 & H3.
(C) 117 V.A.C. BETWEEN PIN & B-GROUND.
(D) METER STOPS LOCAL OSCILLATOR.

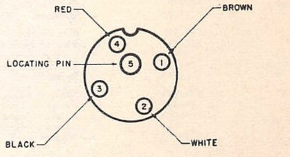
VOLTAGE CHART


67
68
66
69
CORD-2 1/2 TURNS

DIAL CORD DRAWING


BLACK-(CHASSIS GROUND)
GREEN-(GRID, G.O.)
WHITE-(GANG OSC. STATOR)
(OSC. PLATE, G.A.) BLUE
RED-(B+)
1
2
3
4
5

OSCILLATOR COIL


RED
BROWN
LOCATING PIN
BLACK
WHITE
1
2
3
4
5

BATTERY PLUG CONNECTIONS (SHELL SIDE)

# MODELS R-1408,R-1409 UNITED MOTORS SERVICE CORP. (DIV. OF GEN. MOTORS)

## ALIGNMENT PROCEDURE

Output Meter Connections ........ Across Voice Coil Winding
Generator Ground ........ To Ground Terminal
Dummy Antenna ........ In Series with generator
Volume Control Position ........ Fully on

Adjust Signal Generator Output to a Minimum for Satisfactory Output Indication.

| Steps | Series Condenser Or Dummy Antenna | Connect Signal Generator To | Adjust Signal Generator To | Turn Radio Dial To | Adjust Trimmers |
|---|---|---|---|---|---|
| 1 | 0.1 Mfd. | 1A7 Grid Cap.*** | 456 KC | Quiet Point near H. F. end | A-B (2nd IF Trans)<br>C-D (1st IF Trans) |
| 2 | .000200 Mfd. | Ant. Terminal | 1720 KC | 1720 KC | E (Osc.) |
| 3 | .000200 Mfd. | Ant. Terminal | 1400 KC | 1400 KC | F (Ant.) |
| 4* | .000200 Mfd. | Ant. Terminal | 600 KC | 600 KC | H |

*Rock in Oscillator Core "H" with Signal Generator until maximum output is secured.

Repeat steps 2, 3 and 4 for most accurate alignment.

NOTE: If hum is encountered in output when an AC operated signal generator is used for Step 1, short out the 0.2 mfd condenser (#15) which is connected between B– and the chassis until work is completed. Shorting wire must be removed for normal operation in order to reduce shock hazard.

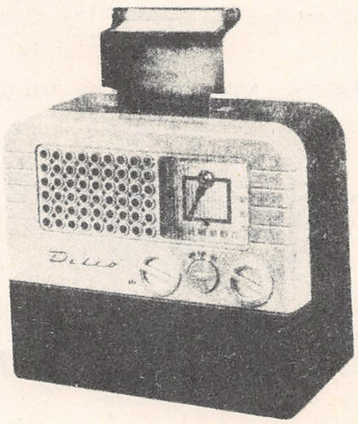
***Connect generator ground to chassis ground.

NOTE: On all sets above Serial No. 5000 the 47 ohm resistors, Illustration No. 27 and 28, have been replaced by 22 ohm resistors to prevent possible overheating if the line voltage is above 120 volts. If replacement becomes necessary, install either a 22 ohm resistor or two 47 ohm resistors in parallel in both locations (Illus. No. 27 and 28).

| Illus. No. | Service Part No. | Description | |
|---|---|---|---|
| | | **ELECTRICAL PARTS** | |
| | | **COILS** | |
| 73 | 1217535 | Antenna Assy. — Loop and Back Cover — Model R-1409 (Includes Condenser #2) | |
| 73 | 1217569 | Antenna Assy. — Loop and Back Cover — Model R-1408 (Includes Condenser #2) | |
| 54 | 1217019 | Oscillator | |
| 52 | 1216952 | 1st I. F. | |
| 53 | 1216953 | 2nd I. F. | |
| | | **CONDENSERS** | |
| 1 | 1216904 | 2 Gang Variable | |
| 1A | | Antenna Section | |
| 1B | | Oscillator Section | |
| 2 | 1217250 | Antenna Trimmer (Included in #1217535 and 1217569) | |
| 3 | G101 | .000100 Mfd. Molded | |
| 4 | E102 | .001 Mfd. 600 V. Tubular | |
| 5 | E502 | .005 Mfd. 600 V. Tubular | |
| 6 | E103 | .01 Mfd. 600 V. Tubular | |
| 7 | E103 | .01 Mfd. 600 V. Tubular | |
| 8 | E103 | .01 Mfd. 600 V. Tubular | |
| 9 | E103 | .01 Mfd. 600 V. Tubular | |
| 10 | E503 | .05 Mfd. 600 V. Tubular | |
| 11 | E104 | 0.1 Mfd. 600 V. Tubular | |
| 12 | E204 | 0.2 Mfd. 400 V. Tubular | |
| 13 | E204 | 0.2 Mfd. 400 V. Tubular | |
| 14 | E204 | 0.2 Mfd. 400 V. Tubular | |
| 15 | E204 | 0.2 Mfd. 400 V. Tubular | |
| 16 | J500 | 40 Mfd. 25 V. Electrolytic | |
| 17 | 1217139 | 4 Section Electrolytic | |
| 17A | | 40 Mfd. 150 V. | |
| 17B | | 40 Mfd. 150 V. | |
| 17C | | 40 Mfd. 150 V. | |
| 17D | | 160 Mfd. 25 V. | |
| | | **RESISTORS** | |
| 26 | A220 | 22 Ohms ½ W. Insulated | |
| 27 | B470 | 47 Ohms 1 W. Insulated | Illus. Nos. 27 and 28 are B220 |
| 28 | B470 | 47 Ohms 1 W. Insulated | 22 Ohm 1 W. on Sets above Serial #5000 |
| 29 | B151 | 150 Ohms 1 W. Insulated | |
| 30 | A331 | 330 Ohms ½ W. Insulated | |
| 31 | A331 | 330 Ohms ½ W. Insulated | |
| 32 | 1216958 | 330 Ohms 10 W. Candohm | |
| 33 | A471 | 470 Ohms ½ W. Insulated | |
| 34 | B102 | 1,000 Ohms 1 W. Insulated | |
| 35 | 1216959 | 1,500 Ohms 10 W. Candohm | |
| 36 | 1216960 | 2,000 Ohms 10 W. Candohm | |
| 37 | B472 | 4,700 Ohms 1 W. Insulated | |
| 38 | A153 | 15,000 Ohms ½ W. Insulated | |
| 39 | A473 | 47,000 Ohms ½ W. Insulated | |
| 41 | A224 | 220,000 Ohms ½ W. Insulated | |
| 42 | A105 | 1 Megohm ½ W. Insulated | |
| 43 | A395 | 3.9 Megohm ½ W. Insulated | |
| 44 | A395 | 3.9 Megohm ½ W. Insulated | |
| 45 | A395 | 3.9 Megohm ½ W. Insulated | |
| 46 | A395 | 3.9 Megohm ½ W. Insulated | |
| 47 | A395 | 3.9 Megohm ½ W. Insulated | |
| | | **MECHANICAL PARTS** | |
| | | **CHASSIS PARTS** | |
| 72 | 1836870 | Bushing — Selector Switch | |
| | 1217103 | Cable Assy. — Battery | |
| 66 | 1212233 | Cord — Universal Dial Drive — 48" Length | |
| 65 | 1217301 | Dial and Dial Plate Assy. | |
| | 7237173 | Grommet — Neon Lamp Mtg. | |
| 70 | 7231480 | Nut — Hex | |
| | 1217533 | Plug — Male Chassis | |
| | 1217255 | Pointer — Dial | |
| 74 | 1217538 | Power Cord and Socket | |
| 68 | 1217238 | Pulley Assy. | |
| 69 | 1216951 | Shaft — Manual Drive | |
| 59 | 1217839 | Socket — Dial Light Assy., Less Lamp | |
| | 7236279 | Socket — Octal Base Tube | |
| 67 | 1217323 | Spring — Cord Tension | |
| | 7245333 | Washer — "C" (Use With #1216951) | |
| | | **MISCELLANEOUS ELECTRICAL PARTS** | |
| 62 | 8760 | Battery — "A" 7.4 V, "B" 90 V | |
| 56 | 1217105 | Fastener — Coil Form | |
| 55 | 1217124 | Iron Core Assembly | |
| 60 | 47 | Lamp — Dial | |
| 61 | 1217239 | Lamp — Neon Glow | |
| 50 | 1216563 | Speaker — 5" PM | |
| 58 | 1216956 | Transfer Switch | |
| 51 | 1217582 | Transformer Output | |
| 57 | 1216945 | Volume Control and Switch | |
| | | **CABINET PARTS** | |
| | 1217586 | Cabinet — Model R-1409 — Brown Leather | |
| | 1217587 | Cabinet — Model R-1408 — Cream Leather | |
| | 1217583 | Front Cover Assy. — Complete — Model R-1409 | |
| | 1217584 | Front Cover Assy. — Complete — Model R-1408 | |
| | | Front Cover | |
| | | Grille and Baffle Cloth | Included in Both |
| | | Mounting Brackets and Screws | Front Cover Assys. |
| | | Dial Crystal | |
| | 1217585 | Handle Assy. Complete | |
| | 1217043 | Knob — Power Volume and Tuning Control — Model R-1409 | |
| | 1217557 | Knob — Power Volume and Tuning Control — Model R-1408 | |
| | 1217068 | Knob and Spring — Transfer Switch — Model R-1409 | |
| | 1217558 | Knob and Spring — Transfer Switch — Model R-1408 | |

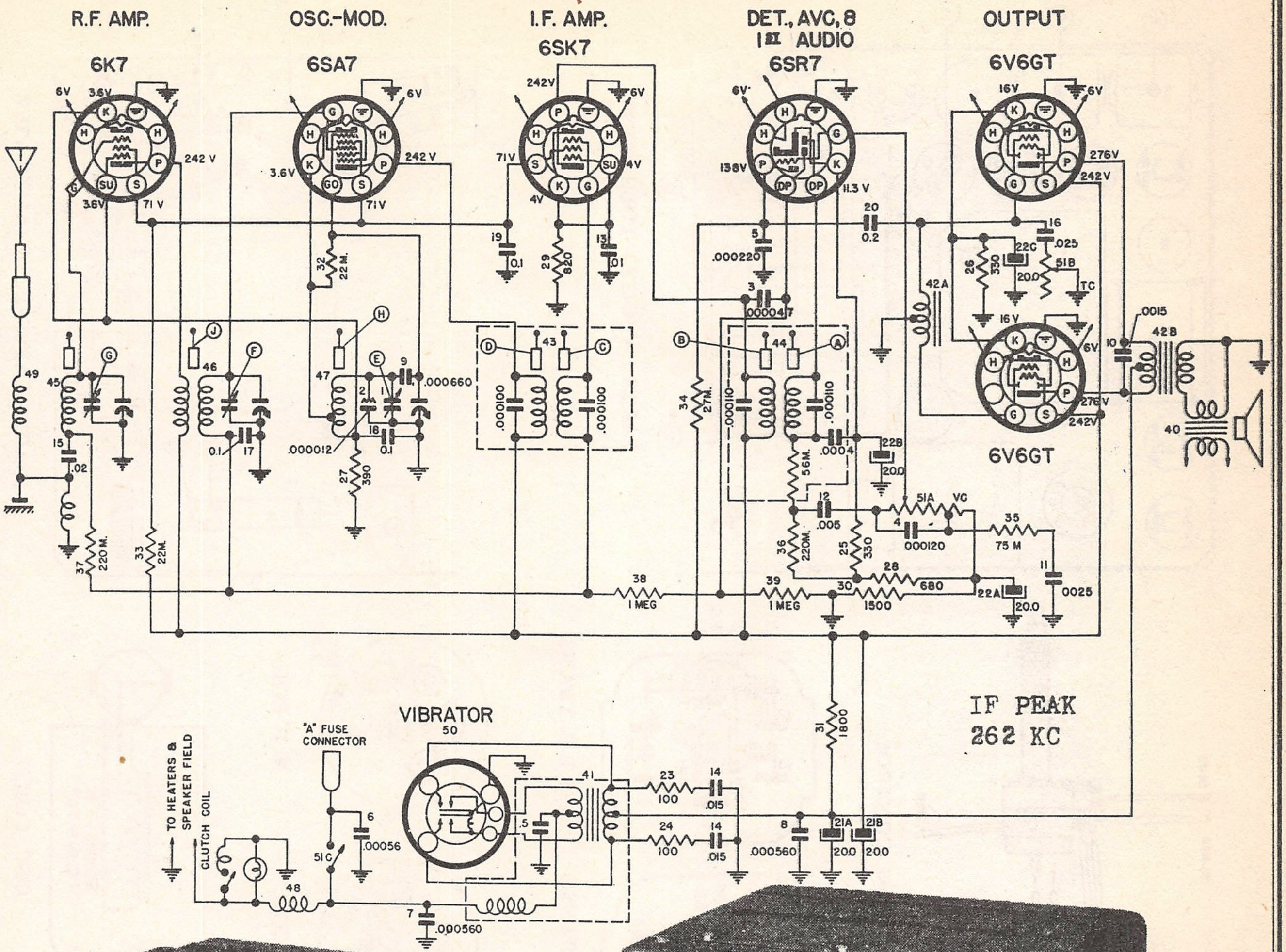
Charging Rate (Battery Charging) "A" ........ 15 Mils.
Charging Rate (Battery Charging) "B" ........ 4 Mils.
Battery Supply, "A" ........ 7.5 Volts
Battery Supply, "B" ........ 90 Volts
Power Supply ........ 105/125 volts AC-DC
Power Consumption ........ 38 Watts

The only difference between the R-1408 and R-1409 is in cabinet colors. The R-1408 is cream leather and the R-1409 is brown leather.

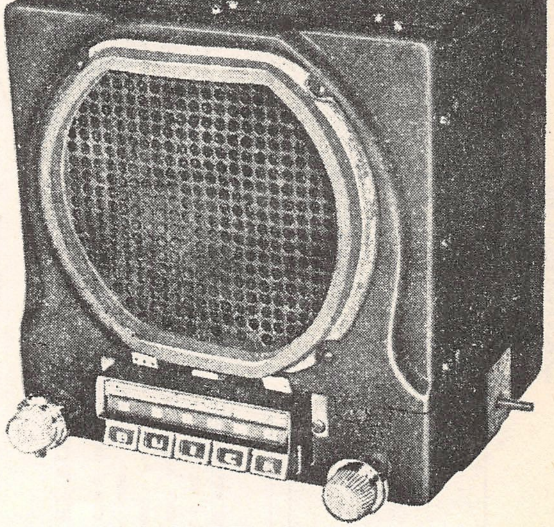


# UNITED MOTORS SERVICE CORP. (DIV. OF GEN. MOTORS)

## MODELS 980690, Revised, 980733, Buick


R.F. AMP.
6K7
OSC.-MOD.
6SA7
I.F. AMP.
6SK7
DET., AVC, & 1ST AUDIO
6SR7
OUTPUT
6V6GT
6V6GT
242 V
71 V
3.6V
138V
11.3 V
276V
4V
.000220
.00004
.000660
.000012
.000100
.000110
.0004
.000120
20.0
.025
.0015
1 MEG
220 M.
22 M.
2.7 M.
5.6 M.
75 M
1500
680
330
390
820
VC
TC
VIBRATOR
50
"A" FUSE CONNECTOR
TO HEATERS & SPEAKER FIELD
CLUTCH COIL
.00056
.000560
.015
100
1800
IF PEAK 262 KC

MODEL 980733



MODEL 980690

SPEAKER—8" Electro-dynamic.

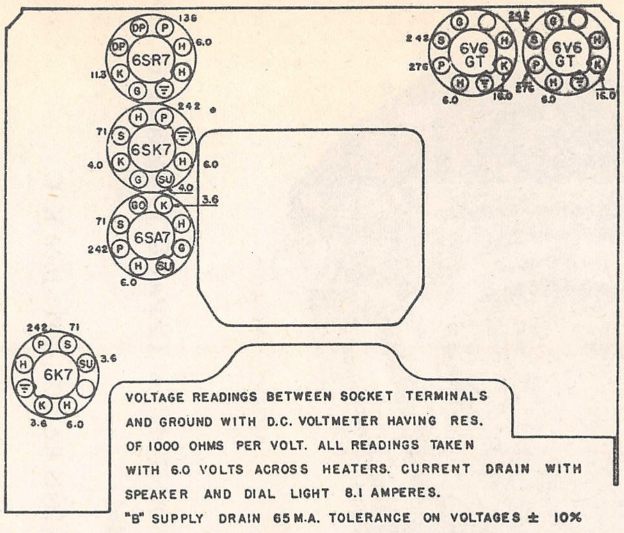
TUNING—Manual and 5 P. B. Mechanical with electric clutch.

CAR ANTENNA CAPACITY—.000052 to .000068 Mfd.

TUNING RANGE—550-1600 K. C.

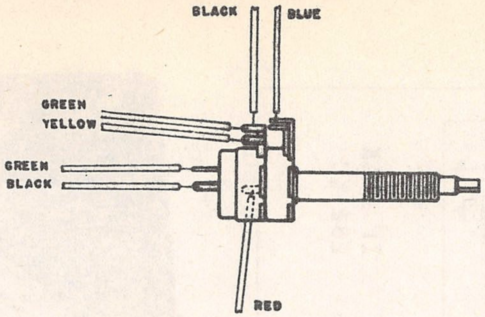
## MODELS 980690,Revised, 980733,Buick

## UNITED MOTORS SERVICE CORP.
## (DIV. OF GEN. MOTORS)

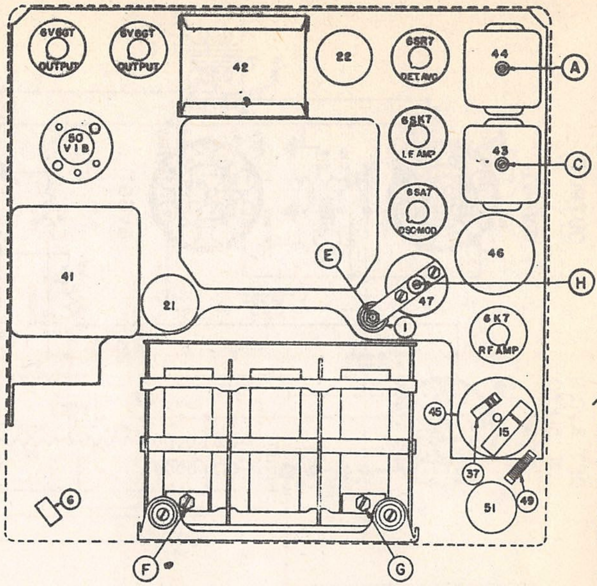

6SR7
DP
P
H
K
G
136
6.0
11.3
6SK7
S
SU
242
71
4.0
6.0
4.0
6SA7
GO
3.6
71
242
6.0
6V6 GT
242
276
6.0
16.0
6K7
242
71
3.6
3.6
6.0

VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RES. OF 1000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS ACROSS HEATERS. CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 8.1 AMPERES.
"B" SUPPLY DRAIN 65 M.A. TOLERANCE ON VOLTAGES ± 10%

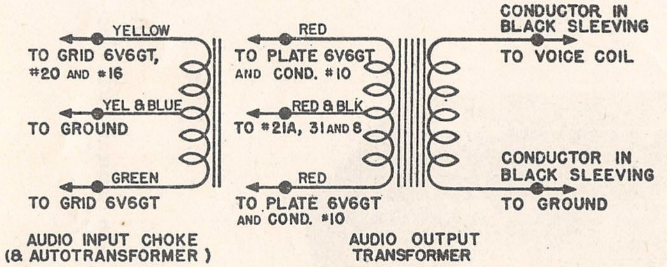
TUBE SOCKET VOLTAGE CHART


BLACK
BLUE
GREEN
YELLOW
GREEN
BLACK
RED

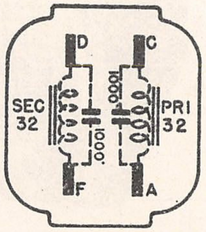
DUAL CONTROL


6V6GT OUTPUT
6V6GT OUTPUT
42
22
6SR7 DET AVC
44
A
50 VIB
6SK7 I.F. AMP
43
C
6SA7 OSC MOD
46
41
21
E
47
H
I
6K7 RF AMP
45
15
6
37
49
51
F
G

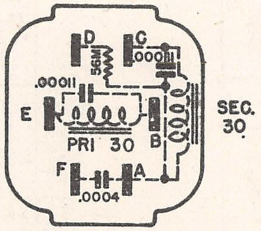
PARTS LAYOUT - TUBE VIEW


YELLOW
TO GRID 6V6GT, #20 AND #16
YEL & BLUE
TO GROUND
GREEN
TO GRID 6V6GT
RED
TO PLATE 6V6GT AND COND. #10
RED & BLK
TO #21A, 31 AND 8
RED
TO PLATE 6V6GT AND COND. #10
CONDUCTOR IN BLACK SLEEVING
TO VOICE COIL
CONDUCTOR IN BLACK SLEEVING
TO GROUND
AUDIO INPUT CHOKE (& AUTOTRANSFORMER)
AUDIO OUTPUT TRANSFORMER

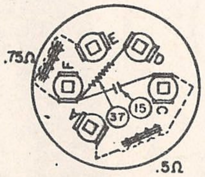
AUDIO PACK - DRIVER AND OUTPUT TRANSFORMER


D
C
SEC 32
PRI 32
1000
1000
F
A

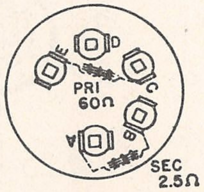
1st I. F. TRANS.


D
C
56M
.00011
.00011
E
PRI 30
B
SEC. 30
F
A
.0004

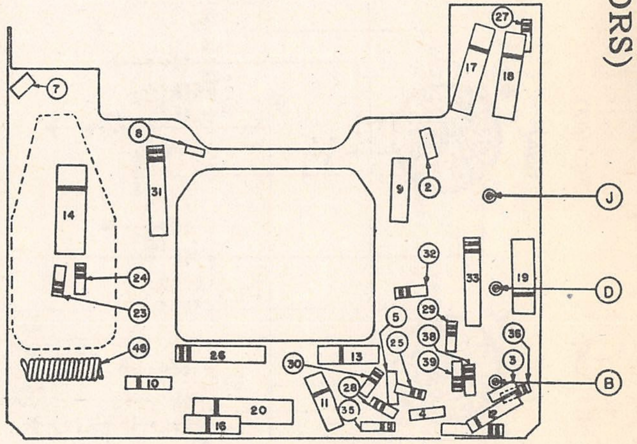
2nd I. F. TRANS.


.75Ω
E
D
F
15
C
37
A
.5Ω

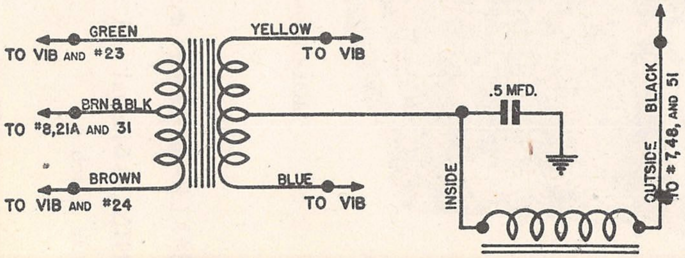
ANT. COIL


D
E
C
PRI 60Ω
B
A
SEC 2.5Ω

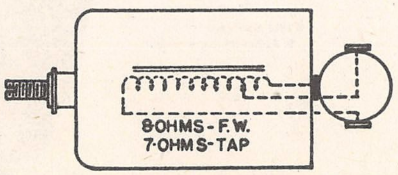
R. F. COIL


27
17
18
7
8
9
2
J
14
31
32
33
19
D
24
23
29
5
38
36
25
39
3
48
26
13
30
B
10
28
11
35
4
20
16
12

PARTS LAYOUT - CHASSIS VIEW


GREEN
TO VIB AND #23
BRN & BLK
TO #8,21A AND 31
BROWN
TO VIB AND #24
YELLOW
TO VIB
BLUE
TO VIB
.5 MFD.
INSIDE
OUTSIDE
BLACK
TO #7,48, AND 51

POWER TRANSFORMER


8 OHMS - F.W.
7 OHMS - TAP

OSC. COIL

## UNITED MOTORS SERVICE CORP. (DIV. OF GEN. MOTORS)

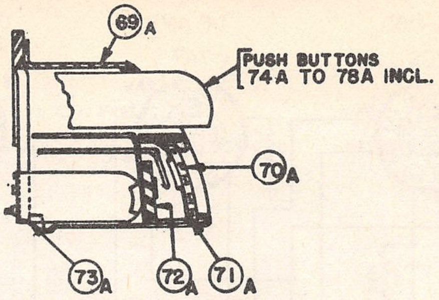
MODELS 980690, Revised, 980733, Buick

### PUSH BUTTON SET-UP

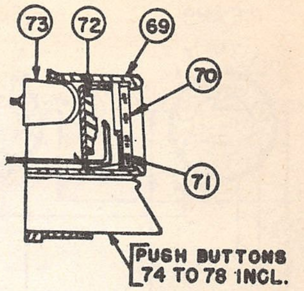
Release holding spring in bottom of button, pull button off. Loosen re-set screw and push in until it bottoms. Tune in desired station while holding in re-set screw. Release and tighten screw. Replace button.

### ALIGNMENT PROCEDURE

Volume control maximum. Signal Generator output minimum for satisfactory output indication (preferably below one watt output).



MODEL 980733



MODEL 980690

ESCUTCHEON CROSS SECTION

| Series Condenser or Dummy Antenna | Connect to | Signal Generator Frequency | Adjust Screws In Order |
|---|---|---|---|
| 0.1 Mfd. | Grid side of R. F. Sec. of Gang. Cond. | 262 K. C. | A B C D |
| 0.1 Mfd. | Grid side of R. F. Sec. of Gang. Cond. | 1615 K. C. | E |
| .000060 Mfd. | Antenna Connector | 1430 K. C. | F G |
| .000060 Mfd. | Antenna Connector | 600 K. C. | H J |

Adjust trimmer G to match car antenna (1430 KC) when radio is installed.

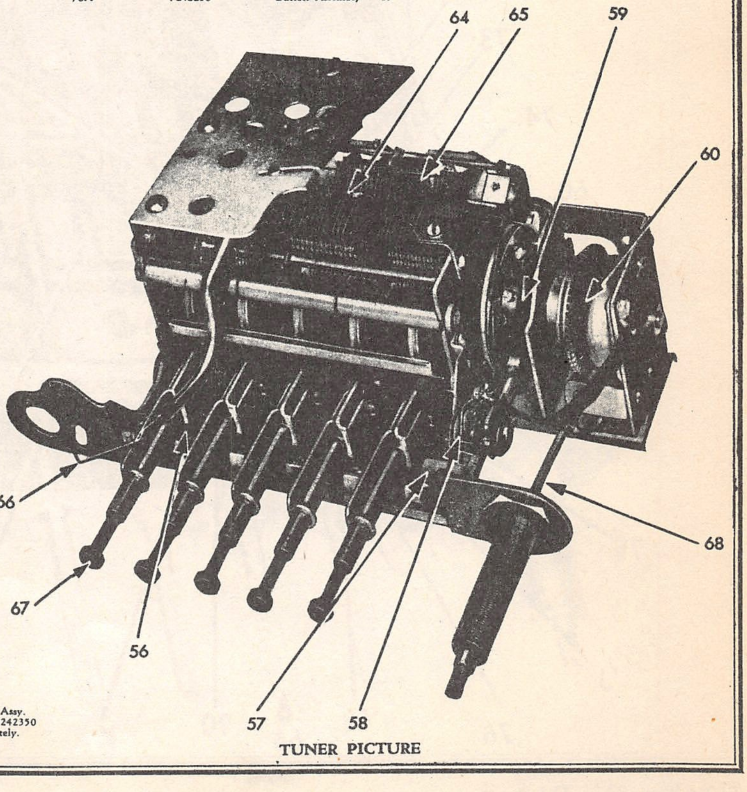
### SPECIAL INSTRUCTIONS

Rock gang condenser back and forth through signal during 600 K. C. adjustment of screws H and J. Repeat Alignment adjustment of trimmers F and G at 1430 K. C. and of cores H and J at 600 K. C.

SERVICE PARTS LIST

1946 BUICK MODELS 980690 (CONTROLS AT BOTTOM) AND 980733 (CONTROLS AT TOP)

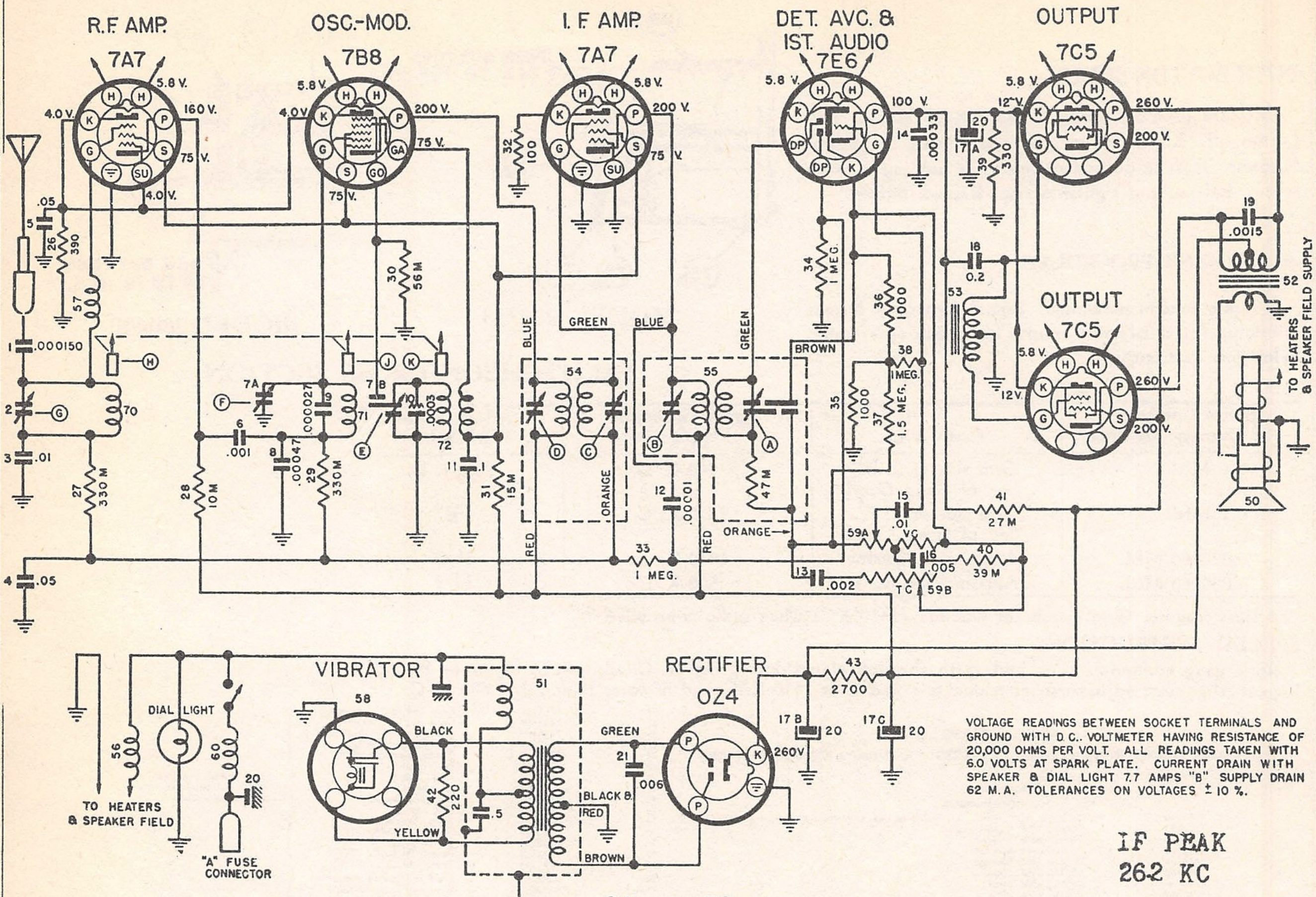
| Illus. No. | Service Part No. | Description | |
|---|---|---|---|
| | | CONDENSERS | |
| 1 | 7244039 | Oscillator Air Trimmer (Included in Osc. Coil Assembly. Part #7244111) | |
| 2 | 7242450 | .000012 Mfd. Compensating | |
| 3 | 7233313 | .000047 Mfd. Molded | |
| 4 | 7240577 | .000120 Mfd. Molded | |
| 5 | 7236105 | .000220 Mfd. Molded | |
| 6 | 7240566 | .000560 Mfd. Mica | |
| 7 | 7240566 | .000560 Mfd. Mica | |
| 8 | 7240566 | .000560 Mfd. Mica | |
| | 7255665 | .000560 Mfd. Mica - Molded (Alt. for 7240566) | |
| 9 | 7236151 | .000660 Mfd. Silver Mica | |
| 10 | 7236134 | .0015 Mfd. 800 V. Tubular | |
| 11 | 7240578 | .0025 Mfd. 400 V. Tubular | |
| 12 | 7230912 | .005 Mfd. 600 V. Tubular | |
| 13 | 1208600 | .01 Mfd. 600 V. Tubular | |
| 14 | 7236075 | .015 x .015 Mfd. 1500 V. Dual-Tubular | |
| 15 | 1212099 | .02 Mfd. 600 V. Tubular | |
| 16 | 1211232 | .025 Mfd. 400 V. Tubular | |
| 17 | 1207908 | 0.1 Mfd. 400 V. Tubular | |
| 18 | 1207908 | 0.1 Mfd. 400 V. Tubular | |
| 19 | 1207908 | 0.1 Mfd. 400 V. Tubular | |
| 20 | 7240579 | 0.2 Mfd. 400 V. Tubular | |
| 21 | 7240612 | Electrolytic - 2 Section 20-20 Mfd. 400 V. | |
| 22 | 7238553 | Electrolytic - 3 Section 20-20-20 Mfd. 25 V. | |
| | | RESISTORS | |
| 23 | 1213217 | 100 Ohms ½ W. Insulated | |
| 24 | 1213217 | 100 Ohms ½ W. Insulated | |
| 25 | 1213224 | 330 Ohms ½ W. Insulated | |
| 26 | 1214572 | 330 Ohms 2 W. Insulated | |
| 27 | 1213482 | 390 Ohms ½ W. Insulated | |
| 28 | 1214543 | 680 Ohms ½ W. Insulated | |
| 29 | 1214544 | 820 Ohms ½ W. Insulated | |
| 30 | 1213237 | 1,500 Ohms ½ W. Insulated | |
| 31 | 1214573 | 1,800 Ohms 2 W. Insulated | |
| 32 | 1214550 | 22,000 Ohms ½ W. Insulated | |
| 33 | 7240590 | 22,000 Ohms 2 W. Insulated | |
| 34 | 1213342 | 27,000 Ohms 1 W. Insulated | |
| 35 | 1213844 | 68,000 Ohms ½ W. Insulated | |
| 36 | 1214555 | 220,000 Ohms ½ W. Insulated | |
| 37 | 1214555 | 220,000 Ohms ½ W. Insulated | |
| 38 | 1213282 | 1 Megohm ½ W. Insulated | |
| 39 | 1213282 | 1 Megohm ½ W. Insulated | |
| | | MISCELLANEOUS ELECTRICAL PARTS | |
| 40 | 7240469 | Speaker - 8" Electrodynamic | |
| 41 | 7240519 | Power Transformer Assembly | |
| 42 | 7240464 | Audio Pack - Driver and Output Transformer | |
| 43 | 7238546 | First I. F. Transformer Assembly | |
| 44 | 7240467 | Second I. F. Transformer Assembly | |
| 45 | 7242232 | Antenna Coil and Shield Assembly | |
| 46 | 7242238 | R. F. Coil Assembly | |
| 47 | 7244111 | Oscillator Coil Assembly | |
| 48 | 7241708 | "A" Filter Choke | |
| 49 | 7240251 | Antenna Choke Coil | |
| 50 | 8630 | Vibrator - Synchronous | |
| 51 | 7241967 | Volume, Tone Control and Switch (Model 980690) | |
| | 7241928 | Volume, Tone Control and Switch (Model 980733) | |
| | | MISCELLANEOUS CHASSIS PARTS | |
| | 7242034 | "A" Lead Connector Assembly | |
| | 7242035 | Antenna Lead Connector Assembly | |
| | 7238539 | Vibrator Socket | |
| | 7236279 | Octal Base Tube Socket | |
| | 7240408 | Dial Light Assembly (Includes Dial Lamp) | |
| | 125588 | Bulb - Dial Lamp | |
| | 1321177 | "A" Lead Cable Assembly - Model 980690 | |
| | 1321178 | "A" Lead Cable Assembly - Model 980733 | |
| | 120151 | Fuse | |
| | 1286759 | Static Collector Assembly | |
| | 1880659 | Generator Condenser | |
| | 1207820 | Distributor Suppressor | |
| | 1853686 | Suppressor Adapter | |
| | 1324056 | Bracket - R. H. - Model 980690 | |
| | 1324057 | Bracket - L. H. - Model 980690 | |
| | 1323926 | Bracket - R. H. - Model 980733 | |
| | 1323927 | Bracket - L. H. - Model 980733 | |
| | 1320624 | Washer | |
| | 120380 | Lockwasher | |
| | 120375 | Hex. Nut | |
| | 123291 | Screw | |
| | | TUNER UNIT AND PARTS | |
| | 7242170 | Tuner Assembly Complete (Model 980690) | |
| | 7242350 | Tuner Assembly Complete (Model 980733) | |
| 56 | 7240287 | Shaft - Declutching Switch Lever | Parts Included in Tuner Assy. Part 7242170 and Part 7242350 which are serviced separately. |
| 57 | 7240410 | Declutching Switch Lever Assembly | |
| | 7255698 | Retainer Spring | |
| | 7240292 | Spring - Declutching Switch Lever | |
| 58 | 7240397 | Switch Assembly - Declutching | |
| 59 | 7240396 | Drive Drum Assembly | |
| 60 | 7240471 | Clutch Assembly Complete | |
| | 7237174 | Universal Joint Spring | |
| 64 | 7242167 | Cord and Spring Assembly | Parts included in Part #7242170 which are serviced separately. |
| 65 | 7242168 | Cord and Link Assembly | |
| 66 | 7240460 | Pointer and Tip Assembly | |
| 67 | 7240368 | Reset Screw Assembly | |
| 68 | 7241981 | Tuning Shaft Assembly | |
| 69 | 7241966 | Escutcheon | |
| 70 | 7242173 | Dial - Glass | |
| 71 | 7240508 | Dial Shield | |
| 72 | 7240509 | Backplate Assembly | |
| 73 | 7238513 | Dial Clamp | |
| 74 | 7242221 | Button Assembly - "B" | |
| 75 | 7242222 | Button Assembly - "U" | |
| 76 | 7242223 | Button Assembly - "I" | |
| 77 | 7242224 | Button Assembly - "C" | |
| 78 | 7242225 | Button Assembly - "K" | |
| 64A | 7242005 | Cord and Spring Assembly | Parts included in Part #7242350 which are serviced separately. |
| 65A | 7242006 | Cord and Link Assembly | |
| 66A | 7241997 | Pointer and Tip Assembly | |
| 67A | 7241982 | Reset Screw Assembly | |
| 68A | 7241980 | Tuning Shaft Assembly | |
| 69A | 7242039 | Escutcheon Assembly | |
| 70A | 7241991 | Dial Glass | |
| 71A | 7241992 | Dial Shield | |
| 72A | 7241987 | Backplate Assembly | |
| 73A | 7242093 | Dial Clamp | |
| 74A | 7242226 | Button Assembly - "B" | |
| 75A | 7242227 | Button Assembly - "U" | |
| 76A | 7242228 | Button Assembly - "I" | |
| 77A | 7242229 | Button Assembly - "C" | |
| 78A | 7242230 | Button Assembly - "K" | |



TUNER PICTURE

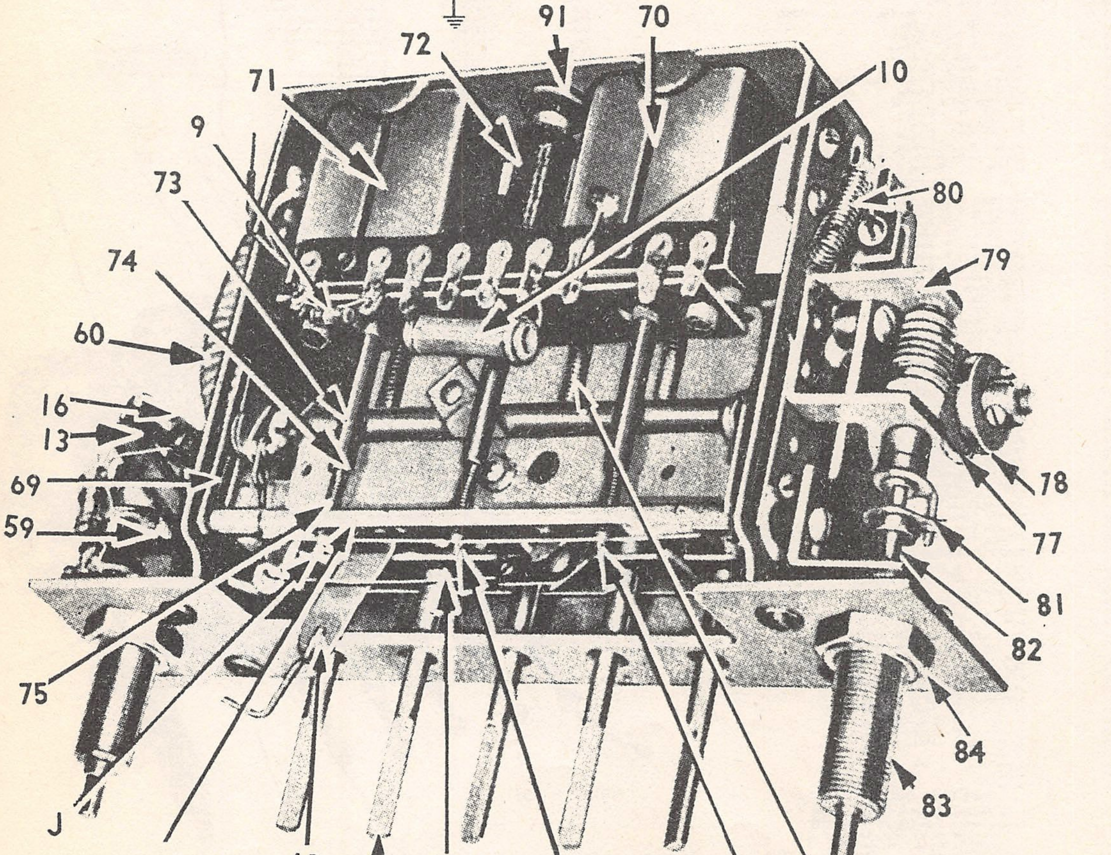
MODEL 982399,
Oldsmobile

## UNITED MOTORS SERVICE CORP.
## (DIV. OF GEN. MOTORS)


R.F. AMP.
7A7
OSC.-MOD.
7B8
I. F. AMP.
7A7
DET. AVC. & IST. AUDIO
7E6
OUTPUT
7C5
OUTPUT
7C5
5.8 V.
4.0 V.
160 V.
75 V.
200 V.
100 V.
260 V.
12 V.
BLUE
GREEN
BROWN
RED
ORANGE
1 MEG.
VIBRATOR
58
BLACK
YELLOW
GREEN
BLACK & RED
BROWN
RECTIFIER
0Z4
260V.
2700
DIAL LIGHT
TO HEATERS & SPEAKER FIELD
"A" FUSE CONNECTOR
TO HEATERS & SPEAKER FIELD SUPPLY
50
52
53
54
55

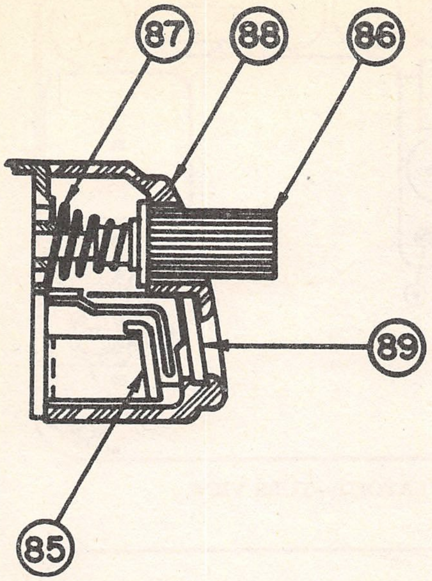
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C.. VOLTMETER HAVING RESISTANCE OF 20,000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS AT SPARK PLATE. CURRENT DRAIN WITH SPEAKER & DIAL LIGHT 7.7 AMPS "B" SUPPLY DRAIN 62 M.A. TOLERANCES ON VOLTAGES ± 10 %.

IF PEAK
262 KC

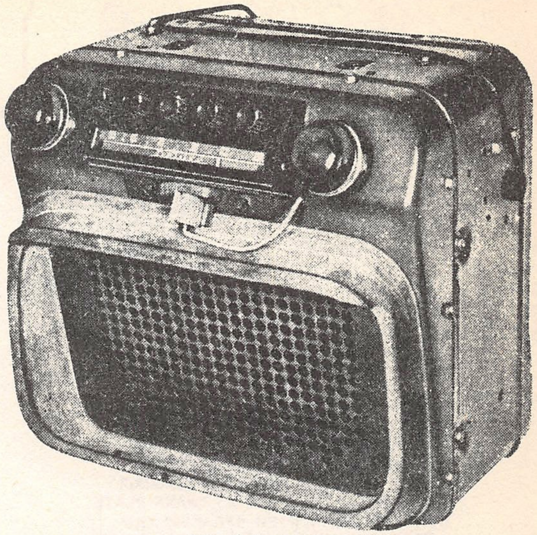

91
70
72
10
71
9
80
73
79
74
60
16
13
69
78
59
77
81
82
75
84
83
J
76
68
66
90
K
H
67

# UNITED MOTORS SERVICE CORP.
# (DIV. OF GEN. MOTORS)

MODEL 982399,
Oldsmobile



**ESCUTCHEON CROSS SECTION**



**Model 982399**

CAR ANTENNA CAPACITY—.000070 Mfd.

## PUSH BUTTON SET-UP

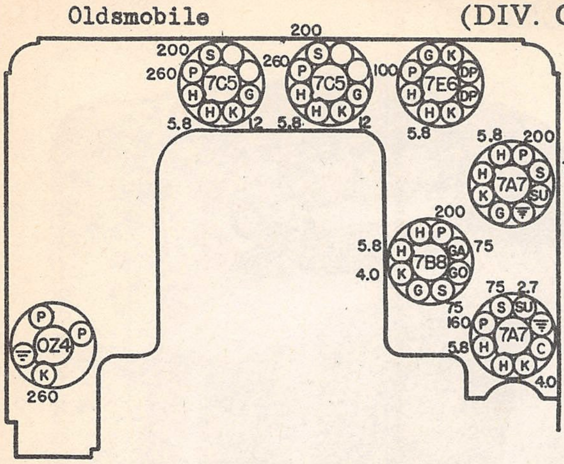
Push button in and latch. Allow to return to normal position. Turn button until desired station is brought in. Do not hold button in while adjusting.

| Illus. No. | Service Part No. | Description |
|---|---|---|
| | | **CONDENSERS** |
| 1 | G151 | .000150 Mfd. Molded |
| 2 | 7255662 | Antenna Trimmer and Bracket Assy. |
| 3 | E103 | .01 Mfd. 600 V. Tubular |
| 4 | E503 | .05 Mfd. 600 V. Tubular |
| 5 | E503 | .05 Mfd. 600 V. Tubular |
| 6 | E102 | .001 Mfd. 600 V. Tubular |
| 7 | 7242322 | Dual Trimmer |
| 8 | G471 | .000470 Mfd. Molded |
| 9 | G270 | .000027 Mfd. Molded |
| 10 | 7255494 | .000300 Mfd. Compensating |
| 11 | E104 | 0.1 Mfd. 600 V. Tubular |
| 12 | G100 | .000010 Mfd. Molded |
| 13 | E202 | .002 Mfd. 600 V. Tubular |
| 14 | G331 | .000330 Mfd. Molded |
| 15 | E103 | .01 Mfd. 600 V. Tubular |
| 16 | E502 | .005 Mfd. 600 V. Tubular |
| 17 | M908 | Electrolytic 3 Section |
| 17A | | 20.0 Mfd. 25 V. |
| 17B | | 20.0 Mfd. 450 V. |
| 17C | | 20.0 Mfd. 450 V. |
| 18 | E204 | 0.2 Mfd. 400 V. Tubular |
| 19 | 7236134 | 0.0015 Mfd. 800 V. Tubular |
| 20 | 7241259 | Spark Plate |
| 21 | H602 | .006 Mfd. 1600 V. Tubular (Buffer) |
| | | **RESISTORS** |
| 26 | A391 | 390 Ohms ½ W. Insulated |
| 27 | A334 | 330,000 Ohms ½ W. Insulated |
| 28 | B103 | 10,000 Ohms 1 W. Insulated |
| 29 | A334 | 330,000 Ohms ½ W. Insulated |
| 30 | A563 | 56,000 Ohms ½ W. Insulated |
| 31 | C153 | 15,000 Ohms 2 W. Insulated |
| 32 | A101 | 100 Ohms ½ W. Insulated |
| 33 | A105 | 1 Megohm ½ W. Insulated |
| 34 | A105 | 1 Megohm ½ W. Insulated |
| 35 | A102 | 1,000 Ohms ½ W. Insulated |
| 36 | A102 | 1,000 Ohms ½ W. Insulated |
| 37 | A155 | 1.5 Megohm ½ W. Insulated |
| 38 | A105 | 1 Megohm ½ W. Insulated |
| 39 | B331 | 330 Ohms 1 W. Insulated |
| 40 | A393 | 39,000 Ohms ½ W. Insulated |
| 41 | B273 | 27,000 Ohms 1 W. Insulated |
| 42 | B221 | 220 Ohms 1 W. Insulated |
| 43 | C272 | 2,700 Ohms 2 W. Insulated |
| | | **MISCELLANEOUS ELECTRICAL PARTS** |
| 50 | 7256443 | Speaker — 6" x 9" Elliptical — Electro Dynamic |
| 51 | 7255881 | Power Transformer Assy. |
| 52 | 7240453 | Output Transformer Assy. |
| 53 | 7256432 | Input Transformer Assy. |
| 54 | 7242079 | First I. F. Transformer Assy. |
| 55 | 7242533 | Second I. F. Transformer Assy. |
| 56 | 7241708 | "A" Filter Choke |
| 57 | 7240251 | Antenna Choke Coil |
| 58 | 8638 | Vibrator - Non-Synchronous |
| 59 | 7255298 | Volume, Tone Control and Switch |
| 60 | 7241701 | "A" Spark Choke |
| | 5274994 | Volume Control Cable |
| | | **MISCELLANEOUS CHASSIS PARTS** |
| | 7255307 | Front Cover |
| | 7256452 | Rear Cover Assy. |
| | 7255257 | "A" Lead Assy. |
| | 7233944 | Vibrator Socket |
| | 7236279 | Octal Base Tube Socket |
| | 7241356 | Loctal Base Tube Socket |
| | 1217820 | Dial Light Assembly (Less Bulb #187189) |
| | 187189 | Dial Light Bulb |

| Illus. No. | Service Part No. | Description |
|---|---|---|
| | | **TUNER UNIT AND PARTS** |
| 65 | 7255472 | Tuner Staked Assembly |
| 66 | 7255373 | Screw — Push Button |
| | 7240740 | Nut — Tuning |
| | 7241835 | Spring — Tuning Nut |
| | 7239991 | "C" Washer |
| 67 | 7241169 | Spring — Return |
| | 7242426 | Button — Latching |
| | 7255370 | Spring — Lever Return (L. H.) |
| | 7255372 | Spring — Lever Return (R. H.) |
| | 7241039 | Spring — Latch Bar |
| 68 | 7255451 | Pointer Assembly Complete |
| | 7255713 | Spring — Pointer Return |
| 69 | 7241042 | Spring — Connecting Link |
| 70 | 7255408 | Antenna Coil Assembly |
| 71 | 7255408 | R. F. Coil Assembly |
| 72 | 7255297 | Oscillator Coil Assembly |
| | 7256097 | Iron Core Parts Package |
| 73 | | Iron Core and Stud Assy. |
| 74 | | Spring |
| 75 | | Washer |
| 76 | | Speed Nut |
| 77 | 7255347 | Clutch Assembly |
| 78 | 7255330 | Clutch Jaw–Driver |
| 79 | 7255365 | Bracket and Worm Assy. |
| 80 | 7255670 | Spring–Slide Bracket Return |
| 81 | 7255348 | Coupler and Shaft Assy. |
| 82 | 7255350 | Manual Control Shaft Assy. |
| 83 | 7255326 | Bushing — Manual Shaft |
| 84 | 7242048 | Hex Nut |
| 85 | 7256437 | Dial Back Plate |
| 86 | 7255402 | Push Button Assy. |
| 87 | 7255397 | Spring — Push Button Return |
| 88 | 7255277 | Escutcheon Assy. |
| 89 | 7255275 | Dial Glass |
| 90 | 1212233 | Cord–Pointer (48" length) |
| | 7244020 | Grommet (Ant. and R. F. Coil) |
| 91 | 7244021 | Grommet (Oscillator) |
| | | **TUBE COMPLEMENT** |
| | 1213562 | 7A7 — R. F. Amplifier |
| | 1213567 | 7B8 — Oscillator Modulator |
| | 1213562 | 7A7 — I. F. Amplifier |
| | 1213980 | 7E6 — Det., AVC and First Audio Amp. |
| | 1213568 | 7C5 — Push-Pull Output |
| | 1211924 | 0Z4 — Rectifier |
| | | **MOUNTING AND INSTALLATION PARTS** |
| | 7255290 | Control Knob Kit |
| | 7255289 | Tuning Knob Assembly (2) |
| | 7255282 | Tone Control Knob |
| | 7255283 | Dummy Knob |
| | | Hex Nut (½ x 28 special) (2) |
| | | Washer — Felt (2) |
| | | Washer — Radio Control Shaft (2) |
| | | Control Washer — Metal Spring |
| | 415640 | "A" Lead and Condenser Assembly (Includes ammeter condenser) |
| | 120151 | Fuse — 15 Amp. |
| | 1845913 | Tube — Fuse Connector |
| | 1880659 | Generator Condenser .5 Mfd. |
| | 7239327 | Distributor Suppressor, 15,000 Ohms |
| | 6008 | Suppressor Adapter |
| | 6013 | Static Collector Assy. |
| | 7255280 | Mounting Bracket — Receiver |
| | 121797 | Bolt — Hex Hd. |

MODEL 982399,
Oldsmobile

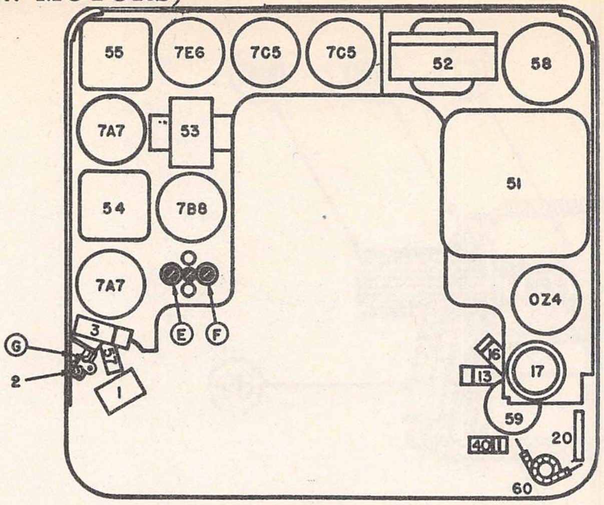
## UNITED MOTORS SERVICE CORP.
## (DIV. OF GEN. MOTORS)



7C5
7C5
7E6
7A7
7B8
7A7
0Z4
200
260
5.8
12
100
75
4.0
2.7
160

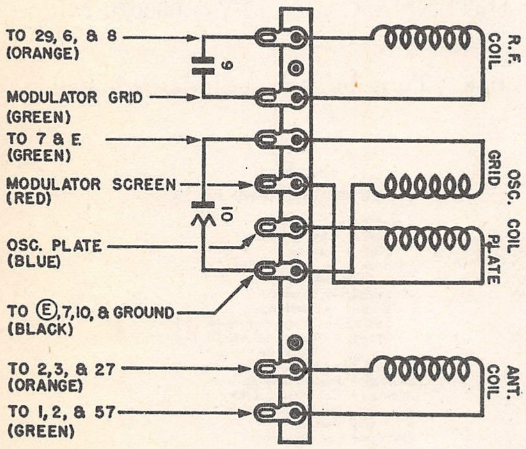
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 20,000 OHMS PER VOLT. ALL READINGS TAKEN WITH 6.0 VOLTS AT SPARK PLATE. CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 7.7 AMPS. "B" SUPPLY DRAIN 62 M.A. TOLERANCES ON VOLTAGES ±10%

TUBE SOCKET VOLTAGE CHART



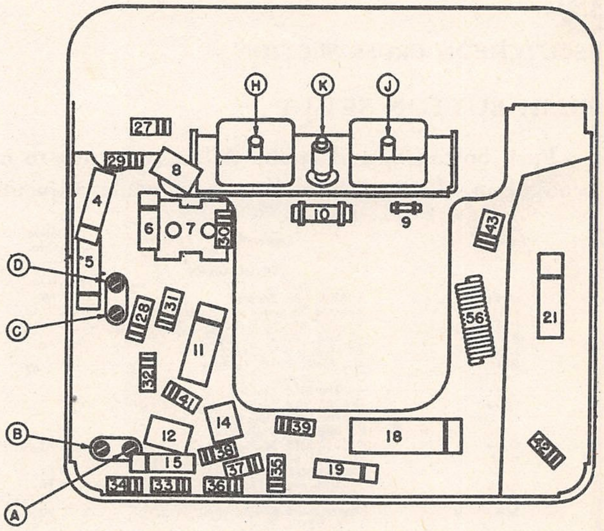
55
7E6
7C5
7C5
52
58
7A7
53
51
54
7B8
7A7
0Z4
G
2
3
1
E
F
16
13
17
59
20
40
60

PARTS LAYOUT—TUBE VIEW



TO 29, 6, & 8 (ORANGE)
MODULATOR GRID (GREEN)
TO 7 & E (GREEN)
MODULATOR SCREEN (RED)
OSC. PLATE (BLUE)
TO E, 7, 10, & GROUND (BLACK)
TO 2, 3, & 27 (ORANGE)
TO 1, 2, & 57 (GREEN)
6
10
R.F. COIL
GRID
OSC. COIL
PLATE
ANT. COIL

TUNER COILS



H
K
J
27
29
8
4
6
7
30
10
9
43
D
5
C
28
31
11
56
21
32
41
B
12
14
39
18
15
38
37
35
19
42
A
34
33
36

PARTS LAYOUT—CHASSIS VIEW

## ALIGNMENT PROCEDURE

Volume Control Maximum — Tone Control on treble.

Signal Generator minimum for satisfactory output indication.

| Series Condenser Or Dummy Antenna | Connect To | Signal Generator Frequency | Adjust Screws In Order |
|---|---|---|---|
| 0.1 MFD | Grid side of Trimmer F | 262 KC | A B C D |
| .000070 MFD | Antenna Terminal | 1615 KC | E |
| .000070 MFD | Antenna Terminal | 1430 KC | F G |

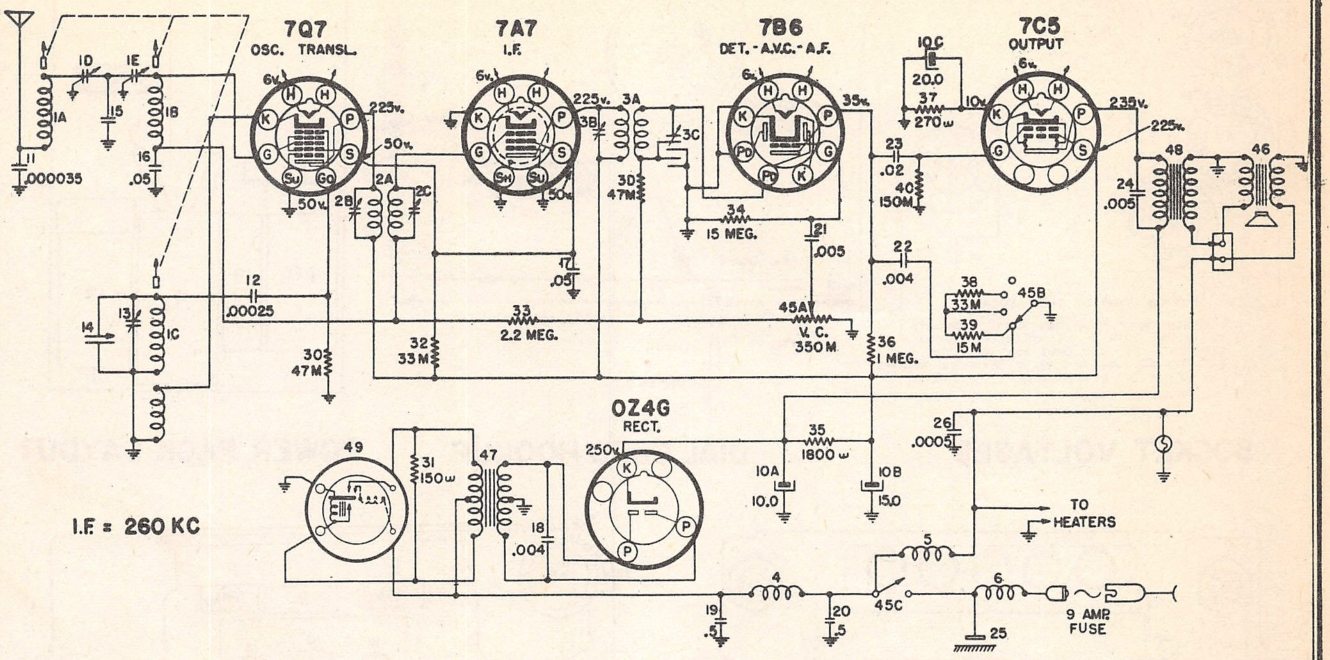
Adjust trimmer G to match car antenna (1430 KC) when radio is installed.

## SPECIAL INSTRUCTIONS

Mechanical alignment of iron cores. Tune to stop at H. F. end of dial. Adjust cores H, J, and K to extend $1\frac{5}{32}''$ from end of coil form. Adjust trimmers E, F, and G, (1615 KC). Adjust cores H and J for maximum output at 1430 KC. Repeat alignment of trimmers E, F, and G at 1615 KC. Repeat alignment of cores H and J at 1430 KC. Align trimmers F and G at 1430 KC.

# UNITED MOTORS SERVICE CORP. (DIV. OF GEN. MOTORS)

**MODEL 984170, Pontiac**



READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A 1000 OHMS PER VOLT D.C. VOLTMETER. "A" BATTERY - 6.0 VOLTS. CURRENT DRAIN - 6.0 AMPERES. "B" SUPPLY DRAIN - APPROX. 50 MA. ALL READINGS ±10%

COILS

| Illus. No. | Service Part No. | Description |
|---|---|---|
| 1 | 1216539 | Tuning Coil & Core Assembly |
| 1A | | Antenna Coil |
| 1B | | Grid Coil |
| 1C | | Oscillator Coil |
| 1D | | Antenna Trimmer |
| 1E | | Grid Coil Trimmer |
| 2 | 1215916 | 1st I. F. Assembly |
| 2A | | I. F. Coil Assembly |
| 2B | | Primary Trimmer |
| 2C | | Secondary Trimmer |
| 3 | 1215917 | 2nd I. F. Assembly |
| 3A | | I. F. Coil Assembly |
| 3B | | Primary Trimmer |
| 3C | | Secondary Trimmer |
| 3D | | Resistor 47,000 Ohm |
| 4 | 1213663 | Hash Choke |
| 5 | 1214385 | Filament Choke |
| 6 | 1217193 | Spark Choke |

CAPACITORS

| Illus. No. | Service Part No. | Description |
|---|---|---|
| 10 | 1213868 | Electrolytic |
| 10A | | 10 Mfd. 350 Volt |
| 10B | | 15 Mfd. 300 Volt |
| 10C | | 20 Mfd. 25 Volt |
| 11 | 1214949 | .000035 Mfd. Moulded |
| 12 | 1209055 | .00025 Mfd. Moulded |
| 13 | 1215925 | Oscillator Trimmer |
| 14 | 1216540 | Compensating 265 Mmfd. |
| 15 | 1212098 | .004 Mfd. 800 Volt |
| 16 | 7230592 | .05 Mfd. 600 Volt |
| 17 | 7230592 | .05 Mfd. 600 Volt |
| 18 | 1213854 | .004 Mfd. 1500 Volt |
| 19 | 7240248 | .5 Mfd. 100 Volt |
| 20 | 7240248 | .5 Mfd. 100 Volt |
| 21 | 7230912 | .005 Mfd. 800 Volt |
| 22 | 1212098 | .004 Mfd. 800 Volt |
| 23 | 1212099 | .02 Mfd. 600 Volt |
| 24 | 7230912 | .005 Mfd. 800 Volt |
| 25 | 1212278 | Spark 225 Mmfd. |
| 26 | 1207636 | .0005 Mfd. Mica |

CHASSIS PARTS - MISCELLANEOUS

| Service Part No. | Description |
|---|---|
| 187189 | Bulb - Pilot Light - Mazda #44 |
| 1215926 | Bushing - Station Selector Shaft |
| 1216535 | Connector Assembly - Antenna |
| 1214394 | Connector Assembly - "A" Lead |
| 1215937 | Cover - Case Back |
| 1215927 | Cover - Power Supply |
| 1216536 | Dial Pointer & Slide Assembly |
| 1216537 | Dial - Window |
| 7242463 | Nut - 1/2-28 Mtg. Spacer |
| 1863407 | Pin Connector - Speaker |
| 1214471 | Pulley - Wood 17/32 OD |
| 1214472 | Pulley - Wood 7/16 OD |
| 1216587 | Push Button Assembly |
| 1213685 | Screw - Cover Retaining |
| 1215932 | Shaft Assembly - Front Drive |
| 1215933 | Shaft Assembly - Rear Drive |
| 1215936 | Socket Assembly - Pilot Light |
| 7238455 | Socket - Lock-in |
| 1214420 | Socket - Rectifier |
| 1213684 | Socket - Vibrator |
| 1214399 | Speaker Gasket - Rubber |
| 1216036 | Spring - Core Driving |
| 1215934 | Spring - Rear Drive Shaft |
| 1214386 | String & Spring Assy.-Pointer Drive |
| 1216538 | Tuner Unit - Mechanical Portion Only |

RESISTORS

| Illus. No. | Service Part No. | Description |
|---|---|---|
| 30 | 1214553 | 47,000 Ohm 1/2 Watt |
| 31 | 1211005 | 150 Ohm 1 Watt |
| 32 | 7242447 | 33,000 Ohm 1 Watt |
| 33 | 1214563 | 2.2 Megohm 1/2 Watt |
| 34 | 1213343 | 15 Megohm 1/2 Watt |
| 35 | 1214573 | 1800 Ohm 2 Watt |
| 36 | 1209885 | 1 Megohm 1/2 Watt |
| 37 | 1213846 | 270 Ohm 1 Watt |
| 38 | 1213845 | 33,000 Ohm 1/2 Watt |
| 39 | 1211089 | 15,000 Ohm 1/2 Watt |
| 40 | 1211163 | 150,000 Ohm 1/2 Watt |

RADIO PACKAGE CONTENTS

| Service Part No. | Description |
|---|---|
| 504617 | "A" Lead & Female Fuse Holder Assy. |
| 1853686 | Adaptor - Radio Distributor Suppressor |
| 505629 | Bolt - 1/4-20 x 5/8 Hex Hd. Special - Zinc (Receiver to Brace) |
| 1849161 | Capacitor Assembly - Ammeter (.5 Mfd.) |
| 1866865 | Capacitor Assembly - Generator (.5 Mfd.) |
| 147684 | Fuse - (9 Amp.) "A" Lead |
| 509129 | Insulator - Radio Distributor Suppressor |
| 507505 | Knob Assy.- Radio Tuning and Volume Control |
| 507510 | Knob - Radio Dummy |
| 507511 | Knob - Radio Tone Control |
| 7235968 | Nut - 1/2-28 Thin Hex - Zinc (Receiver to Instrument Panel) |
| 509031 | Owners Instruction & Warranty Card |
| 508583 | Plate - Radio Control Finish |
| 144722 | Screw - #7 x 3/8 Rnd. Hd. Type "A" Self Tapping - Zinc |
| 1207821 | Suppressor - Radio Distributor |
| 504618 | Tube - Fuse Insulating |
| 121753 | Washer - 1/4 External Tooth Lock |
| 1299232 | Washer - 1/4 Flat Special - Zinc |
| 7238755 | Washer - Radio Dummy Knob - Spring |
| 505630 | Washer - Radio Tone Control Knob-Felt |

MISCELLANEOUS ELECTRICAL PARTS

| Illus. No. | Service Part No. | Description |
|---|---|---|
| 45 | 1216541 | Control-Volume-Tone-Switch |
| 45A | | Volume Control 350,000 Ohm |
| 45B | | Tone Control Switch |
| 45C | | On-Off Switch |
| 46 | 1214389 | Speaker - Electro Dynamic |
| 47 | 1214391 | Transformer - Power |
| 48 | 1215918 | Transformer - Output |
| 49 | 8638 | Vibrator - Plug-in |

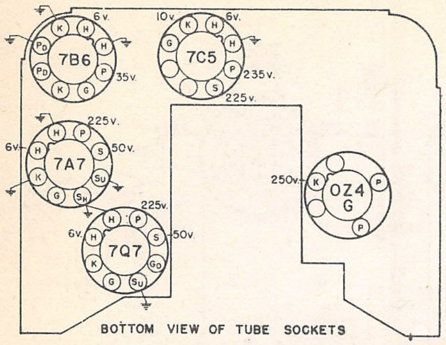
## PUSH BUTTON SET-UP

Turn counter clockwise - tune in manually - depress loosened button - turn button clockwise to tighten.

| | |
|---|---|
| MOUNTING - All 1946 Pontiac Cars | TUNING - Manual and 5 P. B. |
| TUBES - 7Q7, 7A7, 7B6, 7C5, 0Z4G | TUNING RANGE - 540 KC - 1610 KC |
| SPEAKER - 6" Electro Dynamic | CAR ANTENNA CAPACITY - 60 mmfd. |

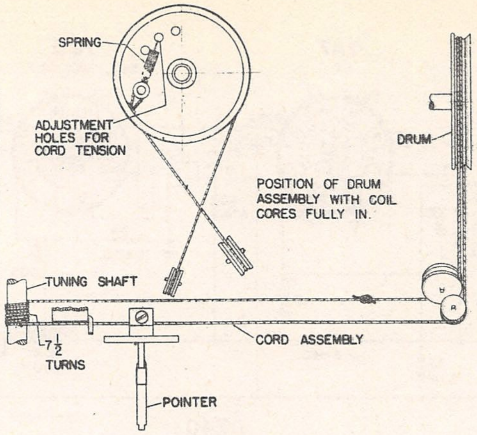
MODEL 984170,Pontiac

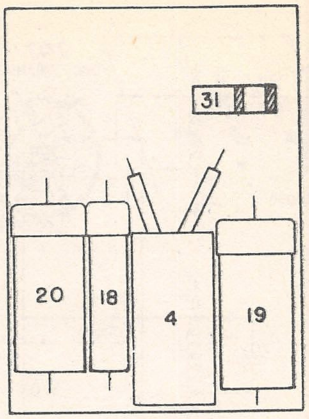
# UNITED MOTORS SERVICE CORP.
# (DIV. OF GEN. MOTORS)


7B6
6v
35v
7C5
10v
6v
235v
225v
7A7
225v
6v
50v
0Z4 G
250v
7Q7
225v
6v
50v
H
K
P
G
S
PD
Su

BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY 6.0 VOLTS. CURRENT DRAIN 6.0 AMPERES; "B" SUPPLY DRAIN APPROXIMATELY 50 M.A. ALL READINGS ± 10%.

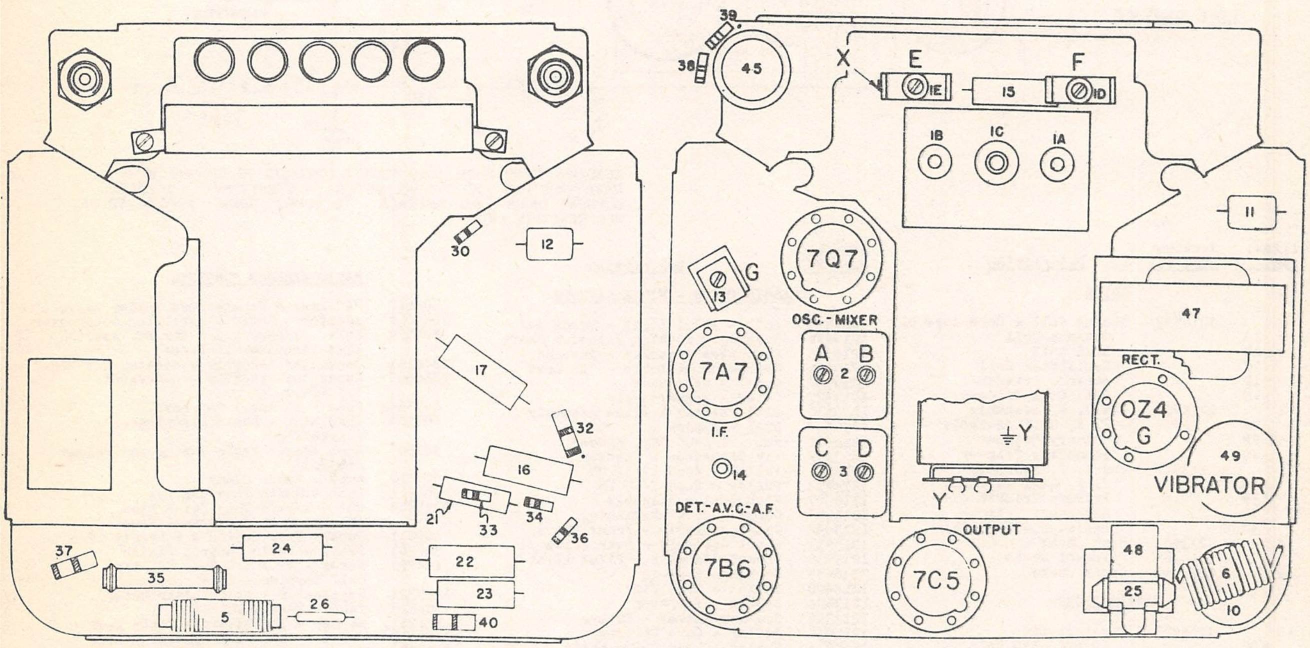

SPRING
ADJUSTMENT HOLES FOR CORD TENSION
DRUM
POSITION OF DRUM ASSEMBLY WITH COIL CORES FULLY IN.
TUNING SHAFT
7½ TURNS
CORD ASSEMBLY
POINTER



## SOCKET VOLTAGES

## DIAL CORD HOOKUP

## POWER PACK LAYOUT


39
38
45
X
E
1E
15
F
1D
1B
1C
1A
11
30
12
G
13
7Q7
OSC.-MIXER
A
B
2
7A7
47
RECT.
17
I.F.
14
C
D
3
Y
0Z4 G
49
VIBRATOR
32
16
DET.-A.V.C.-A.F.
7B6
OUTPUT
7C5
48
25
6
10
21
33
34
36
37
24
35
22
23
5
26
40

## PARTS LAYOUT

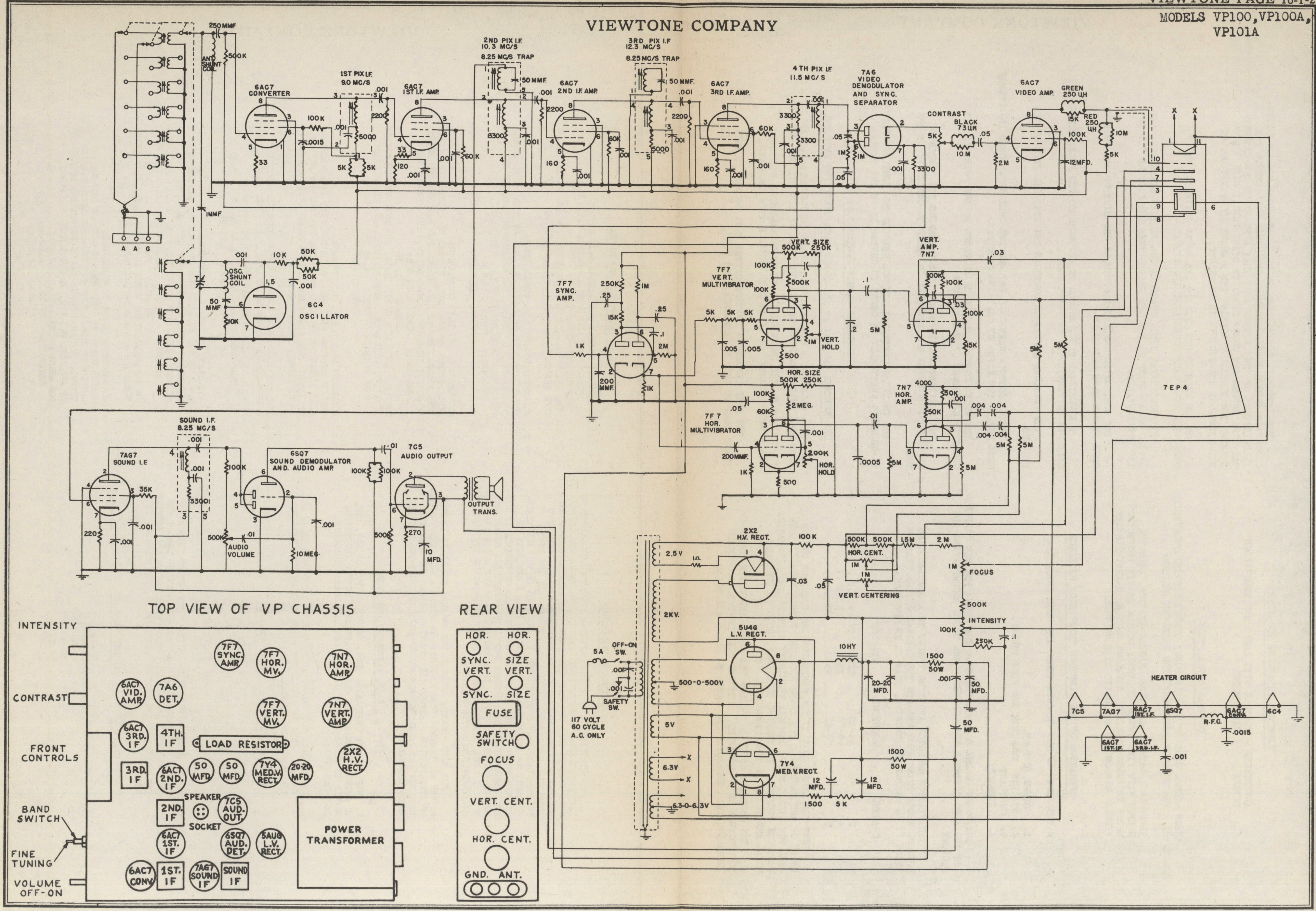
## ALIGNMENT PROCEDURE

Volume Control maximum.
Tone Control on high position.
Signal Generator Output minimum for satisfactory output indication.

| Series Capacitor Or Dummy Antenna | Connect To | Signal Generator Frequency | Adjust Screws In Order |
|---|---|---|---|
| 0.1 mfd. | Terminal X (See Parts Layout) | 260 KC | A, B, C, D |
| .000060 mfd. | Antenna Terminal | 1610 KC | G |
| .000060 mfd. | Antenna Terminal | 1400 KC | E, F |

Low frequency alignment not required.
Adjust Trimmer F to match car antenna (1400 KC) when radio is installed.

# VIEWTONE COMPANY


250 MMF
500K
AND SHUNT COIL
1 MMF
A A G
6AC7 CONVERTER
1ST PIX I.F. 9.0 MC/S
100K
.001
.0015
5000
5K 5K
33
2200
6AC7 1ST I.F. AMP.
33
120
.001
60K
2ND PIX I.F. 10.3 MC/S
8.25 MC/S TRAP
50 MMF.
3300
6AC7 2ND I.F. AMP.
2200
160
60K
3RD PIX I.F. 12.3 MC/S
8.25 MC/S TRAP
50 MMF.
5000
6AC7 3RD I.F. AMP.
160
60K
4 TH PIX I.F. 11.5 MC/S
3300
7A6 VIDEO DEMODULATOR AND SYNC. SEPARATOR
.05
1M
3300
CONTRAST
BLACK 73 UH
10 M
.05
5K
2M
6AC7 VIDEO AMP.
GREEN 250 UH
15K
RED 250 UH
10M
100K
12 MFD.
5K
7EP4
OSC. SHUNT COIL
50 MMF
10K
10K
50K
50K
6C4 OSCILLATOR
7F7 SYNC. AMP.
250K
1M
.25
15K
1K
200 MMF.
2M
1K
7F7 VERT. MULTIVIBRATOR
VERT. SIZE 500K 250K
100K
500K
5K 5K 5K
.005 .005
500
VERT. HOLD
1M
.2
5M
VERT. AMP. 7N7
100K 100K
.03
15K
5M 5M
HOR. SIZE 500K 250K
2 MEG.
7F 7 HOR. MULTIVIBRATOR
200 MMF.
1K
500
200K HOR. HOLD
.0005
5M
7N7 HOR. AMP.
4000
50K
.004 .004
5M
SOUND I.F. 8.25 MC/S
7AG7 SOUND I.F.
35K
3300
220
6SQ7 SOUND DEMODULATOR AND AUDIO AMP.
100K
500K AUDIO VOLUME
10MEG.
7C5 AUDIO OUTPUT
100K 100K
500K
270
10 MFD.
OUTPUT TRANS.
2X2 H.V. RECT.
2.5 V
1Ω
2KV.
.03
.05
100 K
500K 500K 1.5M 2 M
HOR. CENT.
1M 1M
VERT. CENTERING
1M FOCUS
500K
100K INTENSITY
250K
5A
OFF-ON SW.
SAFETY SW.
117 VOLT 60 CYCLE A.C. ONLY
5U4G L.V. RECT.
500-0-500V
10HY
20-20 MFD.
1500 50W
50 MFD.
5V
6.3V
6.3-0-6.3V
7Y4 MED. V. RECT.
12 MFD.
1500 50W
1500
5 K
HEATER CIRCUIT
7C5 7AG7 6AC7 1ST. I.F. 6SQ7 6AC7 CONV. 6C4
R.F.C.
.0015
6AC7 1ST. I.F. 6AC7 3RD. I.F.
.001
TOP VIEW OF VP CHASSIS
INTENSITY
CONTRAST
FRONT CONTROLS
BAND SWITCH
FINE TUNING
VOLUME OFF-ON
7F7 SYNC. AMP.
7F7 HOR. M.V.
7N7 HOR. AMP.
6AC7 VID. AMP.
7A6 DET.
7F7 VERT. M.V.
7N7 VERT. AMP.
6AC7 3RD. I.F.
4TH. I.F.
LOAD RESISTOR
2X2 H.V. RECT.
3RD. I.F.
6AC7 2ND. I.F.
50 MFD.
50 MFD.
7Y4 MED. V. RECT.
20-20 MFD.
2ND. I.F.
SPEAKER SOCKET
7C5 AUD. OUT.
6AC7 1ST. I.F.
6SQ7 AUD. DET.
5AU4 L.V. RECT.
POWER TRANSFORMER
6AC7 CONV.
1ST. I.F.
7AG7 SOUND I.F.
SOUND I.F.
REAR VIEW
HOR. SYNC.
HOR. SIZE
VERT. SYNC.
VERT. SIZE
FUSE
SAFETY SWITCH
FOCUS
VERT. CENT.
HOR. CENT.
GND. ANT.

# VIEWTONE COMPANY

## VIEWTONE TELEPHONE RECEIVER

ADVENTURER - CONSOLE WITH RADIO AND TELEVISION
FUTURA - TABLE MODEL

## GENERAL DESCRIPTION

THESE MODELS CONSIST OF A 19-TUBE, DIRECT VIEWING TELEVISING RECEIVER. FEATURES OF THE TELEVISION RECEIVER INCLUDE:

SEVEN INCH CATHODE RAY TUBE, SINGLE-STATION, SELECTOR SWITCH WITH FINE TUNING CONTROL; DOUBLE SAFETY PROTECTION WHICH INCLUDES FUSE AND INTERLOCK SWITCH; SAFETY PLEXITE VIEWING WINDOW AND AUTOMATIC GAIN CONTROL.

## OPERATION OF THE VIEWTONE TELEVISION RECEIVER

ON THE FRONT OF THE CHASSIS THERE ARE FOUR CONTROLS:

1. VOLUME, OFF-ON.
2. STATION SELECTOR AND FINE TUNING.
3. CONTRAST
4. INTENSITY

THE POWER-VOLUME CONTROL TURNS ON THE POWER FOR THE COMPLETE SET AND ALSO CONTROLS THE VOLUME OF THE SOUND ACCOMPANYING THE PICTURE

THE STATION SELECTOR AND FINE TUNING IS A COAXIAL DUAL CONTROL WHOSE OUTER KNOB SELECTS THE CHANNEL OF THE STATION WHICH IT IS DESIRED TO RECEIVE, THAT IS IN NEW YORK:

| CHANNEL | FREQUENCY | STATION |
|---|---|---|
| 2 | 54-60 | WCBS - TV (C.B.S.) |
| 4 | 66-72 | WNBT (N.B.C.) |
| 5 | 76-82 | WABD (Dumont) |

SET THE LARGE KNOB TO THE CORRESPONDING NUMERALS ON THE FRONT OF THE CABINET. THE INNER SECTION OF THIS KNOB IS THEN USED FOR FINE TUNING, AND MAY ELIMINATE RIPPLES AND DISTORTION FROM THE PICTURE. BY TURNING THIS KNOB, BOTH PICTURE AND SOUND ARE TUNED IN SIMULTANEOUSLY.

THE CONTRAST CONTROL VARIES THE BLACK AND WHITE TONES OF THE PICTURE BEING RECEIVED. TURNING THIS CONTROL CLOCKWISE INCREASES THE CONTRAST FROM GRAYS, TO BLACK AND WHITE.

THE INTENSITY CONTROL SHOULD BE TURNED COMPLETELY COUNTER-CLOCKWISE BEFORE TURNING THE SET ON. THIS WILL REDUCE THE ILLUMINATION OF THE INTENSE SPOT THAT APPEARS ON THE CATHODE RAY TUBE BEFORE THE SWEEP CIRCUITS START FUNCTIONING. BY TURNING THE CONTROL CLOCKWISE THE AVERAGE ILLUMINATION, OR BRIGHTNESS OF THE PICTURE IS INCREASED.

ON THE REAR OF THE CHASSIS ARE SEVEN CONTROLS, WHICH ONCE SET, NEED ONLY OCCASIONAL ADJUSTMENT.

THE HORIZONTAL SYNC. CONTROLS THE PICTURE STABILITY. IT SHOULD BE ADJUSTED TO THE ONE POINT WHERE THE PICTURE "LOOKS IN" HORIZONTALLY.

THE HORIZONTAL AMPLITUDE CONTROLS THE SIZE OF THE PICTURE ONCE IT HAS BEEN LOCKED IN.

THE VERTICAL SYNC. SHOULD BE ADJUSTED TO THE POINT WHERE ONLY ONE PICTURE LOOKS IN VERTICALLY.

THE VERTICAL AMPLITUDE CONTROLS THE VERTICAL SIZE OF THE PICTURE.

THESE CONTROLS WHEN ONCE SET REQUIRE ONLY OCCASIONAL ADJUSTMENT, THIS DUE TO THE AGING OR CHANGING OF TUBES.

THE FOCUS CONTROL SHOULD BE ADJUSTED TO THE POINT OF THE GREATEST SHARPNESS OF THE PICTURE

THE HORIZONTAL CENTERING CONTROL ENABLES THE COMPLETE PICTURE TO BE MOVED HORIZONTALLY IN ORDER TO CENTER IT ON THE TUBE.

THE VERTICAL CENTERING CONTROL ENABLES THE COMPLETE PICTURE TO BE MOVED VERTTCALLY IN ORDER TO CENTER IT ON THE TUBE.

## IMPORTANT SAFETY PRECAUTIONS

## USE EXTREME CAUTION AT ALL TIMES WHEN SERVICING RECEIVER.

THIS RECEIVER CONTAINS HIGH VOLTAGE (3,000 volts). AN INTERLOCK SWITCH IS PROVIDED AT THE REAR OF THE CHASSIS FOR THE PROTECTION OF THE INDIVIDUAL. IT IS RECOMMENDED THAT ONLY QUALIFIED PERSONNEL BE ALLOWED TO SERVICE THIS RECEIVER.

THE MOST DANGEROUS PORTION OF THE H.V. SUPPLY IS THE PLATE LEAD OF THE 2X2/879 RECTIFIER TUBE.

# VIEWTONE COMPANY

## ANTENNA INSTALLATION

THE IMPORTANCE OF A GOOD ANTENNA INSTALLATION CANNOT BE OVEREMPHASIZED. A PROPERLY INSTALLED ANTENNA IS THE DIFFERENCE BETWEEN GOOD OR POOR RECEPTION. AN ANTENNA SHOULD NOT BE INSTALLED PERMANENTLY ON AN APARTMENT OR RESIDENCE ROOF UNTIL THE QUALITY OF PICTURE RECEPTION IS AT ITS BEST. ENOUGH SLACK SHOULD BE ALLOWED IN THE LEAD IN TO FACILITATE MOVEMENT OF THE ANTENNA. A SHIFT OF ONLY A FEW FEET IN ANTENNA POSITION MAY RESULT IN AN ENORMOUS DIFFERENCE IN PICTURE RECEPTION. THE ANTENNA SHOULD BE POSITIONED BROADSIDE TOWARD THE TRANSMITTER. IF A RECEPTOR AND REFLECTOR ARRANGEMENT IS USED, THE RECEPTOR IS PLACED IN FRONT OF THE REFLECTOR BROADSIDE TOWARD THE STATION.

FOR BEST POSSIBLE RESULTS THE ANTENNA SHOULD BE REMOVED AS FAR AS POSSIBLE FROM HIGHWAYS, HOSPITALS, AND OTHER SOURCES OF INTERFERENCE. AUTOMOBILE IGNITION NOISES AND DIATHERMY MACHINES MAY CAUSE "HERRINGBONES" WHICH DISTORT THE PICTURE BEING RECEIVED.

## R. F. ALIGNMENT PROCEDURE

1. REPLACE 6C4 OSCILLATOR TUBE. APPLY OUTPUT OF SIG. GEN. TO ANTENNA TERMINAL OF CHASSIS. CONNECT OUTPUT INDICATING DEVICE TO VIDEO LEAD OF C.R.T. SET OSCILLATOR CONDENSER HALF WAY OPEN.

2. ADJUST OSC. COIL SLUGS SO THAT SOUND OUTPUT IS HEARD AS THE SIG. GEN. IS SET ON THE SOUND CARRIER FREQUENCY OF THE TELEVISION CHANNEL.

| CHANNEL | SOUND CARRIER |
|---|---|
| 1 | 49.75 Mc |
| 2 | 59.75 Mc |
| 3 | 65.75 Mc |
| 4 | 71.75 Mc |
| 5 | 81.75 Mc |
| 6 | 87.75 Mc |

3. ADJUST ANTENNA COIL SLUGS SO THAT THE OUTPUT INDICATING DEVICE INDICATES MAXIMUM AS THE SIG. GEN. IS SET ON THE FREQUENCIES LISTED BELOW. **THESE FREQUENCIES ARE BETWEEN** THE SOUND AND THE PICTURE CARRIERS TO GIVE RESPONSE TO BOTH.

| CHANNEL | SET ANT. COIL TO |
|---|---|
| 1 | 47 Mc |
| 2 | 58 Mc |
| 3 | 63 Mc |
| 4 | 70 Mc |
| 5 | 78 Mc |
| 6 | 85 Mc |

## I. F. ALIGNMENT PROCEDURE

1. REQUIRED: SIGNAL GENERATOR, 8-15 MC
   OUTPUT INDICATOR (OSCILLOSCOPE, V.T.V.M.)
   REMOVE OSCILLATOR TUBE
   TYPE VP100 CHASSIS DISTINGUISHED BY BLACK SERIAL NO.
   TYPE VP100A " " " RED " "

2. ALIGNMENT OF 4TH I.F. TRANSFORMER.
   APPLY OUTPUT OF SIG. GEN. TO GRID OF THIRD I.F. TUBE. TUNE IN SLUG OF TRANS. FOR MAXIMUM DEFLECTION IN INDICATOR CONNECTED TO C.R.T. VIDEO LEAD.
   FREQUENCY: VP100 12.8 Mc
   VP100A 11.5 Mc

3. ALIGNMENT OF 3RD I.F. TRANSFORMER.
   APPLY OUTPUT OF SIG. GEN. TO GRID OF SECOND I.F. TUBE. TUNE BOTTOM SLUG OF I.F. TRANS. FOR MAXIMUM DEFLECTION IN OUTPUT INDICATOR CONNECTED TO C.R.T. VIDEO LEAD.
   FREQUENCY: VP100 12.0 Mc
   VP100A 12.0 Mc
   TUNE TOP IRON SLUG OF IF TRANS. FOR MINIMUM DEFLECTION OF OUTPUT INDICATOR CONNECTED TO C.R.T. VIDEO LEAST
   TRAP FREQUENCY: VP100 8.25 Mc
   VP100A 10.3 Mc

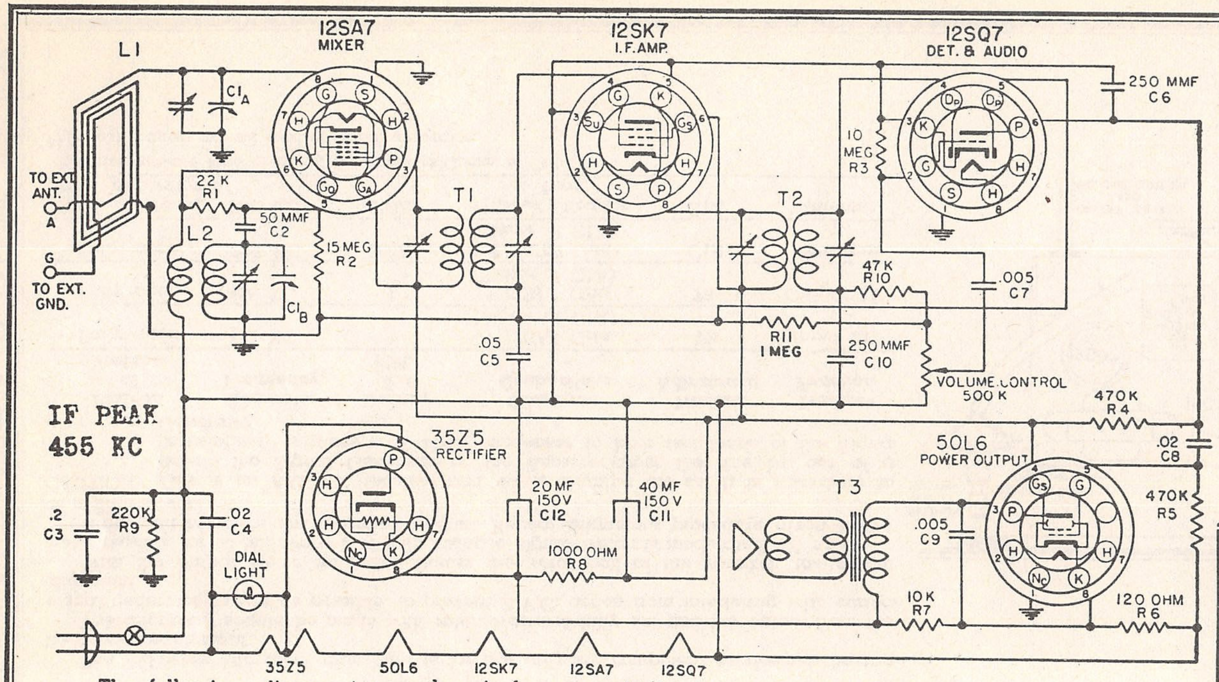
4. ALIGNMENT OF 2ND I.F. TRANSFORMER.
   APPLY OUTPUT OF SIG. GEN. TO GRID OF 1ST IF AMPLIFIER TUBE. TUNE BOTTOM SLUG OF IF FOR MAXIMUM DEFLECTION OF OUTPUT INDICATOR CONNECTED TO VIDEO LEAD OF C.R.T.
   FREQUENCY: VP100 11.5 Mc
   VP100A 10.3 Mc
   .TUNE TOP SLUG OF IF TRANS. FOR MINIMUM DEFLECTION OF OUTPUT INDICATOR CONNECTED TO C.R.T. VIDEO LEAD. THIS WILL CORRESPOND TO MAXIMUM AUDIO OUTPUT.
   TRAP FREQUENCY: VP100 8.25 Mc
   VP100A 8.25 Mc

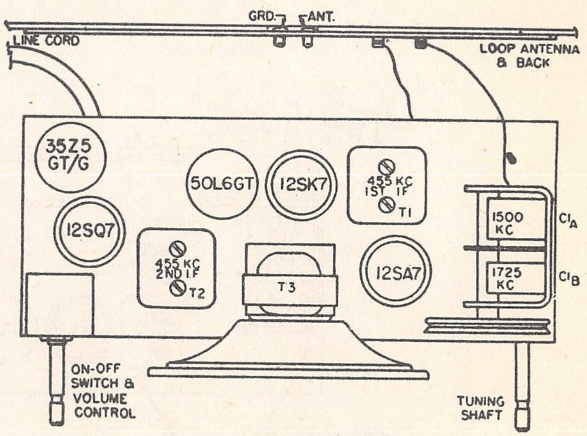
5. ALIGNMENT OF 1ST IF TRANSOFMRER.
   APPLY OUTPUT OF SIG. GEN. TO GRID OR CATHODE OF CONVERTER TUBE. TUNE BOTTOM IRON SLUG FOR MAXIMUM DEFLECTION IN OUTPUT.
   FREQUENCY: VP100 10.3 Mc
   VP100A 9.0 Mc
   IN THE MODEL VP100 THERE IS A 14.25 Mc TRAP WHICH IS TUNED FOR MINIMUM DEFLECTION.

6. ALIGNMENT OF SOUND IF TRANSFRMER .
   APPLY OUTPUT OF SIG. GEN. TO GRID OR CATHODE OF CONVERTER TUBE. TUNE TOP SLUG FOR MAXIMUM SOUND OUTPUT. MAXIMUM SOUND CAN BE DETERMINED BY EAR OR BY APPLYING V.T.V.M. OR OSCILLOSC. TO GRID OF 7C5 AUDIO OUTPUT.
   FREQUENCY: VP100 8.25 Mc
   VP100A 8.25 Mc

# WARWICK MFG. CO.

## MODEL C110


L1
TO EXT. ANT. A
G TO EXT. GND.
12SA7 MIXER
C1A
22 K R1
L2
50 MMF C2
15 MEG R2
C1B
T1
.05 C5
12SK7 I.F. AMP.
T2
12SQ7 DET. & AUDIO
10 MEG R3
47 K R10
R11 1 MEG
250 MMF C10
.005 C7
VOLUME CONTROL 500 K
250 MMF C6
470K R4
.02 C8
470K R5
IF PEAK 455 KC
.2 C3
220K R9
.02 C4
DIAL LIGHT
35Z5 RECTIFIER
20 MF 150V C12
40 MF 150 V C11
1000 OHM R8
T3
50L6 POWER OUTPUT
.005 C9
10 K R7
120 OHM R6
35Z5
50L6
12SK7
12SA7
12SQ7


LINE CORD
GRD.
ANT.
LOOP ANTENNA & BACK
35Z5 GT/G
12SQ7
50L6GT
12SK7
455 KC 2ND IF T2
T3
455 KC 1ST IF T1
12SA7
1500 KC
1725 KC
C1A
C1B
ON-OFF SWITCH & VOLUME CONTROL
TUNING SHAFT

The following alignment procedure is for use only by competent servicemen having the proper equipment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, to prevent A.V.C. action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 400 c.p.s.

Adjust all trimmers for maximum output. Repeat alignment procedure given below as a final check.

CAUTION: This is an A.C.-D.C. receiver and when aligning the set it is necessary to isolate the Signal Generator or the Receiver from the line by use of a transformer, or place a .2 MFD. condenser in both test leads of the Signal Generator.

| Position of Variable | Generator Frequency | Dummy Ant. Mfd. | Generator Connections | Trimmer Adjustment | Trimmer Function |
|---|---|---|---|---|---|
| Fully open | 455 KC | .1 | * 12SA7 Grid (Stator of C1A) | T1 | Input I.F. |
| Fully open | 455 KC | .1 | * 12SA7 Grid (Stator of C1A) | T2 | Output I.F. |
| Fully open | 1725 KC | .00025 | ** Ant. terminal on loop | C1B | Oscillator |
| Tune in signal from generator | 1500 KC | .00025 | ** Ant. terminal on loop | C1A | Antenna |

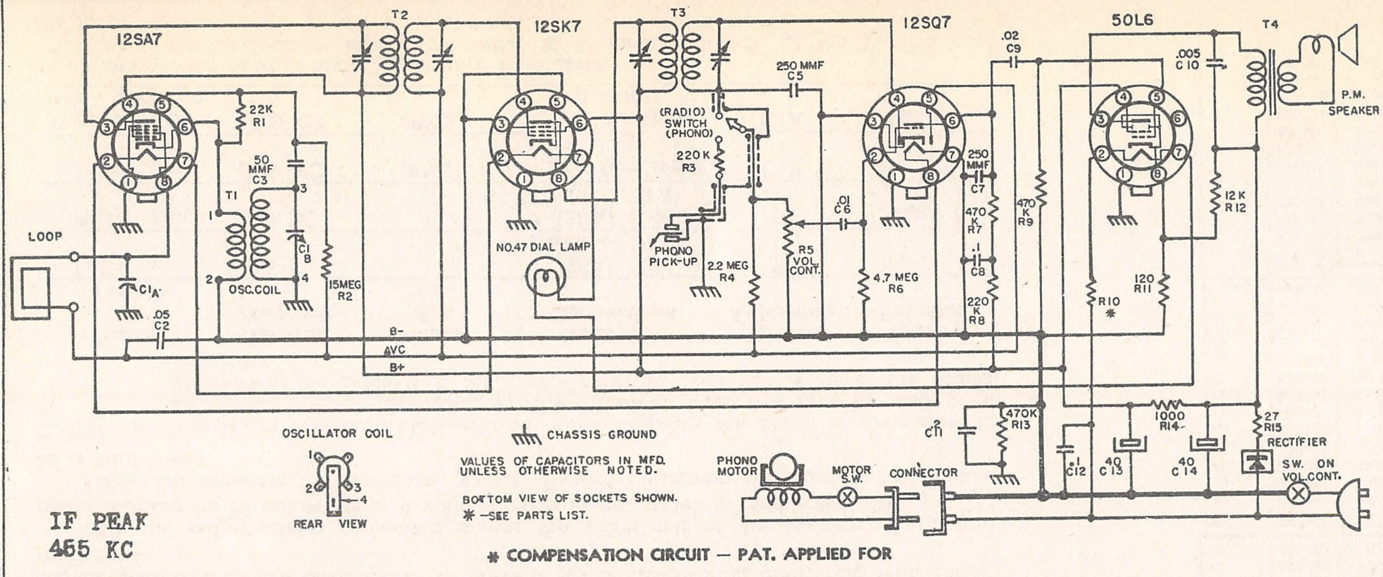
* Connect ground lead of signal generator to chassis.

** Connect ground lead of signal generator to terminal marked "G" on the back of the loop.

| Code | Part No. | DESCRIPTION |
|---|---|---|
| C1A, C1B | B19-180 | Variable condenser |
| C2 | A15-175 | 50 mmfd. mica condenser |
| C3 | A16-154 | .2 mfd. 400 volt tubular condenser |
| C4 | A16-151 | .02 mfd. 600 volt tubular condenser |
| C5 | A16-152 | .05 mfd. 200 volt tubular condenser |
| C6, C10 | A15-176 | 250 mmfd. mica condenser |
| C7, C9 | A16-153 | .005 mfd. 600 volt tubular condenser |
| C8 | A16-150 | .02 mfd. 400 volt tubular condenser |
| C11 | A18-280 | 40 mfd. 150 volt electrolytic condenser |
| C12 | A18-272 | 20 mfd. 150 volt electrolytic condenser |
| R1 | A60-659 | 22K ohm 1/3 watt resistor |
| R2 | A60-664 | 15 megohm 1/3 watt resistor |
| R3 | A60-663 | 10 megohm 1/3 watt resistor |
| R4, R5 | A60-662 | 470K ohm 1/3 watt resistor |
| R6 | A60-658 | 120 ohm 1/3 watt resistor |
| R7 | A60-698 | 10K ohm 1 watt resistor |
| R8 | A60-198 | 1000 ohm 1/2 watt resistor |
| R9 | A60-660 | 220K ohm 1/3 watt resistor |
| R10 | A60-685 | 47K ohm 1/3 watt resistor |
| R11 | A60-668 | 1 megohm 1/3 watt resistor |
| L1 | B82-40 | Antenna, loop |
| L2 | A10-411 | Oscillator coil |
| T1 | B10-453 | 1st I.F. transformer |
| T2 | B10-454 | 2nd I.F. transformer |
| T3 | | Output transformer (part of speaker) |
| | A71-22 | Cover, for volume control |
| | A75-52 | Dial drive shaft |
| | A24-164 | Volume control and switch |
| | B79-340 | 5" P.M. speaker with output transformer |
| | B79-343 | Alternate speaker |
| | B79-344 | Alternate speaker |
| | C83-332 | Cabinet back (mahogany) |
| | A83-335 | Cabinet back (ivory) |
| | D42-375 | Cabinet, molded bakelite (mahogany) |
| | A42-397 | Cabinet, molded bakelite (ivory) |
| | B67-486 | Dial scale |
| | A52-181 | Knob (mahogany) |
| | A52-189 | Knob (ivory) |
| | A58-41 | Dial pointer |
| | B83-267 | Dial diffusing plate |

MODEL 11305

# WARWICK MFG. CO.


12SA7
T2
12SK7
T3
12SQ7
50L6
T4
P.M. SPEAKER
LOOP
C1A
.05 C2
22K R1
50 MMF C3
T1
OSC.COIL
C1B
15MEG R2
B-
AVC
B+
NO.47 DIAL LAMP
(RADIO) SWITCH (PHONO)
220 K R3
PHONO PICK-UP
2.2 MEG R4
250 MMF C5
R5 VOL. CONT.
.01 C6
4.7 MEG R6
250 MMF C7
470 K R7
.1 C8
220 K R8
.02 C9
470 K R9
.005 C10
R10 *
120 R11
12 K R12
C11
470K R13
1000 R14
.1 C12
40 C13
40 C14
27 R15
RECTIFIER
SW. ON VOL.CONT.
OSCILLATOR COIL
REAR VIEW
CHASSIS GROUND
VALUES OF CAPACITORS IN MFD. UNLESS OTHERWISE NOTED.
BOTTOM VIEW OF SOCKETS SHOWN.
* -SEE PARTS LIST.
PHONO MOTOR
MOTOR S.W.
CONNECTOR

IF PEAK
455 KC

* COMPENSATION CIRCUIT — PAT. APPLIED FOR

| Code | Part No. | DESCRIPTION |
|---|---|---|
| C1A, C1B | B19-189 | Variable Condenser |
| C2 | A16-152 | .05 MFD. 200 volt Condenser |
| C3 | A15-175 | 50 MMFD. Mica Condenser |
| C9 | A16-150 | .02 MFD. 400 volt Condenser |
| C5, C7 | A15-176 | 250 MMFD. Mica Condenser |
| C6 | A16-156 | .01 MFD. 400 volt Condenser |
| C8 | A16-157 | .1 MFD. 200 volt Condenser |
| C10 | A16-153 | .005 MFD. 600 volt Condenser |
| C11 | A16-154 | .2 MFD. 400 volt Condenser |
| C12 | A16-160 | .1 MFD. 400 volt Condenser |
| C13, C14 | A18-280 | 40 MFD. 150 volt Electrolytic Condenser |
| R1 | A60-659 | 22K Ohm ½ watt 20% Resistor. |
| R2 | A60-664 | 15 Megohm ½ watt 20% Resistor |
| R3, R8 | A60-667 | 220K Ohm ½ watt 20% Resistor |
| R4 | A60-984 | 2.2 Megohm ½ watt 20% Resistor |
| R5 | A24-164 | 500K Ohm Volume Contsol with Switch |
| R6 | A60-669 | 4.7 Megohm ½ watt 20% Resistor |
| R7, R9, R13 | A60-662 | 470K Ohm ½ watt 20% Resistor |
| R10 | A60-719 | Special Compensating Resistor, order only from the manufacturer |
| R11 | A60-702 | 120 Ohm ½ watt 10% Resistor |
| R12 | A60-720 | 12K Ohm 2 watt 10% Resistor |
| R14 | A60-699 | 1000 Ohm 2 watt 10% Resistor |
| R15 | A60-721 | 27 Ohm 1 watt 10% Resistor |
| T1 | B10-411 | Oscillator Coil |
| T2 | A10-468 | 1st I. F. Transformer |
| T3 | B10-454 | 2nd I. F. Transformer |
| T4 | B80-230 | Output Transformer |
|  | A52-199 | Knob, Volume |
|  | A52-200 | Knob, Tuning |
|  | A52-201 | Knob, Phono-Radio |
|  | A69-172 | Switch, Phono-Radio |
|  | A39-279 | Drum for Variable Condenser |
|  | B79-352 | 5" P. M. Speaker |
|  | A71-22 | Cover for Volume Control |
|  | A83-391 | Selenium Rectifier |
|  | A75-52 | Tuning Shaft |
|  | A83-303 | Connector |
|  | D42-407 | Cabinet, Wood |
|  | C71-27 | Cover for Dial Plate |
|  | B67-499 | Dial Scale |
|  | A58-53 | Dial Pointer |
|  | B83-408 | Dial Scale Retainer |
|  | C83-410 | Cabinet Back |
|  | C82-43 | Loop Antenna |
|  | A83-273 | Dial Diffusing Plate |

## ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent servicemen having the proper equipment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, to prevent A.V.C. action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 400 c.p.s.

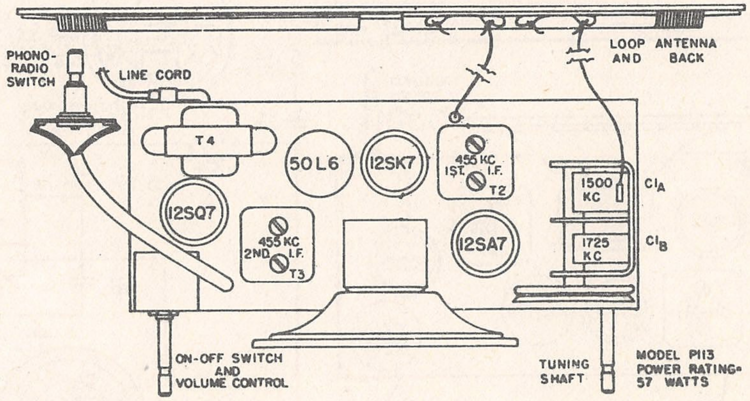
Adjust all trimmers for maximum output. Repeat alignment procedure given below as a final check.

CAUTION: This is an A.C.-D.C. receiver and when aligning the set it is necessary to isolate the Signal Generator or the Receiver from the line by use of a transformer, or place a .2 MFD. condenser in both test leads of the Signal Generator.

| Position of Variable | Generator Frequency | Dummy Ant. Mfd. | Generator Connections | Trimmer Adjustment | Trimmer Function |
|---|---|---|---|---|---|
| Fully open | 455 KC | .1 | * 12SA7 Grid (Stator of C1A) | T2 | Input I.F. |
| Fully open | 455 KC | .1 | * 12SA7 Grid (Stator of C1A) | T3 | Output I.F. |
| Fully open | 1725 KC | .00025 | * 12SA7 Grid (Stator of C1A) | C1B | Oscillator |
| Tune in signal from generator | 1500 KC | .00025 | **Loosely Coupled to Loop | C1A | Antenna |

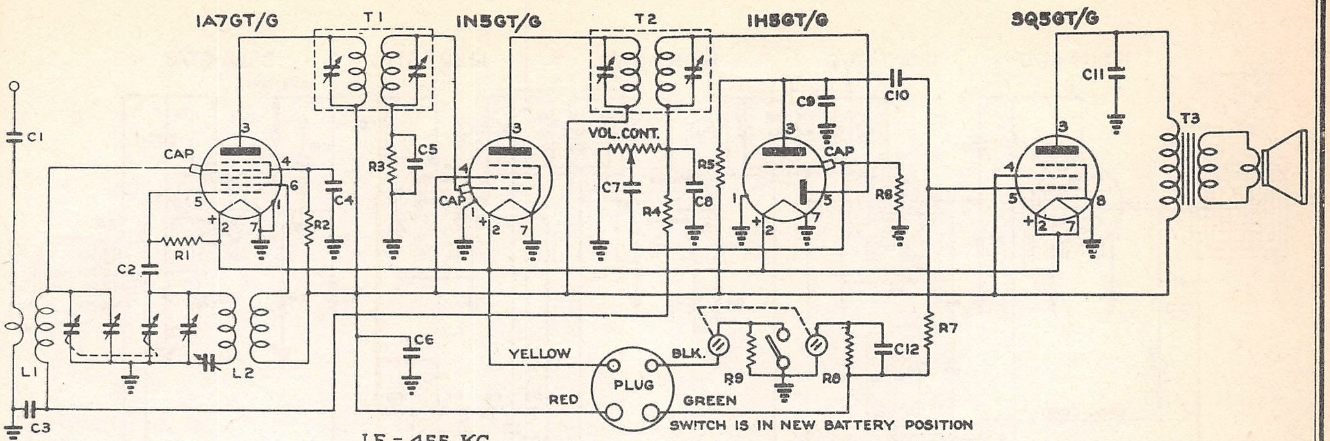
*Connect ground lead of signal generator to Common "B."

**Do not connect ground lead of signal generator.


PHONO-RADIO SWITCH
LINE CORD
LOOP ANTENNA AND BACK
T4
50L6
12SK7
455 KC 1ST. I.F. T2
1500 KC
C1A
1725 KC
C1B
12SQ7
455 KC 2ND. I.F. T3
12SA7
ON-OFF SWITCH AND VOLUME CONTROL
TUNING SHAFT
MODEL P113 POWER RATING-57 WATTS

MODEL 4782

# WATTERSON RADIO MFG. CORP.



IF = 455 KC.

| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | 6W4 | .00005 MICA CONDENSER |
| C2 | 6W3 | .0005 MICA CONDENSER |
| C3 | 5W13 | .1 MFD. 400 V. TUBULAR |
| C4 | 5W13 | .1 MFD. 400 V. TUBULAR |
| C5 | 5W7 | .02 MFD. 400 V. TUBULAR |
| C6 | 5W14 | .25 MFD. 400 V. TUBULAR |
| C7 | 5W2 | .005 MFD. 400 V. TUBULAR |
| C8 | 6W2 | .00025 MFD. MICA CONDENSER |
| C9 | 6W1 | .0001 MFD. MICA CONDENSER |
| C10 | 5W6 | .01 MFD. 400 V. TUBULAR |
| C11 | 5W18 | .002 MFD. 600 V. TUBULAR |
| C12 | 19W11 | 10 MFD. 50 V. TUBULAR |
| R1 | 9W47 | 220,000 Ω - 1/2 WATT |
| R2 | 9W6 | 22,000 Ω - 1/2 WATT |
| R3 | 9W55 | 1 MEGOHM - 1/4 WATT |
| R4 | 9W55 | 1 MEGOHM - 1/4 WATT |
| R5 | 9W55 | 1 MEGOHM - 1/4 WATT |
| R6 | 9W63 | 10 MEGOHM - 1/2 WATT |
| R7 | 9W56 | 2.2 MEGOHM 1/2 WATT |
| R8 | 9W32 | 360 Ω - 1/4 WATT |
| R9 | 9W12 | 75 Ω 1/4 WATT |
| T1 | 3W24 | 1ST. I.F. TRANSFORMER |
| T2 | 3W25 | 2ND. I.F. TRANSFORMER |
| T3 | 12W2 | OUTPUT TRANSFORMER |
| L1 | 3W46 | ANTENNA COIL |
| L2 | 3W45 | OSCILLATOR COIL |
| SP. | 22W10B | P.M. SPEAKER |
| VOL. | 13W2 | VOLUME CONTROL - 500M Ω |

**BATTERY**—This receiver has been designed to operate from a battery that has the "B" supply (90 volts) and the "A" supply (1½ volts) incorporated into a single pack. The batteries recommended to be used with this set are the following:

1. Ray-O-Vac—their No. "AB" 82 Power Pack.
2. Eveready—their No. 748 Power Pack.
3. Burgess—their No. 17G-D60 Power Pack.
4. General—their No. 60DL11L Power Pack.

Either of the above battery packs may be used in conjunction with this receiver, and is to be placed inside and to the rear of the cabinet and the 4 prong plug provided plugged into the socket of the battery pack.

**ANTENNA**—To obtain the excellent performance of which your Watterson Receiver is capable, a good outside antenna must be provided. For best results the antenna should be approximately 75 to 100 feet long, including the lead in, and should be connected to the colored wire coming out of the back of the cabinet. It should be erected as high as possible and as far from surrounding objects as practical.

**GROUND**—A ground connection must be used. A satisfactory ground can be made by connecting the black wire to a nearby cold water pipe by means of an approved clamp, or to a pipe or ground rod driven into the ground.

**BATTERY AND TUBE SAVING SWITCH**—Located on the back of the chassis is a slide type witch identified by the instruction tag "New Battery" and "Old Battery". When using an unused or new battery, the switch must be in the "New Battery" position. After approximately 100 hours of actual use of battery, this switch may be moved to the "Old Battery" position and increased sensitivity and performance obtained.

**OPERATION**—There are two adjustable controls on the front panel of the receiver. The one on the left is the volume control. Turning the volume control knob in a clockwise direction turns the receiver on, and is also a means of adjusting the volume output of the receiver.

**CAUTION**—When not using the receiver, make certain that it is shut off by turning the volume control knob completely to the left until the on-off switch has been thrown. Failure to do this will cause the battery pack to run down.

The knob on the right is the tuning knob and is used to tune any desired station within the broadcast band.

## I. F. Alignment

The I. F. frequency of this receiver is 455 K. C. For realignment, use the following procedure:

Open tuning condenser fully, and set volume control to maximum volume.

Couple an accurately calibrated signal generator to the grid of the 1A7 tube with a .1 mfd. condenser in series with the "high" lead of the signal generator. Connect the ground side of the signal generator to the chassis. Set the signal generator to 455 K. C. Attenuate the signal generator so that the signal is just audible in the speaker. If possible, an output meter should be used.

Adjust the 2nd I. F. transformer first. Each screw should be adjusted for maximum output. After the 2nd I. F. has been adjusted, the 1st I. F. should be adjusted for maximum output. After both transformers have been adjusted, it is necessary to recheck both transformers, making sure maximum output has been attained from both I. F.'s.

## R. F. Alignment

To align the R. F. section of the receiver, proceed as follows:

1. Connect the "high" side of the signal generator to the antenna lead and the ground lead to radio chassis.

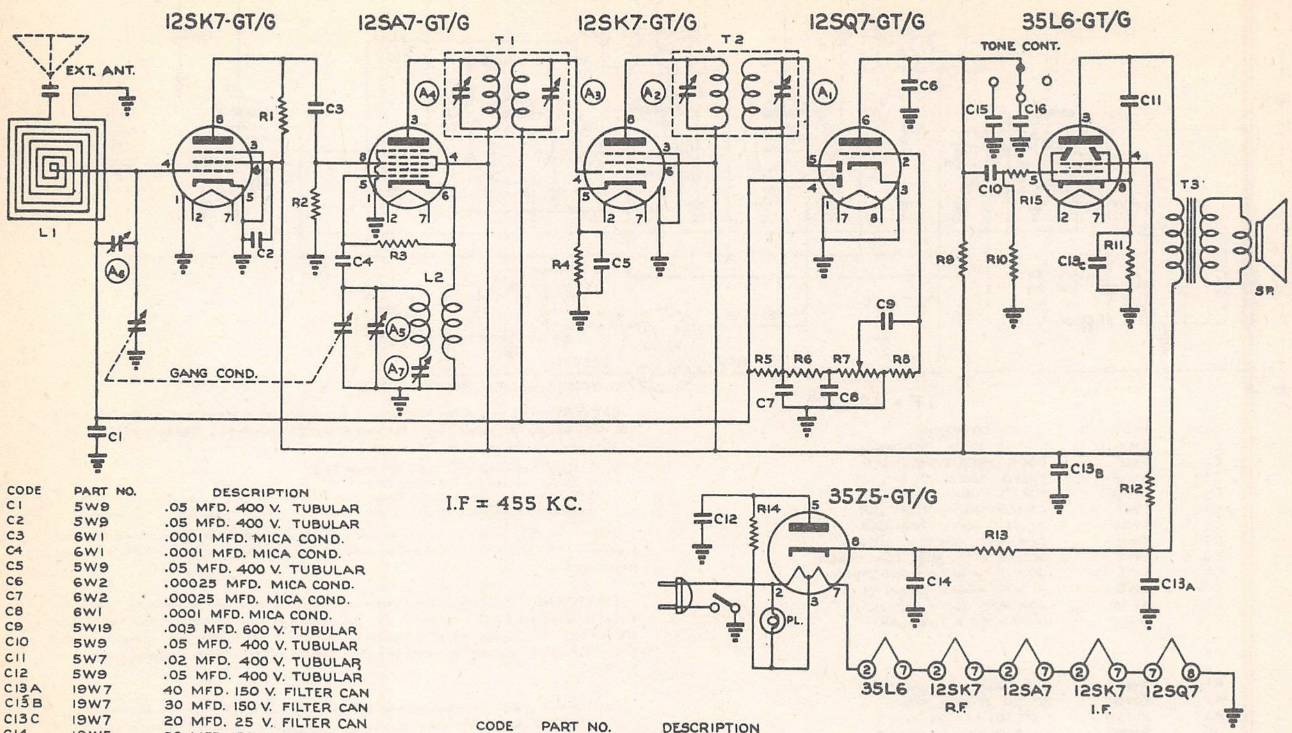
2. Set tuning dial to 1400 K. C. and while feeding a 1400 K. C. signal into receiver adjust the oscillator trimmer (inside adjustment) and antenna trimmer (on top of chassis) for maximum output.

3. Set tuning dial to approximately 600 K. C. and while "rocking" the dial adjust the oscillator padder (nearest edge of chassis) for maximum output.

4. Repeat steps 2 and 3 above.

MODEL 4790

# WATTERSON RADIO MFG. CORP.



I.F = 455 KC.

| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | 5W9 | .05 MFD. 400 V. TUBULAR |
| C2 | 5W9 | .05 MFD. 400 V. TUBULAR |
| C3 | 6W1 | .0001 MFD. MICA COND. |
| C4 | 6W1 | .0001 MFD. MICA COND. |
| C5 | 5W9 | .05 MFD. 400 V. TUBULAR |
| C6 | 6W2 | .00025 MFD. MICA COND. |
| C7 | 6W2 | .00025 MFD. MICA COND. |
| C8 | 6W1 | .0001 MFD. MICA COND. |
| C9 | 5W19 | .003 MFD. 600 V. TUBULAR |
| C10 | 5W9 | .05 MFD. 400 V. TUBULAR |
| C11 | 5W7 | .02 MFD. 400 V. TUBULAR |
| C12 | 5W9 | .05 MFD. 400 V. TUBULAR |
| C13A | 19W7 | 40 MFD. 150 V. FILTER CAN |
| C13B | 19W7 | 30 MFD. 150 V. FILTER CAN |
| C13C | 19W7 | 20 MFD. 25 V. FILTER CAN |
| C14 | 19W5 | 30 MFD. 150 V. PAPER FILTER |
| C15 | 5W20 | .006 MFD. 600 V. TUBULAR |
| C16 | 5W17 | .001 MFD. 600 V. TUBULAR |
| | | |
| R1 | 9W37 | 2,200 Ω - 1/2 WATT RESISTOR |
| R2 | 9W28 | 100,000 Ω - 1/2 WATT |
| R3 | 9W64 | 22,000 Ω - 1/2 WATT |
| R4 | 9W72 | 1,000 Ω - 1/2 WATT |
| R5 | 9W56 | 2.2 MEGOHM - 1/2 WATT |
| R6 | 9W52 | 47,000 Ω - 1/2 WATT |
| R7 | 13W1 | .5 MEGOHM VOL. CONT. |
| R8 | 9W63 | 10 MEGOHM - 1/2 WATT |
| R9 | 9W62 | 220,000 Ω - 1/2 WATT |
| R10 | 9W59 | 470,000 Ω - 1/2 WATT |
| R11 | 9W20 | 150 Ω - 1/2 WATT |
| R12 | 9W72 | 1000 Ω - 1/2 WATT |
| R13 | 9W47 | 220 Ω - 1 WATT |
| R14 | 9W61 | 22 Ω - 1/2 WATT |

| | CODE | PART NO. | DESCRIPTION |
|---|---|---|---|
| | L1 | 3W31 | LOOP - 184 μh. |
| | L2 | 3W28 | OSCILLATOR COIL |
| | T1 | 3W20 | 1ST. I.F. TRANSFORMER |
| | T2 | 3W21 | 2ND. I.F. TRANSFORMER |
| | T3 | 12W1 | OUTPUT TRANSFORMER |
| | PL. | 26W2 | PILOT LIGHT |
| | SP. | 22W22 | SPEAKER |
| NOTE: | R15 | 9W11 | 250 Ω - 1/2 WATT (OMITTED ON SOME MODELS) |

**ANTENNA**—No external antenna is required for the Model 4790 except in remote localities where reception is poor. For proper performance in such a case, an outside antenna approximately 75 feet in length, including lead in, should be connected to the colored antenna lead extending from the back of the set.

**OPERATION**—The three controls on the front panel of the receiver are used as follows: the extreme left control is the on-off switch and volume control; the center control is the tuning control; and the extreme right control is the tone control.

## I. F. Alignment

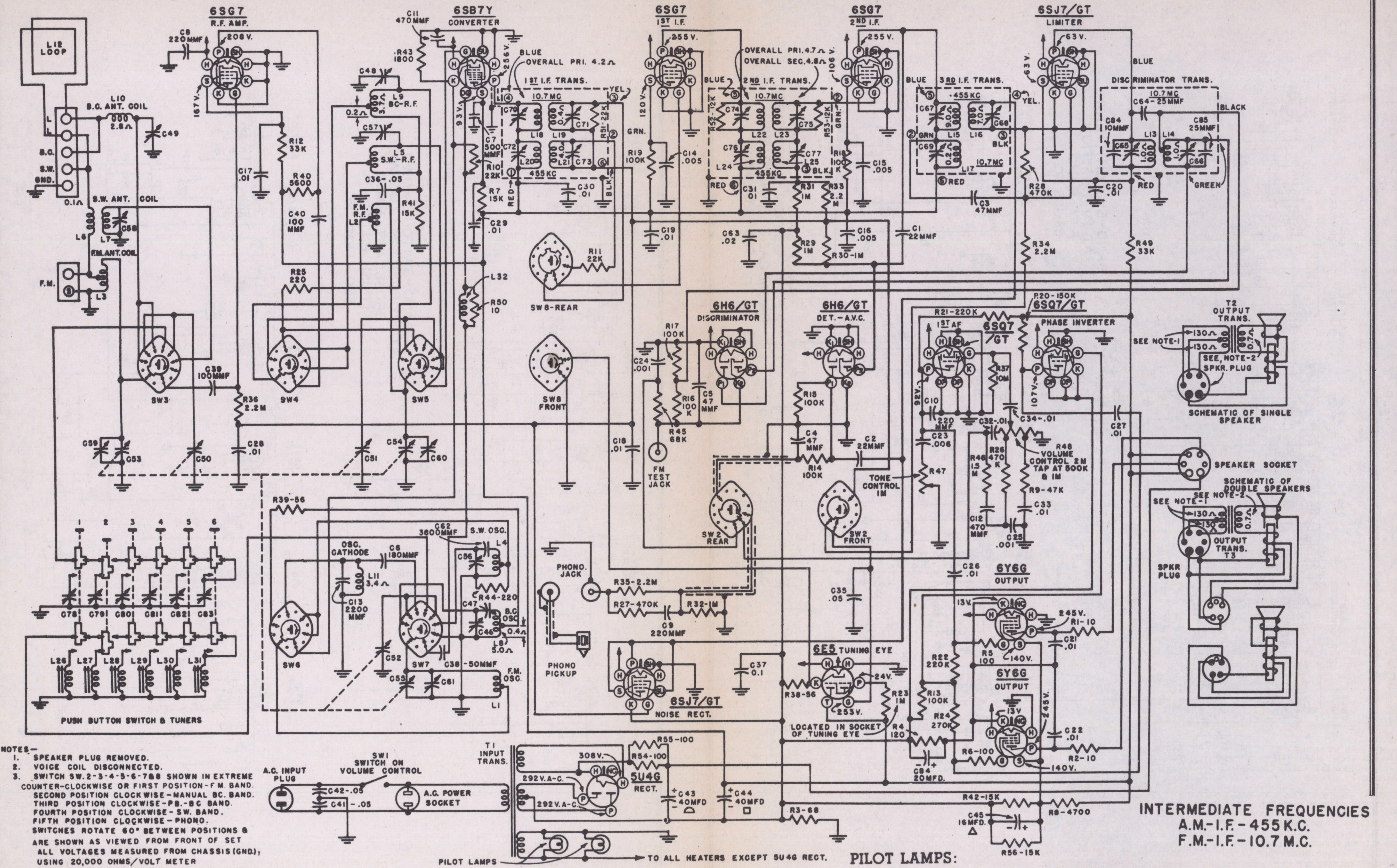
Connect the low side of an accurately calibrated signal generator through a .1 mfd condenser to the chassis of the receiver and the "high" side of the generator through a .1 mfd. condenser to the R. F. grid (pin 8) of the 12SA7 converter tube. Set the signal generator to 455 Kc. with just enough signal to be audible in the speaker with the receiver volume control full on. If possible, an output meter should be used.

Adjust the second I. F. transformer ($A_1$ and $A_2$) and then the first I. F. transformer ($A_3$ and $A_4$) for maximum output. Recheck all adjustments.

## R. F. Alignment

Connect "high" side of signal generator to the antenna lead of the receiver. Set dial pointer to 1400 Kc. on the receiver dial and turn volume control full on. Set signal generator to 1400 Kc. Adjust oscillator trimmer ($A_5$) and then the antenna trimmer ($A_6$) for maximum output. Set signal generator to 600 Kc. and receiver dial to approximately 600 Kc. While "rocking" receiver dial, adjust oscillator padder ($A_7$) for maximum output. Recheck adjustments at 1400 Kc.

## WESTINGHOUSE ELECTRIC CORP.


6SG7
R.F. AMP.
6SB7Y
CONVERTER
6SG7
1ST I.F.
6SG7
2ND I.F.
6SJ7/GT
LIMITER
L12
LOOP
L10
B.C. ANT. COIL
2.8Ω
C49
B.C.
S.W.
GND.
0.1Ω
S.W. ANT. COIL
L6
L7
C58
F.M. ANT. COIL
F.M.
L3
C8
220MMF
208 V.
167 V.
C11
470MMF
R43
1800
256V.
93V.
BLUE
OVERALL PRI. 4.2Ω
1ST I.F. TRANS.
10.7MC
455KC
YEL.
C70
C71
C72
C73
L18
L19
L20
L21
R51-22K
C48
L9
BC-R.F.
C57
L5
S.W.-R.F.
C36-.05
F.M. R.F.
L2
R41
15K
C7
500
MMF
R10
22K
R7
15K
C29
.01
C30
.01
RED
BLK
R12
33K
C17
.01
R40
5600
C40
100
MMF
255 V.
120 V.
OVERALL PRI. 4.7Ω
OVERALL SEC. 4.8Ω
2ND I.F. TRANS.
106 V.
R52-12K
R53-12K
C74
C75
C76
C77
L22
L23
L24
L25
GRN.
R19
100K
C14
.005
C31
.01
R31
1M
R33
2.2M
C19
.01
C63
.02
R29
1M
R30-1M
C16
.005
C1
22MMF
R18
100K
C15
.005
3RD I.F. TRANS.
455KC
10.7MC
C67
C68
C69
L15
L16
L17
63 V.
C3
47MMF
R28
470K
R34
2.2M
DISCRIMINATOR TRANS.
10.7MC
C64-25MMF
C84
10MMF
C85
25MMF
C65
C66
L13
L14
BLACK
GREEN
C20
.01
R49
33K
R11
22K
SW8-REAR
SW8
FRONT
L32
R50
10
R25
220
C39
100MMF
R36
2.2M
C28
.01
SW3
SW4
SW5
C59
C53
C50
C51
C54
C60
6H6/GT
DISCRIMINATOR
6H6/GT
DET.-A.V.C.
R17
100K
C24
.001
R16
100K
C5
47
MMF
R45
68K
C18
.01
FM
TEST
JACK
R15
100K
C4
47
MMF
R14
100K
C2
22MMF
SW2
REAR
SW2
FRONT
TONE
CONTROL
1M
R47
6SQ7/GT
1ST AF
R21-220K
R20-150K
6SQ7/GT
PHASE INVERTER
92V.
107V.
R37
10M
C10
220
MMF
C23
.006
C32-.01
C34-.01
R46
1.5
M
R26
470
K
R48
VOLUME
CONTROL 2M
TAP AT 500K
& 1M
R9-47K
C33
.01
C12
470
MMF
C25
.001
C27
.01
T2
OUTPUT
TRANS.
SEE NOTE-1
SEE NOTE-2
SPKR. PLUG
130Ω
0.7Ω
SCHEMATIC OF SINGLE
SPEAKER
SPEAKER SOCKET
SCHEMATIC OF
DOUBLE SPEAKERS
OUTPUT
TRANS.
T3
SPKR
PLUG
1 2 3 4 5 6
C78
C79
C80
C81
C82
C83
L26
L27
L28
L29
L30
L31
PUSH BUTTON SWITCH & TUNERS
R39-56
OSC.
CATHODE
C6
180MMF
L11
3.4Ω
C13
2200
MMF
C62
3600MMF
S.W. OSC.
L4
C56
R44-220
C47
B.C.
OSC
C46
L8
5.0Ω
0.4Ω
C52
C55
C61
C38-50MMF
F.M.
OSC.
L1
SW6
SW7
PHONO.
JACK
PHONO
PICKUP
R35-2.2M
R27-470K
R32-1M
C9
220MMF
6SJ7/GT
NOISE RECT.
C37
0.1
C35
.05
6E5 TUNING EYE
R38-56
24V.
253V.
R23
1M
LOCATED IN SOCKET
OF TUNING EYE
R4
120
C26
.01
6Y6G
OUTPUT
13V.
245V.
R1-10
C21
.01
R5
100
140V.
R22
220K
R13
100K
R24
270K
6Y6G
OUTPUT
R6-100
C22
.01
R2-10
C84
20MFD.
T1
INPUT
TRANS.
308V.
292V.A-C.
R55-100
R54-100
5U4G
RECT.
C43
40MFD
C44
40MFD
R3-68
R42-15K
R8-4700
C45
16MFD.
R56-15K
SW1
SWITCH ON
VOLUME CONTROL
A.C. INPUT
PLUG
C42-.05
C41-.05
A.C. POWER
SOCKET
PILOT LAMPS
TO ALL HEATERS EXCEPT 5U4G RECT.

NOTES—
1. SPEAKER PLUG REMOVED.
2. VOICE COIL DISCONNECTED.
3. SWITCH SW.2-3-4-5-6-7&8 SHOWN IN EXTREME COUNTER-CLOCKWISE OR FIRST POSITION-F.M. BAND.
SECOND POSITION CLOCKWISE-MANUAL BC. BAND.
THIRD POSITION CLOCKWISE-PB.-BC BAND.
FOURTH POSITION CLOCKWISE-SW. BAND.
FIFTH POSITION CLOCKWISE-PHONO.
SWITCHES ROTATE 60° BETWEEN POSITIONS & ARE SHOWN AS VIEWED FROM FRONT OF SET
ALL VOLTAGES MEASURED FROM CHASSIS (GND.), USING 20,000 OHMS/VOLT METER
LINE VOLTAGE 117 V.A.C. MAX. VOLUME CONTROL SETTING AT NO SIGNAL CONDITIONS FOR B.C. BAND

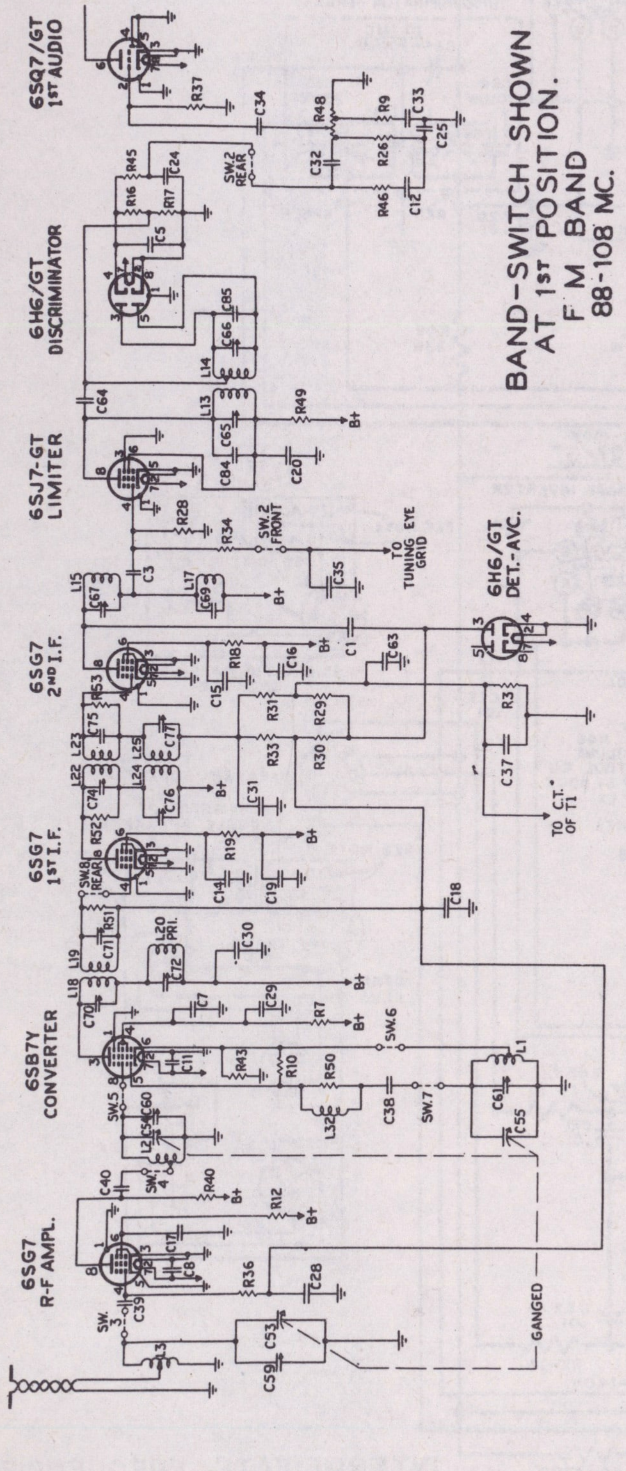
**INTERMEDIATE FREQUENCIES**
A.M.-I.F.-455K.C.
F.M.-I.F.-10.7M.C.

**PILOT LAMPS:**
2 Westinghouse No. 44, 6.3 volts, 0.25 amps.

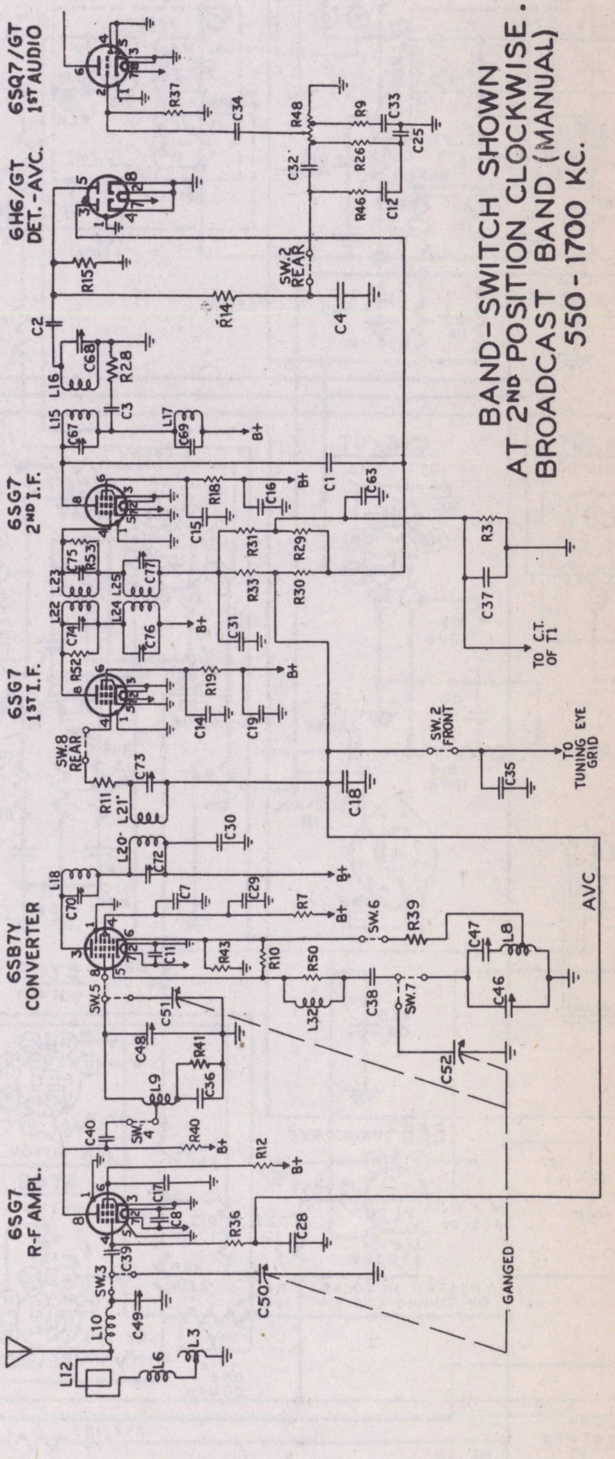
RECORD CHANGER for H-116,117: General Instrument 204,RCD.CH.P.15-1
RECORD CHANGER for H-119: Webster 56,RCD.CH.P.15-10

# WESTINGHOUSE ELECTRIC CORP.

MODELS H-113 -114,
-116,-117, ,-119


6SG7 R-F AMPL.
6SB7Y CONVERTER
6SG7 1ST I.F.
6SG7 2ND I.F.
6SJ7-GT LIMITER
6H6/GT DISCRIMINATOR
6SQ7/GT 1ST AUDIO
6H6/GT DET.-AVC.
SW.2 REAR
SW.2 FRONT
TO TUNING EYE GRID
TO C.T. OF T1
SW.3
SW.4
SW.5
SW.6
SW.7
SW.8 REAR
GANGED
L20 PRI.
B+

BAND-SWITCH SHOWN AT 1ST POSITION. F M BAND 88-108 MC.

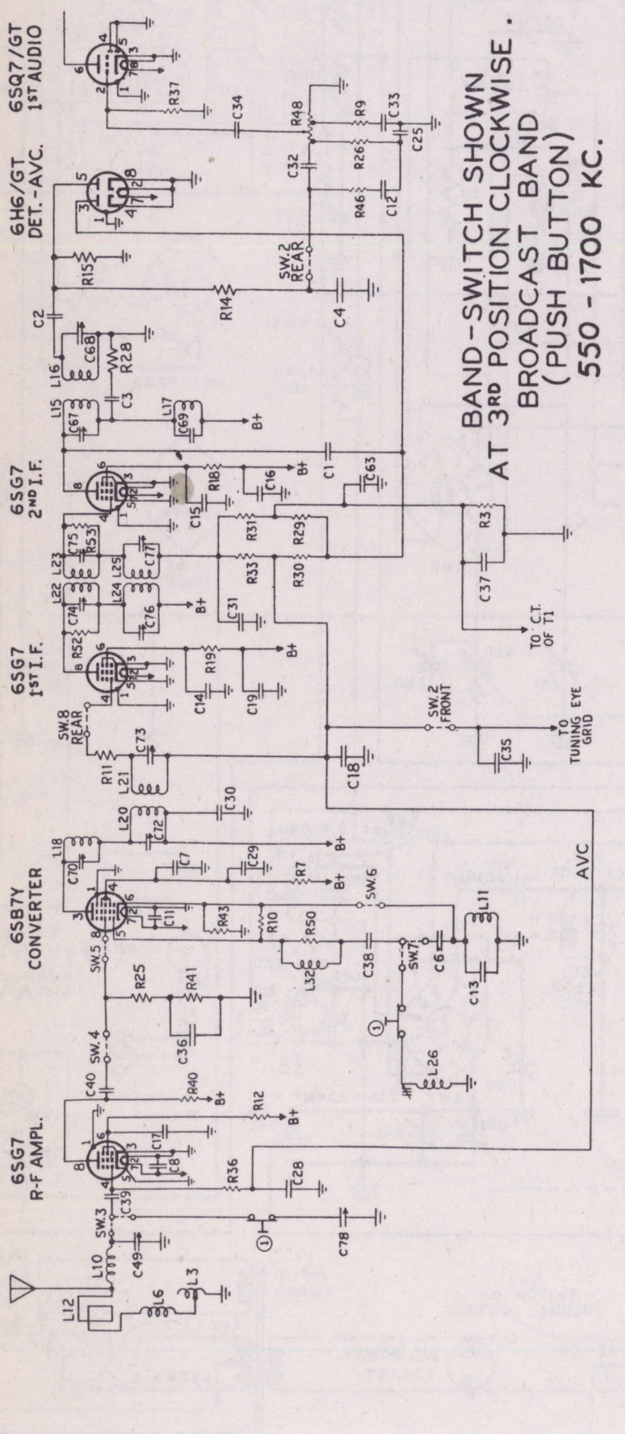

6SG7 R-F AMPL.
6SB7Y CONVERTER
6SG7 1ST I.F.
6SG7 2ND I.F.
6H6/GT DET.-AVC.
6SQ7/GT 1ST AUDIO
SW.2 REAR
SW.2 FRONT
TO TUNING EYE GRID
TO C.T. OF T1
AVC
SW.3
SW.4
SW.5
SW.6
SW.7
SW.8 REAR
GANGED
B+

BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. BROADCAST BAND (MANUAL) 550-1700 KC.

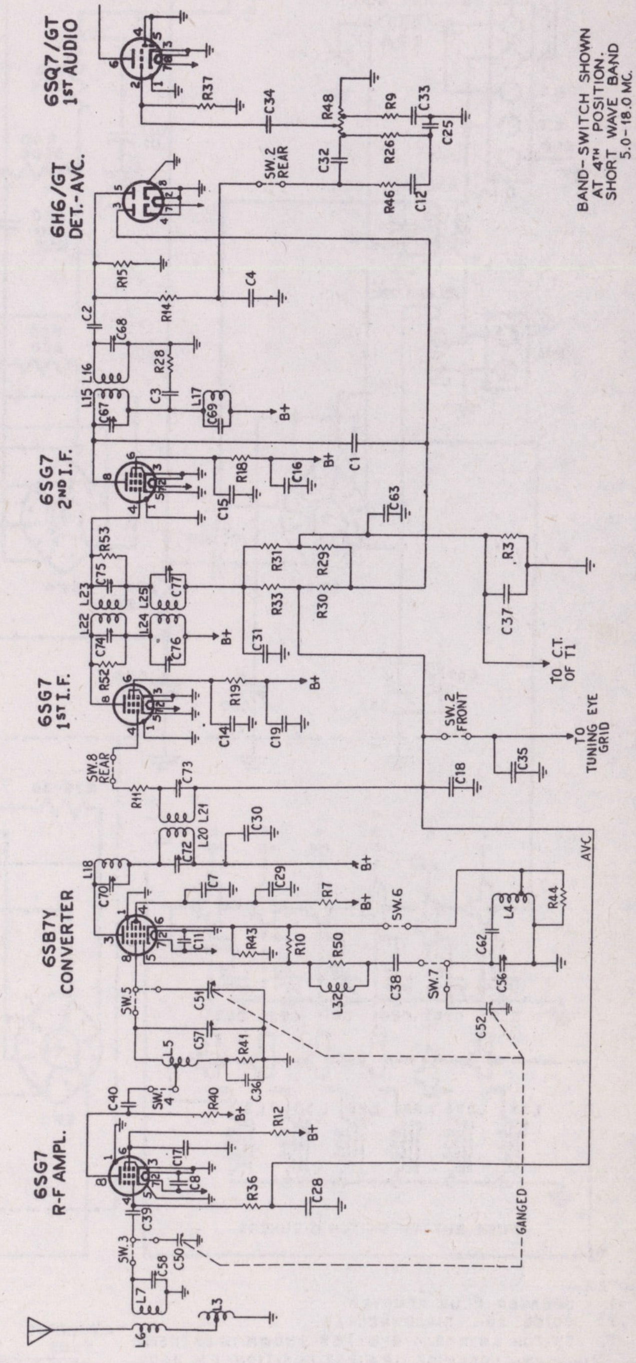
# "clarified schematics"

## WESTINGHOUSE ELECTRIC CORP.

MODELS H-113,-114,-
-116,-117, -119

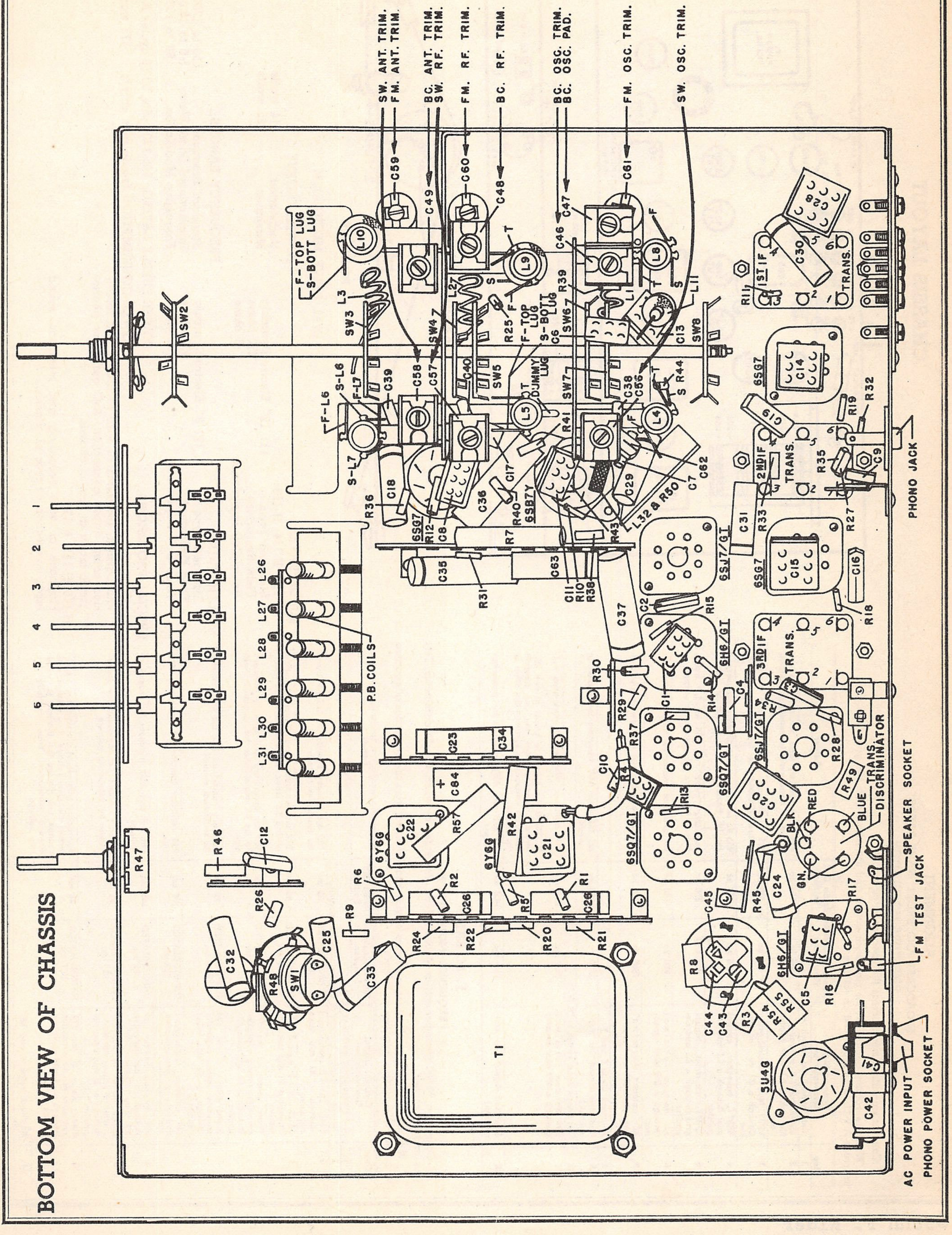

6SG7
R-F AMPL.
6SB7Y
CONVERTER
6SG7
1ST I.F.
6SG7
2ND I.F.
6H6/GT
DET.-AVC.
6SQ7/GT
1ST AUDIO
SW.2 REAR
SW.2 FRONT
SW.3
SW.4
SW.5
SW.6
SW.7
SW.8 REAR
TO TUNING EYE GRID
TO C.T. OF T1
AVC
B+

BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE. BROADCAST BAND (PUSH BUTTON) 550 - 1700 KC.


6SG7
R-F AMPL.
6SB7Y
CONVERTER
6SG7
1ST I.F.
6SG7
2ND I.F.
6H6/GT
DET.-AVC.
6SQ7/GT
1ST AUDIO
SW.2 REAR
SW.2 FRONT
SW.3
SW.5
SW.6
SW.7
SW.8 REAR
TO TUNING EYE GRID
TO C.T. OF T1
AVC
GANGED
B+

BAND-SWITCH SHOWN AT 4TH POSITION. SHORT WAVE BAND 5.0-18.0 MC.

WESTINGHOUSE ELECTRIC CORP. MODELS H-113,-114,-116,-117,-119



BOTTOM VIEW OF CHASSIS

SW. ANT. TRIM.
FM. ANT. TRIM.
BC. ANT. TRIM.
SW. RF. TRIM.
FM. RF. TRIM.
BC. RF. TRIM.
BC. OSC. TRIM.
BC. OSC. PAD.
FM. OSC. TRIM.
SW. OSC. TRIM.
C59
C49
C60
C48
C47
C46
C61
F-TOP LUG
S-BOTT LUG
L10
L9
L8
L3
L2
L1
L11
SW2
SW3
SW4
SW5
SW6
SW7
SW8
R25
F-TOP LUG
S-BOTT LUG
C6
R39
C13
F-L6
S-L6
F-L7
S-L7
C39
C58
C57
C40
DUMMY LUG
L5
L4
R41
C38
C56
R44
C18
R36
C17
C36
6SQ7
R12
C8
6SB7Y
R40
R7
C29
L32 & R50
C7
C62
R43
C35
C63
R31
C11
R10
R38
C37
C2
R15
6SH7/GT
6SJ7/GT
C31
R33
2ND IF TRANS.
R35
R27
C9
C19
R19
R32
6SG7
C14
1ST IF TRANS.
R11
C30
C28
C15
C16
R18
3RD IF TRANS.
PHONO JACK
1
2
3
4
5
6
L26
L27
L28
L29
L30
L31
P.B. COILS
R30
R29
R37
C1
R14
C4
C3
R28
6SQ7/GT
6SJ7/GT
C10
R4
R13
C20
R49
TRANS. DISCRIMINATOR
C23
C34
C84
R57
C22
6Y6G
R42
C21
6Y6G
R6
R2
C26
R5
R1
C26
R24
R22
R20
R21
RED
BLK
BLUE
GN.
R45
C24
SPEAKER SOCKET
R17
FM TEST JACK
R47
R46
C12
R26
R9
C32
C25
SW1
R48
C33
T1
C45
R8
C44
C43
R3
R54
R55
6H6/GT
C5
R16
5U4G
C41
C42
AC POWER INPUT
PHONO POWER SOCKET

# ALIGNMENT

## BROADCAST AND SHORT WAVE BANDS

### AMPLITUDE MODULATION

Connect an output meter across the speaker voice coil.

With the volume control set for maximum output and the signal from the generator attenuated to avoid A.V.C. action, proceed as follows:

| Step | Connect Signal Generator to— | Signal Generator Frequency | Radio Dial Setting | Adjust |
|---|---|---|---|---|
| 1 | Set Phono-Band switch to "BC" | | | |
| 2 | 6SG7, 2nd I-F, control grid through a 0.1 mfd capacitor | 455 kc | 550 kc | 455 kc secondary and primary trimmers of 3rd I-F transformer for maximum output. |
| 3 | 6SG7, 1st I-F, control grid through a 0.1 mfd. capacitor | 455 kc | 550 kc | 455 kc secondary and primary trimmers of 2nd I-F transformer for maximum output. |
| 4 | 6SB7Y, converter, control grid through a 0.1 mfd capacitor | 455 kc | 550 kc | 455 kc secondary and primary trimmers of 1st I-F transformer for maximum output. |
| 5 | 6SB7Y, converter, control grid through a 0.1 mfd capacitor | 455 kc | 550 kc | carefully "peak" all 455 kc I-F transformer trimmers for maximum output. |
| 6 | BC antenna terminal through a 200 mmf capacitor | 600 kc | 600 kc | BC oscillator padder for maximum output. |
| 7 | BC antenna terminal through a 200 mmf capacitor | 1600 kc | 1600 kc | BC oscillator trimmer for maximum output. |
| 8 | Re-check steps 6 and 7 | | | |
| 9 | Radiated signal (no connection) | 1400 kc | 1400 kc | BC R-F and ANT trimmers for maximum output. |
| 10 | Set Phono-Band switch to "S.W." | | | |
| 11 | SW antenna terminal through a 400 ohm resistor | 18.0 mc | 18.0 mc | SW oscillator trimmer for maximum output.<br>NOTE: If the signal is heard at two different trimmer settings, the one nearest minimum capacity is correct—the other is the image. |
| 12 | Radiated signal (no connection) | 16.0 mc | 16.0 mc | SW R-F and ANT trimmers for maximum output. |

## F. M. BAND

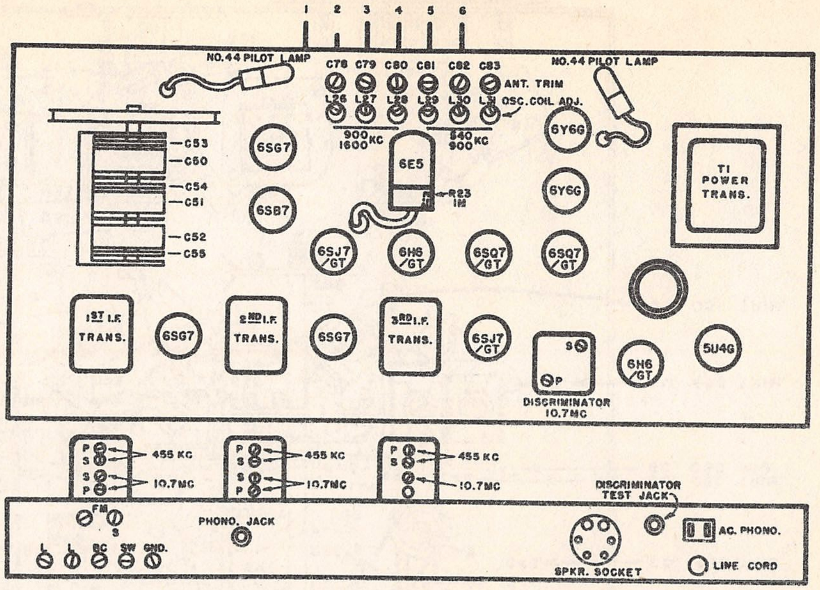
### FREQUENCY MODULATION

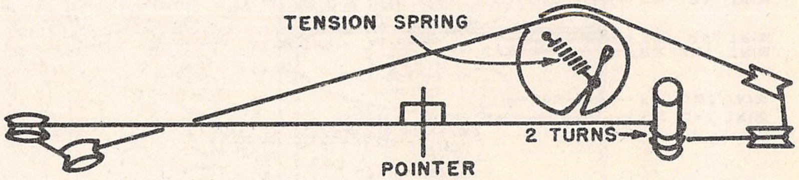
Connect a 20,000 ohms-per-volt or Vacuum Tube Voltmeter between the Discriminator Test Jack and the chassis.

With the volume control set for maximum output and the signal from the generator attenuated to avoid A.V.C. action, proceed as follows:

| Step | Connect Signal Generator to— | Signal Generator Frequency | Radio Dial Setting | Adjust |
|---|---|---|---|---|
| 1 | Set Phono-Band switch to "F.M." | | | |
| 2 | Detune secondary trimmer of discriminator transformer. | | | |
| 3 | 6SG7, 2nd I-F, control grid through a .01 mfd mica capacitor | UNMODULATED 10.7 mc | 88 mc | 10.7 mc primary trimmer of 3rd I-F trans. for maximum voltage. |
| 4 | 6SG7, 1st I-F, control grid through a .01 mfd mica capacitor | UNMODULATED 10.7 mc | 88 mc | 10.7 mc secondary and primary trimmers of 2nd I-F trans. for maximum voltage. |
| 5 | Fixed plates of the FM converter tuning capacitor through a .01 mfd mica capacitor | UNMODULATED 10.7 mc | 88 mc | 10.7 mc secondary and primary trimmers of 1st I-F transformer for maximum voltage. |
| 6 | Fixed plates of the FM converter tuning capacitor through a .01 mfd mica capacitor | UNMODULATED 10.7 mc | 88 mc | carefully "peak" all 10.7 mc I-F trimmers for maximum voltage. |
| 7 | FM antenna terminal through a non-inductive 300 ohm resistor | UNMODULATED 105 mc | 105 mc | FM oscillator trimmer for maximum voltage. |
| 8 | FM antenna terminal through a non-inductive 300 ohm resistor | UNMODULATED 105 mc | 105 mc | FM R-F and ANT trimmers for maximum voltage. |
| 9 | Fixed plates of the FM converter tuning capacitor through a .01 mfd mica capacitor | UNMODULATED 10.7 mc | 88 mc | Primary trimmer of 'discriminator transformer for maximum voltage. |
| 10 | Fixed plates of the FM converter tuning capacitor through a .01 mfd mica capacitor | UNMODULATED 10.7 mc | 88 mc | Secondary trimmer of discriminator transformer for zero voltage. The voltage will change polarity as the trimmer is tuned through resonance. Tune carefully for zero voltage. |
| 11 | Re-check steps 9 and 10. | | | |

# CHASSIS LAYOUT





DIAL DRIVE MECHANISM

**LOUDSPEAKER:**

H-113, H-114, H-119:
Size and Type ...... (1) 12" Electro-Dynamic
Field Resistance ....................250 ohms
Voice Coil Impedance ................8 ohms

H-116, H-117:
Size and Type ....... (2) 8" Electro-Dynamic
Field Resistance ....................500 ohms
Voice Coil Impedance ..............3.2 ohms

**POWER OUTPUT**

Undistorted .......14 watts
Maximum .........25 watts

**FREQUENCY RANGES:**

Standard Broadcast .......550 to 1700 kc.
International Short Wave ..5.0 to 18.0 mc.
Frequency Modulation ......88 to 108 mc.

**SPECIAL PROVISIONS:**

H-113, H-114:
Phonograph, playback of wire recording and television sound input connection. A-C outlet for phonograph motor at rear of chassis.

H-116, H-117, H-119:
Playback of wire recording and television sound input connection at rear of chassis.

**POWER SUPPLY RATING:** 105-120 volts, 50-60 cycles A-C

**POWER CONSUMPTION** (radio sect. only): ...175 watts

# WESTINGHOUSE ELECTRIC CORP.

MODELS H-113,-114,-115,
-116,-117,-118,-119

| Part No. | Description |
|---|---|
| V-3420 | Background, felt |
| V-3532S | Bar, flat for phono. mtg. (H-116, H-117) |
| V-3429S-4 | Bolt, chassis mtg. |
| V-3185 | Bracket, dial light (short) |
| V-3357 | Bracket, dial light (long) |
| V-4086-1 | Bracket, motorboard stop, R.H. (H-116, H-117) |
| V-4086-2 | Bracket, motorboard stop, L.H. (H-116, H-117) |
| V-3671 | Bracket, variable capacitor mtg. (rear) |
| V-3672 | Bracket, variable capacitor mtg. (front) |
| V-3374 | Bracket, volume control mtg. |
| V-3507 | Bracket & Clip Assy. (tuning eye) |
| RCM20C220K | Capacitor, 22 mmf. mica (C1, C2) |
| RCM20B470K | Capacitor, 47 mmf. mica (C3, C4, C5) |
| RCM20C181J | Capacitor, 180 mmf. mica (C6) |
| V-3714-4 | Capacitor, fixed ceramic, 500 mmf. (C7) |
| RCM20B221M | Capacitor, 220 mmf. mica (C8, C9, C10) |
| RCM20B471M | Capacitor, 470 mmf. mica (C11, C12) |
| RCM30B222M | Capacitor, 2200 mmf. mica (C13) |
| RCM30B512M | Capacitor, .005 mfd. mica (C14, C15, C16) |
| RCM30B103M | Capacitor, .01 mfd. mica (C17, C18, C19, C20, C21, C22) |
| RCP10M6602M | Capacitor, .006 mfd, 600 v. (C23) |
| RCP10M6102M | Capacitor, .001 mfd. 600 v. (C24, C25) |
| RCP10M4103A | Capacitor, .01 mfd. 400 v. (C26, C27) |
| RCP10W4103A | Capacitor, .01 mfd. 400 v. (C28, C29, C30, C31, C32, C33, C34) |
| RCP10W4503A | Capacitor, .05 mfd. 400 v. (C35) |
| RCP10M4503A | Capacitor, .05 mfd. 400 v. (C36) |
| RCP10W4104A | Capacitor, 0.1 mfd. 400 v. (C37) |
| V-3714-1 | Capacitor, fixed ceramic, 50 mmf. (C38) |
| V-3714-2 | Capacitor, fixed ceramic, 100 mmf. (C39, C40) |
| V-3241 | Capacitor, dual line filter, .05 - .05 mfd. 600 v. (C41, C42) |
| V-3302 | Capacitor, electrolytic<br>40 mfd. 450 v. (C43)<br>40 mfd. 400 v. (C44)<br>16 mfd. 350 v. (C45) |
| V-3424 | Capacitor, 2 gang trimmer (C46 & C47) |
| V-3306-1 | Capacitor, trimmer (C48) |
| V-3423-1 | Capacitor, trimmer (C49) |
| V-3296 | Capacitor, variable, 3 gang (C50, C51, C52, C53, C54, C55) |
| V-3423-2 | Capacitor, trimmer (C56, C57) |
| V-3306-2 | Capacitor, trimmer (C58) |
| V-3713-1 | Capacitor, variable ceramic (C59, C61) |
| V-3713-2 | Capacitor, variable ceramic (C60) |
| RCM30C382G | Capacitor, 3800 mmf. mica (C62) |
| RCP10W4203A | Capacitor, .02 mfd. 400 v. (C63) |
| V-3181 | Rail, pointer |
| RC20AE100K | Resistor, 10 ohms ½ w. (R1, R2) |
| RC40AE680J | Resistor, 68 ohms 2 w. (R3) |
| V-3282 | Resistor, 120 ohms 3 w. (R4) |
| RC20AE101K | Resistor, 100 ohms ½ w. (R5, R6) |
| RC40AE153K | Resistor, 15K 2 w. (R7) |
| RC40AE472M | Resistor, 4700 ohms 2 w. (R8) |
| RC10AE473M | Resistor, 47K ¼ w. (R9) |
| RC10AE223K | Resistor, 22K ¼ w. (R10, R11) |
| RC20AE333M | Resistor, 33K ½ w. (R12) |
| RC10AE104K | Resistor, 100K ¼ w. (R13, R14, R15, R16, R17, R18, R19) |
| RC10AE154K | Resistor, 150K ¼ w. (R20) |
| RC10AE224K | Resistor, 220K ¼ w. (R21, R22) |
| RC10AE105K | Resistor, 1 meg. ¼ w. (R23, R29, R30, R31) |
| RC10AE274K | Resistor, 270K ¼ w. (R24) |
| RC10AE221M | Resistor, 220 ohms ¼ w. (R25) |
| RC10AE474M | Resistor, 470K ¼ w. (R26, R27) |
| RC10AE474K | Resistor, 470K ¼ w. (R28) |
| RC10AE105M | Resistor, 1 meg. ¼ w. (R32) |
| RC10AE225K | Resistor, 2.2 meg. ¼ w. (R33) |
| RC10AE225M | Resistor, 2.2 meg. ¼ w. (R34, R35, R36) |
| RC10AE106M | Resistor, 10 meg. ¼ w. (R37) |
| RC20AE560K | Resistor, 56 ohms ½ w. (R38, R39) |
| RC20AE562K | Resistor, 5600 ohms ½ w. (R40) |
| RC10AE153M | Resistor, 15K ¼ w. (R41) |
| RC41AE153K | Resistor, 15K 2 w. (R42, R56) |
| RC20AE182K | Resistor, 1800 ohms ½ w. (R43) |
| RC10AE221K | Resistor, 220 ohms ¼ w. (R44) |
| RC10AE683K | Resistor, 68K ¼ w. (R45) |
| RC10AE155M | Resistor, 1.5 meg. ¼ w. (R46) |
| RC30AE333K | Resistor, 33K 1 w. (R49) |
| RC40AE560K | Resistor, 56 ohms 2 w. (replaces R54 & R55) |
| V-3805 | Shield, spiral, 4" long |

| Part No. | Description |
|---|---|
| V-3236 | Capacitor, electrolytic, 20 mfd, 25 v. (C84) |
| V-4156 | Choke Assy., parasitic suppresso (L32, R50) |
| V-3337 | Clamp, tuning eye cable |
| V-3183 | Clip, speed (dial mtg.) |
| V-3361 | Coil Assy., F.M. osc. (L1) |
| V-3418 | Coil Assy., F.M. R.F. (L2) |
| V-3485 | Coil Assy., F.M. ant. (L3) |
| V-3524 | Coil, S.W. osc. (L4) |
| V-3526 | Coil, S.W. R.F. (L5) |
| V-3525 | Coil, S.W., ant. (L6 & L7) |
| V-3512 | Coil, B.C. osc. (L8) |
| V-3527 | Coil, B.C. R.F. (L9) |
| V-3528 | Coil, B.C. ant. (L10) |
| V-3313 | Coil, osc. cathode (L11) |
| V-3254 | Connector, phono |
| V-3305 | Control, tone 1 meg. (R47) |
| V-3293 | Control, volume and power, 2 meg. tapped at 500K and 1M (R48), and switch (SW1) |
| V-3239 | Cord, A-C power |
| V-4157S-60 | Cord, dial drive |
| V-3632 | Cover, back (H-116, H-117) |
| V-3362 | Decal, band |
| V-3609 | Decal, tone |
| V-3422 | Dial, glass |
| V-3354 | Dripboard (H-116, H-117) |
| V-3364 | Escutcheon, push button |
| V-3631 | Escutcheon, tuning eye (H-116, H-117, H-119) |
| V-3276-1 | Grille Cloth, speaker (H-113) |
| V-3276-2 | Grille Cloth, speaker (H-114) |
| V-3616-1 | Grille Cloth, speaker (H-116) |
| V-3616-2 | Grille Cloth, speaker (H-117) |
| V-3617-1 | Grille Cloth, speaker (H-119) |
| V-3345S-4 | Grommet, var. cond. mtg. |
| V-3187S-1 | Grommet, rubber, chassis mtg. |
| V-4318 | Hinge, door (submit sample with order) |
| V-3359 | Insulator, filter capacitor |
| Form RM32 | Instruction Book (H-113, H 114) |
| Form RM33 | Instruction Book (H-116, H-117) |
| Form RM48 | Instruction Book (H-119) |
| V-3483 | Jack, discriminator test |
| V-3264-1 | Knob, tuning & volume (H-113, H-116, H-119) |
| V-3262-1 | Knob, tone (H-113, H-116, H-119) |
| V-3262-3 | Knob, band (H-113, H-116, H-119) |
| V-3264-2 | Knob, tuning & volume (H-114, H-117) |
| V-3262-2 | Knob, tone (H-114, H-117) |
| V-3262-4 | Knob, band (H-114, H-117) |
| V-4320-1 | Knob, door (H-119) |
| (W) No. 44 | Lamp, dial, 6.3 v. |
| V-3283-2 | Loop Assembly (L12) |
| V-3703 | Mask, tuning eye (H-116, H-117, H-119) |
| V-3613 | Speaker, 8" Electro Dynamic with receptacle (H-116, H-117) |
| V-3248S | Spring, dial drive |
| V-3258S | Spring, knob |
| V-3397 | Spring, push button |
| V-3167S-1 | Stud, pulley (threaded) |
| V-3430 | Support, volume control shaft |
| V-3261-2 | Switch Assy., push button |
| V-3310 | Switch, selector (SW2 to SW8 incl.) |
| V-3395 | Tabs, station (for push buttons) |
| V-3482 | Teenut (H-116, H-117) |
| V-3643 | Teenut (H-119) |
| V-3351 | Terminal Board, 2 lugs |
| V-3484 | Terminal Board, 1 lug |
| V-3487 | Terminal Board, 11 lugs |
| V-3349 | Terminal Board, 8 lugs |
| V-3675 | Terminal Board, 3 lugs (no lugs grounded) |
| V-3488 | Terminal Board, 12 lugs |
| V-3486 | Terminal Board, 3 lugs (one lug grounded) |
| V-3255 | Terminal Board, ANT-GND |
| V-3417 | Terminal Board F.M. ANT. |
| V-3411 | Transformer, discriminator |
| V-3419 | Transformer, 3rd. I-F |
| V-3426 | Transformer, 1st. I-F |
| V-3427 | Transformer, 2nd. I-F |
| V-3295 | Transformer, power |
| V-3274S | Tube holder (5U4G) |
| V-3317 | Tuner, push button (C78 to C83 and L26 to L31 incl.) |
| V-3415 | Tuning Shaft & Bracket Assy. |
| V-3668S | Washer, felt |
| V-3506S-1 | Washer, neoprene, chassis mtg. |
| V-3267S-3 | Washer, steel, chassis mtg. |
| V-3431 | Windows, station tab |

| Part No. | Description |
|---|---|
| V-3229-3 | Moulding, dial (H-113, H-114, H-116, H-117) |
| V-3229-4 | Moulding, dial (H-119) |
| V-3490 | Nameplate (H-119) |
| V-3366S-2 | Pin, escutcheon |
| V-3841-1 | Plate Assy., front glass (H-113) |
| V-3841-2 | Plate Assy., front glass (H-114) |
| V-3841-3 | Plate Assy., front glass (H-116) |
| V-3841-4 | Plate Assy., front glass (H-117) |
| V-3841-5 | Plate Assy., front glass (H-119) |
| V-3399 | Pointer Assy. |
| V-4319-3 | Pull, drawer (H-116, H-117) |
| V-4319-2 | Pull, drawer (H-119) |
| V-3166S | Pulley, 7/16" dia. |
| V-3398-1 | Push Button with Spring (H-113, H-116, H-119) |
| V-3398-2 | Push Button with Spring (H-114, H-117) |

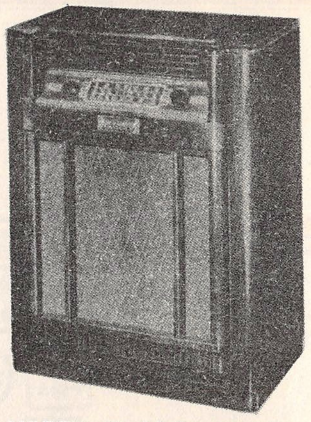
| Part No. | Description |
|---|---|
| V-3344-2 | Sleeve, cond. mtg. |
| V-3639-1 | Slide Mechanism, left hand unit (H-116, H-117, H-119) |
| V-3639-2 | Slide Mechanism, right hand unit (H-116, H-117, H-119) |
| V-3393-2 | Socket, A-C outlet |
| V-3288S | Socket, 6 contact tube |
| V-3290 | Socket, moulded octal tube (6SB7Y, 6SG7) |
| V-3275S | Socket, moulded octal tube (5U4G) |
| V-3246S | Socket, octal tube |
| V-3252-2 | Socket, pilot light |
| V-3308 | Socket, tuning eye (with R23) |
| V-3292 | Speaker, 12" Electro Dynamic, incl. output trans. T2 (H-113, H-114, H-119) |
| V-3612 | Speaker, 8" Electro Dynamic with cord, plug and output trans, T3 (H-116, H-117) |

## PUSH BUTTONS

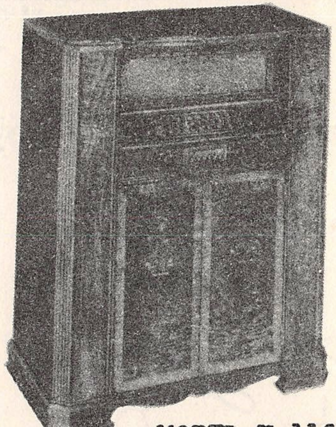
Push buttons 1 to 3 are designed to receive stations from 900 to 1600 kc; push buttons 4 to 6 are designed to receive stations from 540 to 900 kc.

Refer to CHASSIS LAYOUT drawing for location of push button adjusters, and then proceed as follows:

1. Turn on radio and allow it to warm up for five minutes.
2. Set the Phono-Band switch on "BC," and tune in the desired station in the frequency range 900 to 1600 kc.
3. Re-set the Phono-Band switch on "P.B.", and depress the first push button (right button viewed from the front).
4. Adjust C78 for maximum receiver output (either a station or static will be heard depending on the setting of L26). Now adjust L26 until the desired station is heard. It will be necessary to re-adjust C78 at intervals to maintain maximum output.
5. Make a final adjustment of L26 for proper tuning and C78 for maximum output.
6. Return the band switch to "B.C." to make certain that the push button has been set to the desired station.
7. Adjust the remaining push buttons in the same manner.



MODEL H-113, H-114

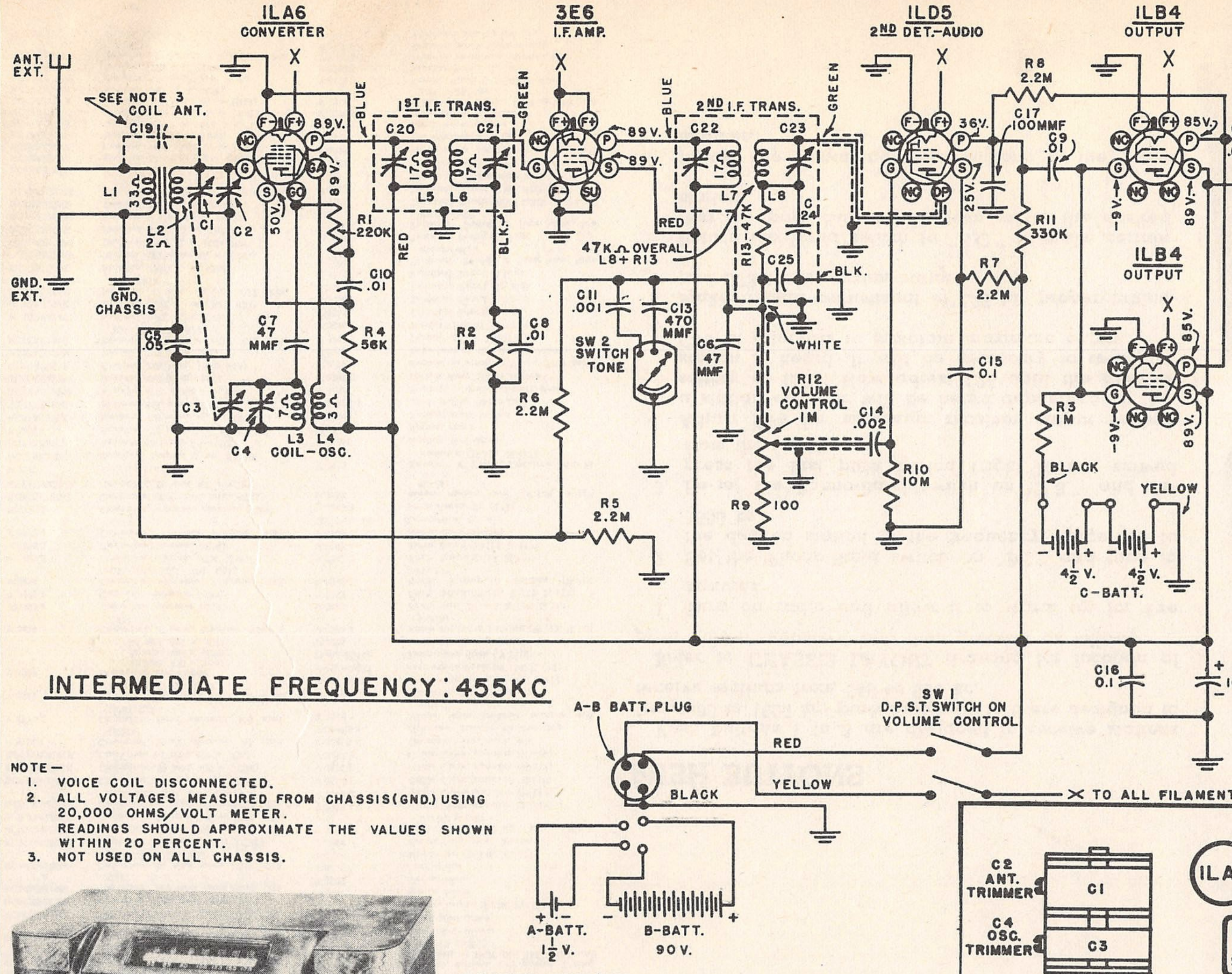


MODEL H-116, H-117

MODEL H-119

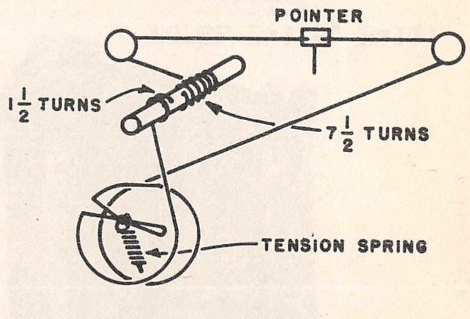
MODEL H-133

# WESTINGHOUSE ELECTRIC CORP.

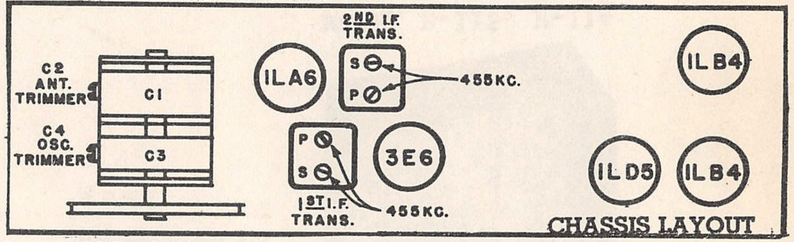

ILA6
CONVERTER
3E6
I.F. AMP.
ILD5
2ND DET.-AUDIO
ILB4
OUTPUT
ILB4
OUTPUT
ANT. EXT.
GND. EXT.
GND. CHASSIS
SEE NOTE 3
COIL ANT.
C19
L1
33Ω
L2
2Ω
C1
C2
C3
C4
C5
.05
L3
L4
COIL-OSC.
7Ω
3Ω
C7
47 MMF
50V.
89V.
R1
220K
C10
.01
R4
56K
1ST I.F. TRANS.
C20
C21
L5
L6
17Ω
BLUE
GREEN
RED
BLK.
89V.
R2
1M
C8
.01
R6
2.2M
R5
2.2M
47KΩ OVERALL
L8+R13
C11
.001
C13
470 MMF
SW 2
SWITCH
TONE
C6
47 MMF
2ND I.F. TRANS.
C22
C23
L7
L8
R13-47K
C
24
C25
WHITE
R12
VOLUME
CONTROL
1M
C14
.002
R9
100
R10
10M
36V.
25V.
R8
2.2M
C17
100MMF
C9
.01
R11
330K
R7
2.2M
C15
0.1
85V.
89V.
-9V.
C12
.001
T1
TRANS.
OUTPUT
290Ω
0.4Ω
SEE NOTE-1
PM
3.2
SPEAKER
R3
1M
BLACK
YELLOW
4½ V.
4½ V.
C-BATT.
C16
0.1
C18
10 MFD
SW 1
D.P.S.T. SWITCH ON
VOLUME CONTROL
A-B BATT. PLUG
RED
YELLOW
BLACK
X TO ALL FILAMENTS +
A-BATT.
1½ V.
B-BATT.
90 V.

INTERMEDIATE FREQUENCY: 455KC

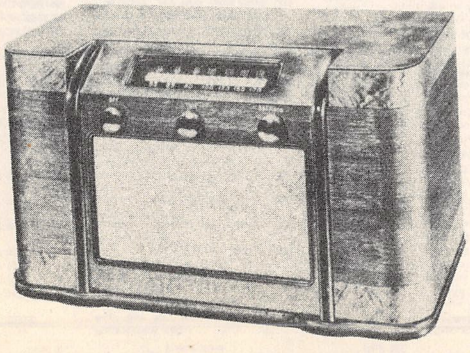
NOTE –
1. VOICE COIL DISCONNECTED.
2. ALL VOLTAGES MEASURED FROM CHASSIS (GND.) USING 20,000 OHMS/VOLT METER. READINGS SHOULD APPROXIMATE THE VALUES SHOWN WITHIN 20 PERCENT.
3. NOT USED ON ALL CHASSIS.


POINTER
1½ TURNS
7½ TURNS
TENSION SPRING

DIAL DRIVE MECHANISM


C2
ANT.
TRIMMER
C4
OSC.
TRIMMER
C1
C3
ILA6
2ND I.F. TRANS.
S
P
455KC.
3E6
1ST I.F. TRANS.
P
S
455KC.
ILB4
ILD5
ILB4

CHASSIS LAYOUT



POWER SUPPLY:
1 Westinghouse V-3594 "AB" Battery (1½ v. "A" and 90 v. "B")
2 Westinghouse V-3595 "C" Batteries (4½ v. each)

CURRENT CONSUMPTION:

| | |
|---|---|
| "A" Section of "AB" Battery | 300 milliamperes |
| "B" Section of "AB" Battery | 21 milliamperes |
| "C" Battery | 0 milliamperes |

LOUDSPEAKER:

| | |
|---|---|
| Size and Type | 5½" P.M. |
| Voice Coil Impedance | 3.2 ohms |

FREQUENCY RANGE:

| | |
|---|---|
| Standard Broadcast and Police | 550 to 1700 kc. |

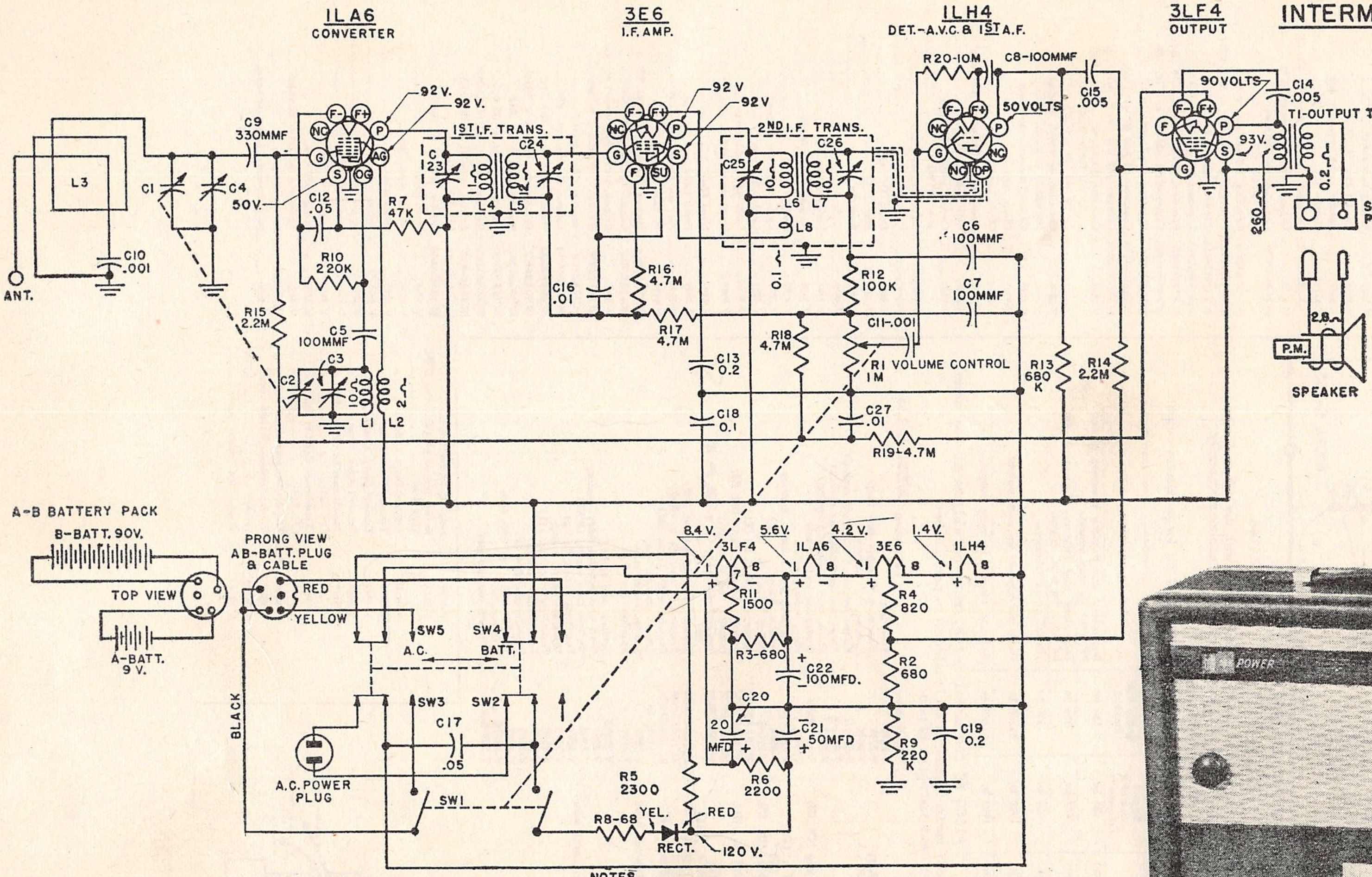
For Parts list and Alignment, see P.16-10

## WESTINGHOUSE ELECTRIC CORP.

MODEL H-148

## INTERMEDIATE FREQUENCY

## 455 KC.


1LA6
CONVERTER
3E6
I.F. AMP.
1LH4
DET.-A.V.C. & 1ST A.F.
3LF4
OUTPUT
ANT.
L3
C10 .001
C1
C4
C9 330MMF
50V.
92 V.
NC F- F+ P AG OG S G
C12 .05
R7 47K
R10 220K
R15 2.2M
C5 100MMF
C3
C2
L1 L2
1ST I.F. TRANS.
C 23
C24
L4 L5
C16 .01
R16 4.7M
R17 4.7M
C13 0.2
C18 0.1
2ND I.F. TRANS.
C25
C26
L6 L7
L8
R18 4.7M
R12 100K
C11-.001
R1 VOLUME CONTROL 1M
C27 .01
R19-4.7M
R20-10M
C8-100MMF
50 VOLTS
C6 100MMF
C7 100MMF
C15 .005
R13 680 K
R14 2.2M
90 VOLTS
C14 .005
T1-OUTPUT TRANS.
93V.
260
0.2
SPKR. PLUG
2.8
P.M.
SPEAKER
A-B BATTERY PACK
B-BATT. 90V.
TOP VIEW
A-BATT. 9 V.
PRONG VIEW AB-BATT. PLUG & CABLE
RED
YELLOW
BLACK
SW5
A.C.
SW4
BATT.
SW3
SW2
C17 .05
A.C. POWER PLUG
SW1
8.4 V.
5.6V.
4.2 V.
1.4V.
3LF4
1LA6
3E6
1LH4
R11 1500
R3-680
C22 100MFD.
C20 20 MFD
C21 50MFD
R6 2200
R4 820
R2 680
R9 220 K
C19 0.2
R5 2300
R8-68
YEL.
RED
RECT.
120 V.

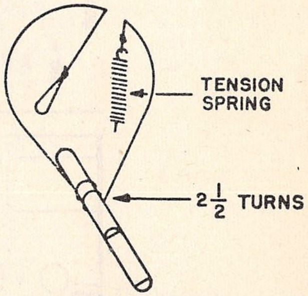
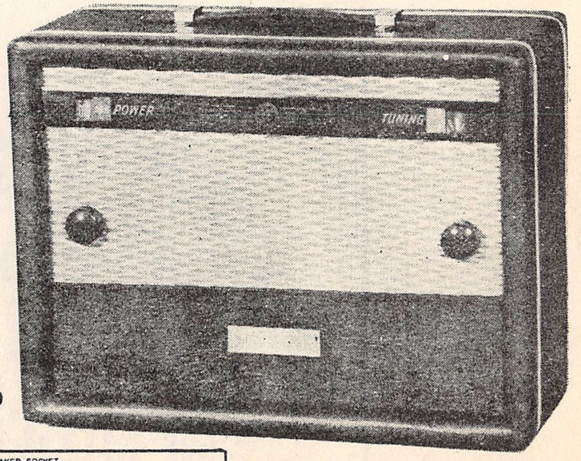

TENSION SPRING
2 1/2 TURNS

Fig. 3 -- DIAL DRIVE MECHANISM

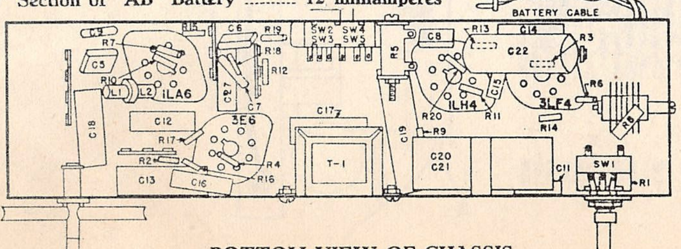

POWER
TUNING

NOTES.

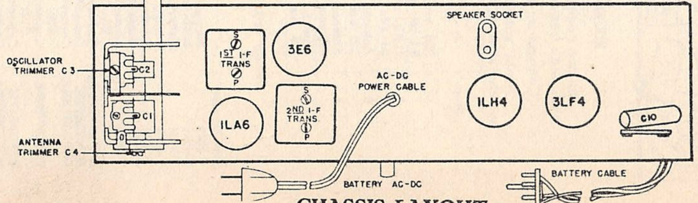
1. SWITCHES "SW. 2-3-4-5" ARE SHOWN IN A.C. POSITION.
2. VOLTAGES MEASURED FROM COMMON NEGATIVE USING A 20,000 OHM/VOLT METER. (A.C. OPERATION — 115 V. LINE.)

CURRENT CONSUMPTION (Battery Operation):

| | |
|---|---|
| "A" Section of "AB" Battery | 50 milliamperes |
| "B" Section of "AB" Battery | 12 milliamperes |


BATTERY CABLE
C9
C5
R15
C6
R19
R18
R12
SW2 SW4
SW3 SW5
R5
C8
R13
C14
C22
R3
R10
L1
L2
1LA6
C27
C7
C15
1LH4
R11
3LF4
R6
C18
C12
3E6
C17
R20
R9
C19
R17
T-1
C20 C21
R14
C11
SW1
R2
R4
R8
C13
C16
R16
R1

BOTTOM VIEW OF CHASSIS


OSCILLATOR TRIMMER C3
C2
C1
ANTENNA TRIMMER C4
1ST I-F TRANS
3E6
1LA6
2ND I-F TRANS.
AC-DC POWER CABLE
SPEAKER SOCKET
1LH4
3LF4
C10
BATTERY AC-DC
BATTERY CABLE

CHASSIS LAYOUT

POWER OUTPUT:

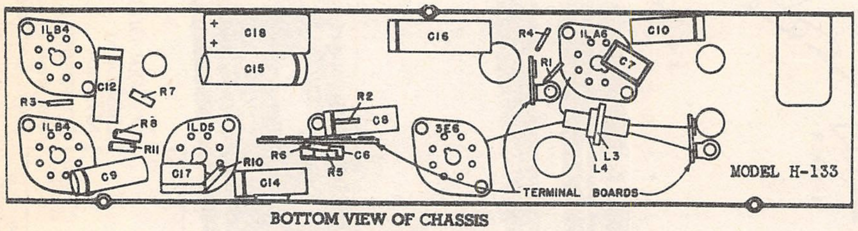
| | |
|---|---|
| Undistorted | 200 milliwatts |
| Maximum | 400 milliwatts |

LOUDSPEAKER:

| | |
|---|---|
| Size and Type | 4" P. M |
| Voice Coil Impedance | 3.2 ohms |

**MODEL H-133**
**MODEL H-148**

# WESTINGHOUSE ELECTRIC CORP.



BOTTOM VIEW OF CHASSIS

## MODEL H-133 ALIGNMENT MODEL H-148

Before beginning alignment, make certain that the dial pointer aligns with the dot on the extreme high-frequency end of the dial when the tuning capacitor is set for minimum capacity.

Connect an output meter across the speaker voice coil.

While making the following adjustments, keep the volume control set for maximum output and the signal generator output attenuated to avoid A.V.C. action.

| Step | Connect Signal Generator to— | Signal Generator Frequency | Radio Dial Setting | Adjust |
|---|---|---|---|---|
| 1 | 3E6 control grid through 0.1 mfd capacitor | 455 kc | 550 kc | Secondary and Primary trimmers of 2nd I-F trans. for max. output. |
| 2 | 1LA6 control grid through 0.1 mfd capacitor | 455 kc | 550 kc | Secondary and Primary trimmers of 1st I-F trans. for max. output. |
| 3 | Antenna terminal through 200 mmf capacitor | 455 kc | 550 kc | "Peak" all I-F trimmers. |
| 4 | Antenna terminal through 200 mmf capacitor | * 1700 kc | *1700 kc | Oscillator trimmer for max. output. |
| 5 | Antenna terminal through 200 mmf capacitor | 1400 kc | 1400 kc | Antenna trimmer for max. output. |

*1600 KC for Model H-148; rest of alignment the same

When ordering parts specify model number of set in addition to part number and description of part.

MODEL H-133

| Part Number | Description |
|---|---|
| V-3803 | Background, dial |
| V-4521 | Baffle and Grille Cloth Assy. |
| V-3594 | Battery, "A-B" (1½ v. & 90 v.) |
| V-3595 | Battery, "C" (4½ v.) |
| V-3580 | Bracket, var. cap. mtg. |
| V-1112-2 | Cabinet |
| V-3569 | Capacitor, variable, 2 gang (C1, C2, C3, C4) |
| RCP10W2503A | Capacitor, 0.05 mfd. 200 v. (C5) |
| RCM20A470K | Capacitor, 47 mmf. (C6, C7) |
| RCP10W4103A | Capacitor, 0.01 mfd. 400 v. (C8, C9, C10) |
| RCP10W6102K | Capacitor, 0.001 mfd. 600 v. (C11, C12) |
| RCM20A471K | Capacitor, 470 mmf. (C13) |
| RCP10W6202A | Capacitor, 0.002 mfd. 600 v. (C14) |
| RCP10W2104A | Capacitor, 0.1 mfd. 200 v. (C15, C16) |
| RCM20A101M | Capacitor, 100 mmf. (C17) |
| V-3581 | Capacitor, electrolytic, 10 mfd. 150 v. (C18) |
| V-4723 | Capacitor, 4.7 mmf. (C19—not used on all chassis) |
| V-3582 | Clamp, dial mtg. |
| V-3567 | Coil, antenna (L1, L2) |
| V-3582 | Coil, oscillator (L3, L4) |
| V-3564 | Control, volume, 1 meg. (R12) with switch (SW1) |
| V-4157S-66 | Cord, dial drive |
| V-3596 | Decal, OFF |
| V-3660 | Decal, TONE |
| V-3662 | Decal, STATIONS |
| V-3665 | Decal, WESTINGHOUSE |
| V-3559 | Dial, glass |
| V-3489 | Foot, felt |
| V-3268 | Grommet, variable cap. mtg. |
| V-3602 | Jumper, "C" battery |
| V-3331-1 | Knob, volume (including spring) |
| V-3331-2 | Knob, tuning (including spring) |
| V-3331-3 | Knob, tone (including spring) |
| Form RM66 | Operating Instructions |
| V-3585 | Plug, battery cable |
| V-3587 | Plug and Cable Assy., battery |
| V-3558 | Pointer Assy. |
| V-3166S | Pulley, 7/16" dia. |
| RC10AE224M | Resistor, 220K ¼ w. (R1) |
| RC10AE105M | Resistor, 1.0 meg. ¼ w. (R2, R3) |
| RC10AE563M | Resistor, 56K ¼ w. (R4) |
| RC10AE225M | Resistor, 2.2 meg. ¼ w. (R5, R6, R7, R8) |
| RC10AE101M | Resistor, 100 ohms ¼ w. (R9) |
| RC10AE106M | Resistor, 10 meg. ¼ w. (R10) |
| RC10AE334M | Resistor, 330K ¼ w. (R11) |
| V-3755S-10 | Screw, chassis mtg. |
| V-3573 | Socket, loctal tube |
| V-3601 | Speaker, 5¼" P.M. |
| V-3248S | Spring, dial drive |
| V-3551 | Stud and Bracket Assy., pulley |
| V-3563 | Switch, tone control (SW2) |
| V-3574 | Terminal Board, 2 lugs |
| V-3575 | Terminal Board, 5 lugs |
| V-3576 | Transformer, output (T1) |
| V-3577 | Transformer, 1st I.F. |
| V-3578 | Transformer, 2nd I.F. |
| V-3237 | Washer, cup, var. cap. mtg. |
| V-3752S | Washer, felt |
| V-3267S-4 | Washer, chassis mtg. |

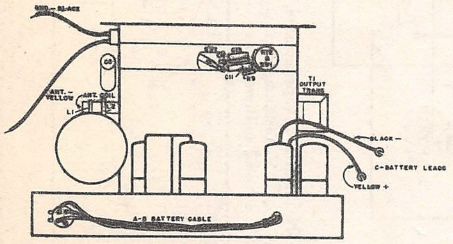


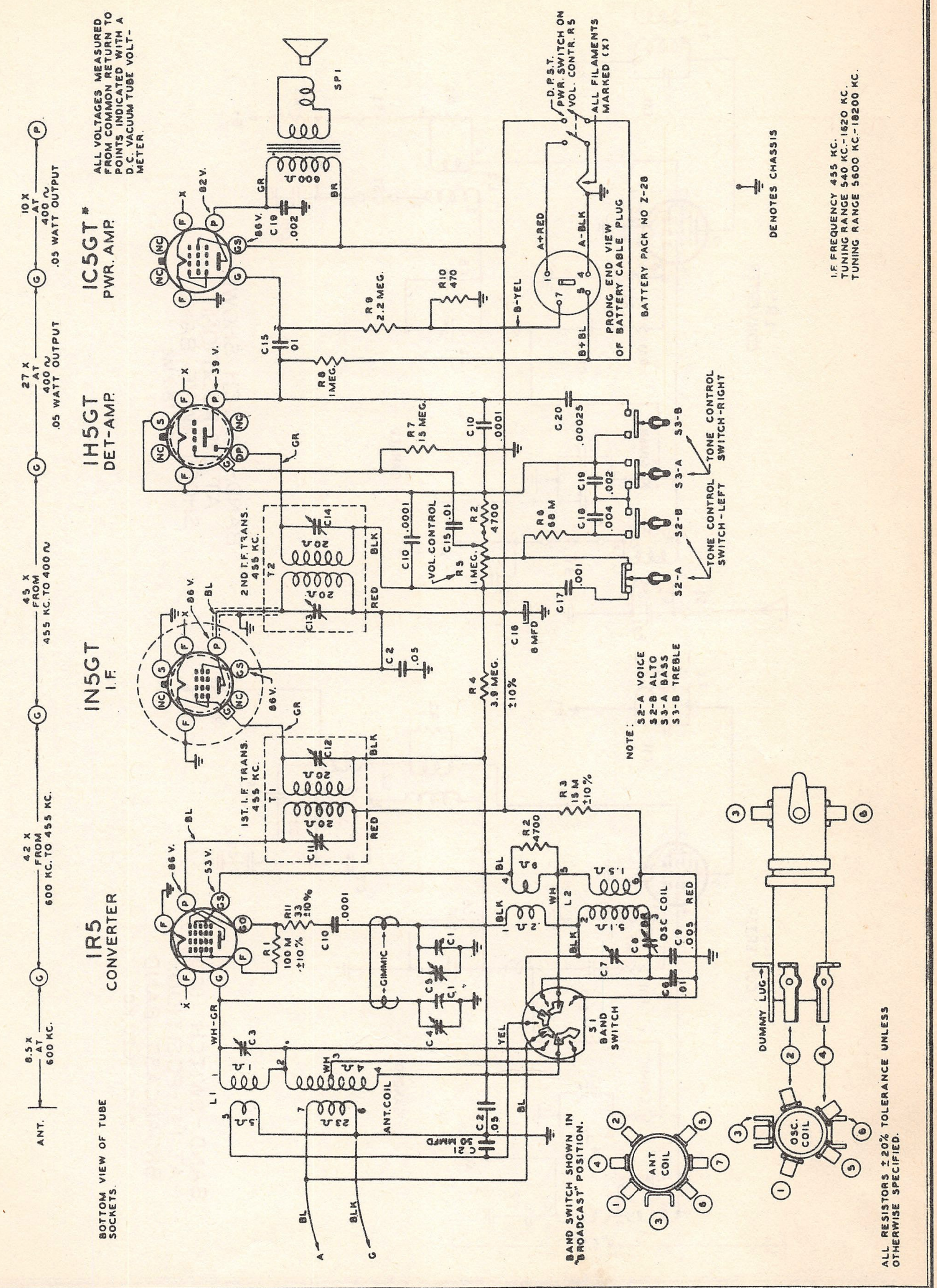
FIG. 3—REAR VIEW OF CHASSIS

MODEL H-148

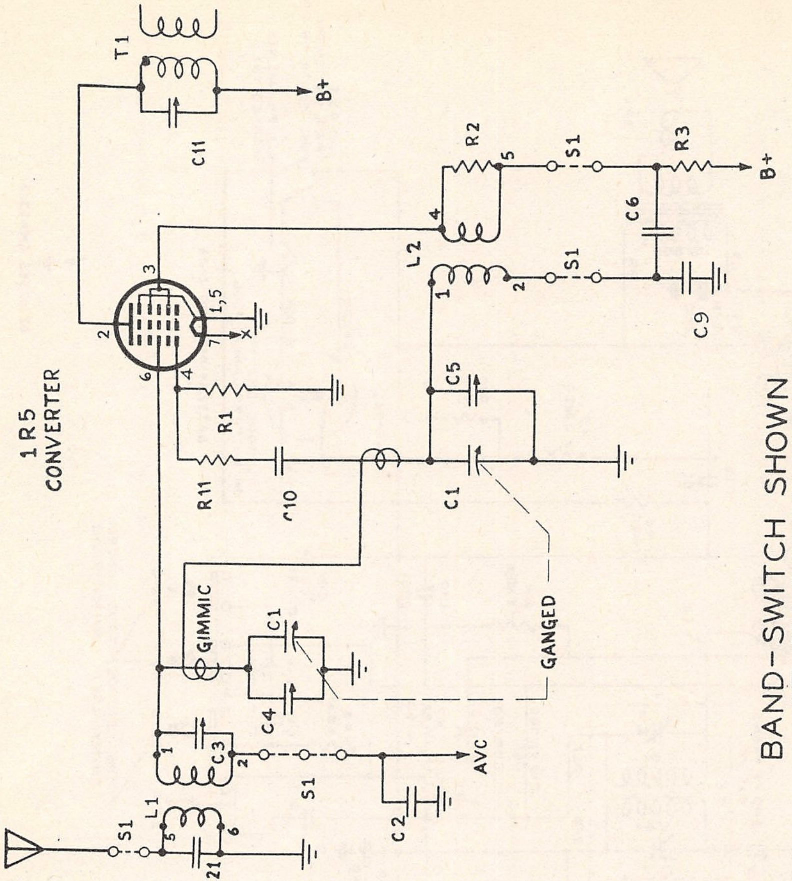
| PART NO. | DESCRIPTION |
|---|---|
| V-3881 | Baffle and Grille Cloth Assy. |
| V-3920 | Battery Pack, "AB" (9 v. and 90 v.) |
| V-3323 | Bearing, tuning shaft |
| V-3844 | Bracket Assy. (OFF-ON) |
| V-3857 | Bracket, variable capacitor mtg. |
| V-1114 | Cabinet |
| V-3858 | Capacitor, variable 2 gang (C1, C2, C3) |
| V-4542 | Capacitor, Antenna trimmer (C4) |
| RCM20A101M | Capacitor, 100 mfd mica (C5, C6, C7, C8) |
| RCM20A331M | Capacitor, 330 mfd mica (C9) |
| RCP10W6102A | Capacitor, .001 mfd 600 v. (C10, C11) |
| RCP10W2503A | Capacitor, .05 mfd 200 v. (C12) |
| RCP10W2204A | Capacitor, 0.2 mfd 200 v. (C13) |
| RCP10W6502A | Capacitor, .005 mfd 600 v. (C14, C15) |
| RCP10W4103A | Capacitor, .01 mfd 400 v. (C16, C27) |
| RCP10W4503A | Capacitor, .05 mfd 400 v. (C17) |
| RCP10W4104A | Capacitor, 0.1 mfd 400 v. (C18) |
| RCP10W4204K | Capacitor, 0.2 mfd 400 v. (C19) |
| V-3861 | Capacitor, electrolytic<br>20 mfd 150 v. (C20)<br>50 mfd 150 v. (C21) |
| V-3866 | Capacitor, electrolytic cartridge 100 mfd 25 v. (C22) |
| V-3897 | Channel, decorative strip mtg. |
| V-3337 | Clamp, cable |
| V-3886 | Clamp, handle |
| V-3862 | Clamp, spring (electrolytic cap. mtg.) |
| V-3845 | Coil, oscillator (L1, L2) |
| V-3852 | Control, volume (R1) with switch (SW1) |
| V-4349-1 | Cord, A-C power |
| V-4157S-15 | Cord, dial drive |
| V-3878 | Decal, OFF-ON |
| V-3859 | Dial |
| V-3885 | Foot, felt |
| V-3898 | Grille |
| V-3766 | Grommet, fiber |
| V-3880 | Grommet, rubber, square |
| V-3901 | Handle |
| V-3912 | Knob, tuning and volume |
| V-3914 | Label, tube layout |
| V-5265 | Latch Assy., back cover |
| V-3915 | Loop, antenna (L3) |
| V-3894 | Name Plate |
| V-3904 | Panel, metal |
| V-3874 | Plug and Cable, Assy., battery |
| V-4115 | Rectifier, selenium |
| RC10AE681K | Resistor, 680 ohms ¼ w. (R2, R3) |
| RC10AE821K | Resistor, 820 ohms ¼ w. (R4) |
| V-3869 | Resistor, ballast, 2300 ohms 5 w. (R5) |
| RC30AE222K | Resistor, 2200 ohms ½ w. (R6) |
| RC10AE473K | Resistor, 47K ¼ w. (R7) |
| RC40AE680M | Resistor, 68 ohms 2 w. (R8) |
| RC10AE224M | Resistor, 220K ¼ w. (R9, R10) |
| RC10AE152K | Resistor, 1500 ohms ¼ w. (R11) |
| RC10AE104K | Resistor, 100K ¼ w. (R12) |
| RC10AE684K | Resistor, 680K ¼ w. (R13) |
| RC10AE225M | Resistor, 2.2M ¼ w. (R14, R15) |
| RC10AE475K | Resistor, 4.7M ¼ w. (R16, R17, R18, R19) |
| RC10AE106M | Resistor, 10M ¼ w. (R20) |
| V-3960 | Shaft, tuning |
| V-3899 | Shield, plastic front |
| V-3871 | Shield, spiral |
| V-3870-1 | Socket, lock in |
| V-3299 | Socket, speaker |
| V-4114 | Spacer, sleeve |
| V-3917 | Speaker, 4" P.M. |
| V-3850 | Spring, OFF-ON |
| V-3855 | Spring, coil, for OFF-ON switch |
| V-3248S | Spring, dial drive |
| V-3900 | Strip, decorative power and tuning |
| V-3909 | Strip, plastic, loop mtg. |
| V-3872 | Switch, battery AC-DC (SW2, SW3, SW4, SW5) |
| V-4116S | Terminal Board, 1 lug |
| V-3864 | Terminal Board, 2 lugs |
| V-3842 | Terminal Board, 3 lugs |
| V-3865 | Terminal Board, 4 lugs |
| V-3877 | Transformer, 1st I-F (L4, L5, C23, C24) |
| V-3876 | Transformer, 2nd I-F (L6, L7, C25, C26) |
| V-3868 | Transformer, output |
| V-3867 | Washer, phenolic (resistor mtg.) |
| V-3752S | Washer, felt |
| V-3919 | Washer, flat (chassis mtg.) |

# ZENITH RADIO CORP.

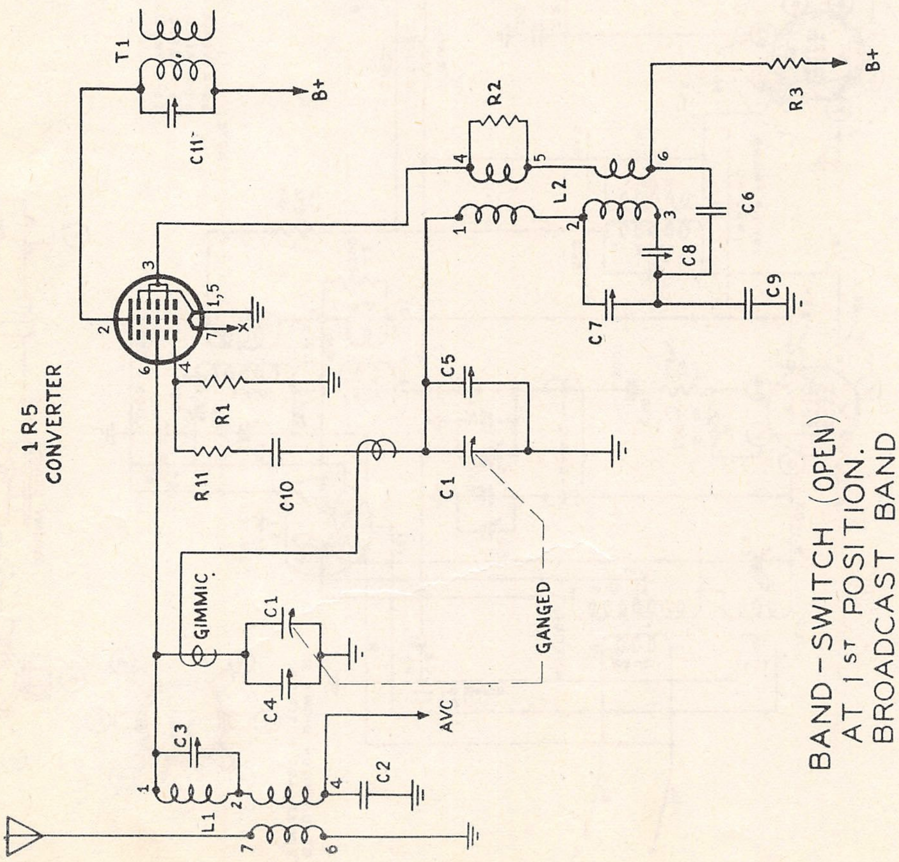
## MODELS 4K040,4K040G,
## Chassis 4C54


ANT.
8.5 X AT 600 KC.
42 X FROM 600 KC. TO 455 KC.
45 X FROM 455 KC. TO 400 ∿
27 X AT 400 ∿ .05 WATT OUTPUT
10 X AT 400 ∿ .05 WATT OUTPUT
ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A D.C. VACUUM TUBE VOLT-METER.
BOTTOM VIEW OF TUBE SOCKETS.
1R5 CONVERTER
1N5GT I.F.
1H5GT DET-AMP.
1C5GT* PWR. AMP.
86 V.
53 V.
86 V.
86 V.
39 V.
86 V.
82 V.
1ST. I.F. TRANS. 455 KC. T1
2ND I.F. TRANS. 455 KC. T2
C11
C12
C13
C14
R1 100 M ±10%
R11 33 ±10%
C10 .0001
GIMMIC
C3
C4
C5
C1
C2 .05
C2 .05
C2 50 MMFD
L1
L2
ANT. COIL
OSC COIL
C6
C7
C8 .005
C9 .01
R2 4700
R3 15 M ±10%
R4 3.9 MEG. ±10%
C16 8 MFD
C17 .001
R5 1 MEG.
VOL. CONTROL
C15 .01
C10 .0001
R2 4700
R6 68 M
R7 15 MEG.
C10 .0001
C18 .004
C19 .002
C20 .00025
R8 1 MEG.
C15 .01
R9 2.2 MEG.
R10 470
C19 .002
600 ∿
SP 1
GR
BR
BL
BLK
RED
WH
WH-GR
YEL
S1 BAND SWITCH
S2-A
S2-B
S3-A
S3-B
TONE CONTROL SWITCH-LEFT
TONE CONTROL SWITCH-RIGHT
NOTE: S2-A VOICE S2-B ALTO S3-A BASS S3-B TREBLE
D.P.S.T. PWR. SWITCH ON VOL. CONTR. R5
ALL FILAMENTS MARKED (X)
A+RED
A-BLK
B-YEL
B+BL
PRONG END VIEW OF BATTERY CABLE PLUG
BATTERY PACK NO Z-28
DENOTES CHASSIS
I.F. FREQUENCY 455 KC.
TUNING RANGE 540 KC.-1620 KC.
TUNING RANGE 5600 KC.-18200 KC.
BAND SWITCH SHOWN IN "BROADCAST" POSITION.
ANT COIL
OSC. COIL
DUMMY LUG
ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
A
G

ZENITH RADIO CORP.


T1
C11
B+
1R5
CONVERTER
1,5
2
3
4
6
7
X
R2
4
5
S1
R3
B+
C6
L2
1
2
S1
C9
C5
R1
R11
C10
C1
GIMMIC
C1
C4
GANGED
C3
1
2
S1
AVC
C2
L1
5
6
S1
C21

BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND
5.6 - 18.2 MC


T1
C11
B+
1R5
CONVERTER
1,5
2
3
4
6
7
X
R2
4
5
6
R3
B+
L2
1
2
3
C6
C8
C7
C9
C5
R1
R11
C10
C1
GIMMIC
C1
C4
GANGED
AVC
C3
1
2
4
C2
L1
7
6

BAND-SWITCH (OPEN)
AT 1ST POSITION.
BROADCAST BAND
540 - 1620 KC

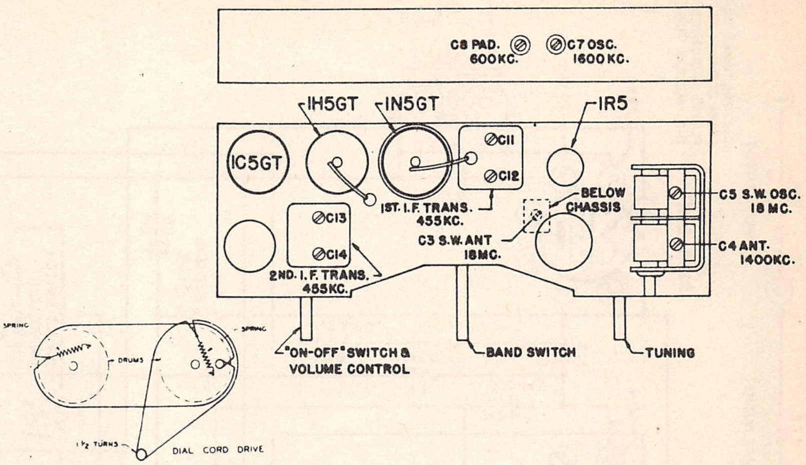
# ZENITH RADIO CORP.

**MODELS 4K040 4K040G**

TO THE SERVICE MAN:

The alignment of this receiver is conventional. An output meter, connected across the voice coil of the speaker, is very helpful in making correct adjustments.

The Guardian Reminder Circuit consist of a 4700 ohm resistor (R2) in series with the low side of the volume control. With this circuit, it is impossible to turn the volume completely off and leave the power on. In some cases where the minimum volume is too high even at the lowest setting of the volume control, R2 may be changed to a lower value or shorted out completely.



TUBE TRIMMER LOCATION AND DIAL CABLE DRAWING

## ALIGNMENT PROCEDURE

| OPERATION | CONNECT OSC. TO | DUMMY ANT. | INPUT SIG. FREQUENCY | BAND | SET DIAL AT | TRIMMERS | PURPOSE |
|---|---|---|---|---|---|---|---|
| 1 | Converter Grid | .5 Mfd. | 455 Kc. | BC | 600 Kc. | C-11, C-12, C-13, C-14 | Align I.F. |
| 2 | Ant.-Gnd. | 400 ohms | 18 Mc. | SW | 18 Mc. | C-5 | Set Osc. to Scale |
| 3 | Ant.-Gnd. | 400 ohms | 400 ohms | SW | Rock Gang 18 Mc. | C-3 | Align Antenna |
| 4 | Ant.-Gnd. | 200 Mmf. | 1600 Kc. | BC | 1600 Kc. | C-7 | Set Osc. to Scale |
| 5 | Ant.-Gnd. | 200 Mmf. | 1400 Kc. | BC | 1400 Kc. | C-4 | Align Antenna |
| 6 | Ant.-Gnd. | 200 Mmf. | 600 Kc. | BC | Rock Gang 600 Kc. | C-8 | Adjust Padder |

### DIAL ASSEMBLY

| | | |
|---|---|---|
| 26-342 | Dial Scale | .32 |
| 46-443 | Radiogran Knob (Voice) | .07 |
| 46-444 | " " (Treble) | .07 |
| 46-445 | " " (Alto) | .07 |
| 46-446 | " " (Bass) | .07 |
| 59-122 | Off & ON Indicator | .12 |
| 59-160 | Dial Pointer | 1.14 |
| 76-335 | Tuning Control Shaft | .07 |
| 80-183 | Indicator Spring | .024 |
| 80-209 | Dial Cord Tension Spring | .024 |
| 80-471 | Tuning Shaft Spring | 1.31C |
| 93-690 | Felt Washer (S-11362) | .60C |
| 192-90 | Dial Crystal | .50 |
| 196-64 | Dial Crystal Gasket | .08 |
| S9588 | Indicator Cam Assem. | .07 |
| S9610 | Dial Cord & Eyelet (Pointer) | .12 |
| S9733 | Dial Cord & Eyelet (Gang Cond.) | .07 |
| S9751 | Pulley & Rivet Assem. (Gang Cond.) | .12 |
| S11362 | Pulley & Bushing Assem. (Pointer) | .11 |
| S11558 | Vol. & Tuning Knob Assem. (2 used) (46-520) | .28 |
| S12305 | Band Switch Knob Assem. (46-598) | .32 |

### COILS & CHOKES

| | | |
|---|---|---|
| 95-838 | 1st I.F. Transformer (T1) | 1.77 |
| 95-839 | 2nd I.F. Transformer (T2) | 1.77 |
| S9829 | Osc. Coil Assem. (L2) | 1.39 |
| S9832 | Ant. Coil Assem. (L1) | 1.39 |

### CONDENSERS

| | | | |
|---|---|---|---|
| 22-162 | .0001 Mfd. (C10) | 600 V. | .20 |
| 22-182 | .00025 Mfd. (C20) | 600 V. | .26 |
| 22-196 | .01 Mfd. (C15) | 600 V. | .20 |
| 22-448 | .004 Mfd. (C18) | 600 V. | .20 |
| 22-492 | .002 Mfd. (C19) | 600 V. | .20 |
| 22-684 | Dry Electrolytic 8 Mfd. (C16) | 150 V. | .45 |
| 22-826 | .01 Mfd. (C6) | 200 V. | .20 |
| 22-829 | .05 Mfd. (C2) | 200 V. | .20 |
| 22-887 | .001 Mfd. (C17) | 600 V. | .20 |
| 22-1022 | .005 Mfd. (C9) | 600 V. | .38 |
| 22-1208 | Two Section Gang (C1) | | 2.56 |
| 22-1239 | Two Section Trimmer (C7 & C8) | | .58 |
| 22-1240 | Single Section Ceramic Trimmer (C3) | | .20 |
| 22-1532 | 50 Mmfd. (C21) | 500 V. | .20 |

### RESISTORS

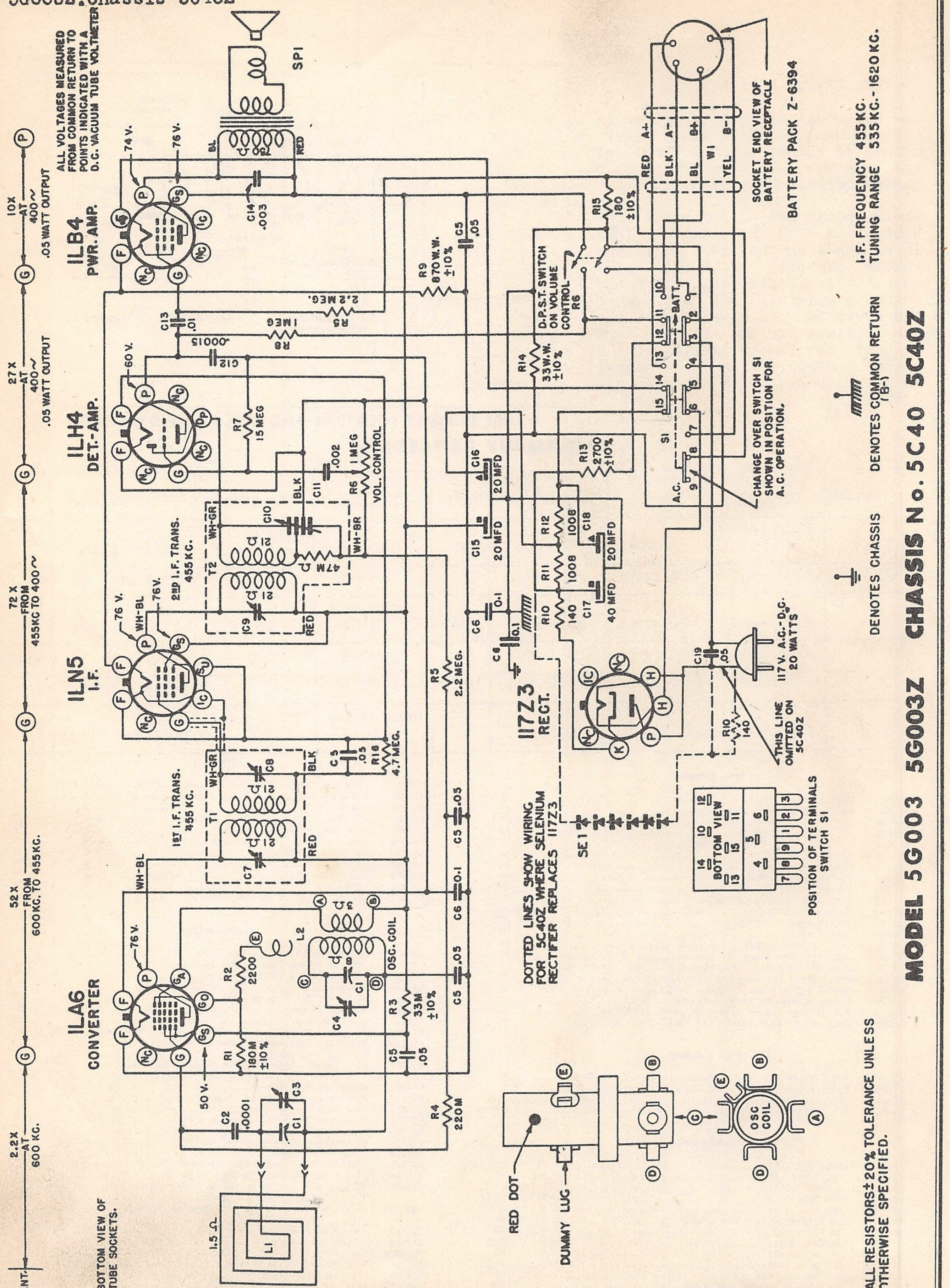
| | | | |
|---|---|---|---|
| 63-260 | 100M Ohm (R1) | 1/4 Watt | .09 |
| 63-271 | 1 Megohm (R8) | 1/4 " | .09 |
| 63-311 | 15M Ohm (R3) | 1/4 " | .09 |
| 63-581 | 470 Ohm (R10) | 1/4 " | .09 |
| 63-587 | 4700 Ohm (R2) | 1/4 " | .09 |
| 63-594 | 68M Ohm (R6) | 1/4 " | .09 |
| 63-600 | 2.2 Megohm (R9) | 1/4 " | .09 |
| 63-620 | 33 Ohm (R11) | 1/4 " | .09 |
| 63-669 | 3.9 Megohm (R4) | 1/4 " | .09 |
| 63-976 | 15 Megohm (R7) | 1/4 " | .09 |
| 63-1236 | Volume Control & Switch (R5) | | 1.81 |

### MISCELLANEOUS

| | | |
|---|---|---|
| 49-522 | 6½" P.M. Speaker | 10.00 |
| | 206-522 Output Transformer | 2.21 |
| | 208-522 Cone & Voice Coil | 2.09 |
| 52-190 | Speaker Cable | .19 |
| 54-34 | #6-32 x 1/4 x 3/32 Hex Nut | .31C |
| 57-11A | Antenna Marker | .024 |
| 57-11G | Ground Marker | .024 |
| 57-900 | Dial Mtg. Plate | .35 |
| 57-1159 | Radiorgan Escutcheon Plate (2 used) | .18 |
| 58-74 | Battery Cable Plug | .12 |
| 70-124 | #2 x 3/8 Phillips Hd. Wood Screw - Brass Plated (57-1159) | 1.70C |
| 78-436 | Miniature Tube Socket | .19 |
| 78-611 | Octal Base Tube Socket (3 used) | .12 |
| 85-279 | Band Selector Switch | .72 |
| 85-284 | Radiorgan Switch L.H. (Voice & Alto) | .55 |
| 85-288 | Radiorgan Switch R.H. (Treble & Bass) | .55 |
| 93-125 | #6 Internal Shakeproof Lockwasher | .31C |
| 93-258 | Brown Felt Washer (Knobs) | .78C |
| 94-295 | Steel Bushing (Radiorgan) (4 used) | .036 |
| 112-56 | #6-1/4 Hex Hd. Self Tapping Screw | .55C |
| 114-67 | #6-32 x 7/16 Hex Acorn Hd. M.S. Steel N.P. (Radiorgan) (4 used) | .43C |
| 114-162 | #8 x 7/8 Hex Acorn Hd. Self Tapping Screw (Chassis Mtg.) | 1.20C |
| 125-17 | Rubber Grommets (85-284 & 288) | .03 |
| 125-39 | Rubber Grommets | .02 |
| 126-379 | Tube Shield | .07 |
| 159-14 | Plug Buttons (Dial Scale) | .78C |
| 188-32 | Retainer Ring (76-335) | 1.03C |
| 188-34 | Retainer Ring (S-11362) | 1.20C |
| 188-48 | Control Knob Decorative Ring | .035 |
| 202-384 | Instruction Book | .15 |

MODELS 5G003, Chassis 5C40;
5G003Z, Chassis 5C40Z

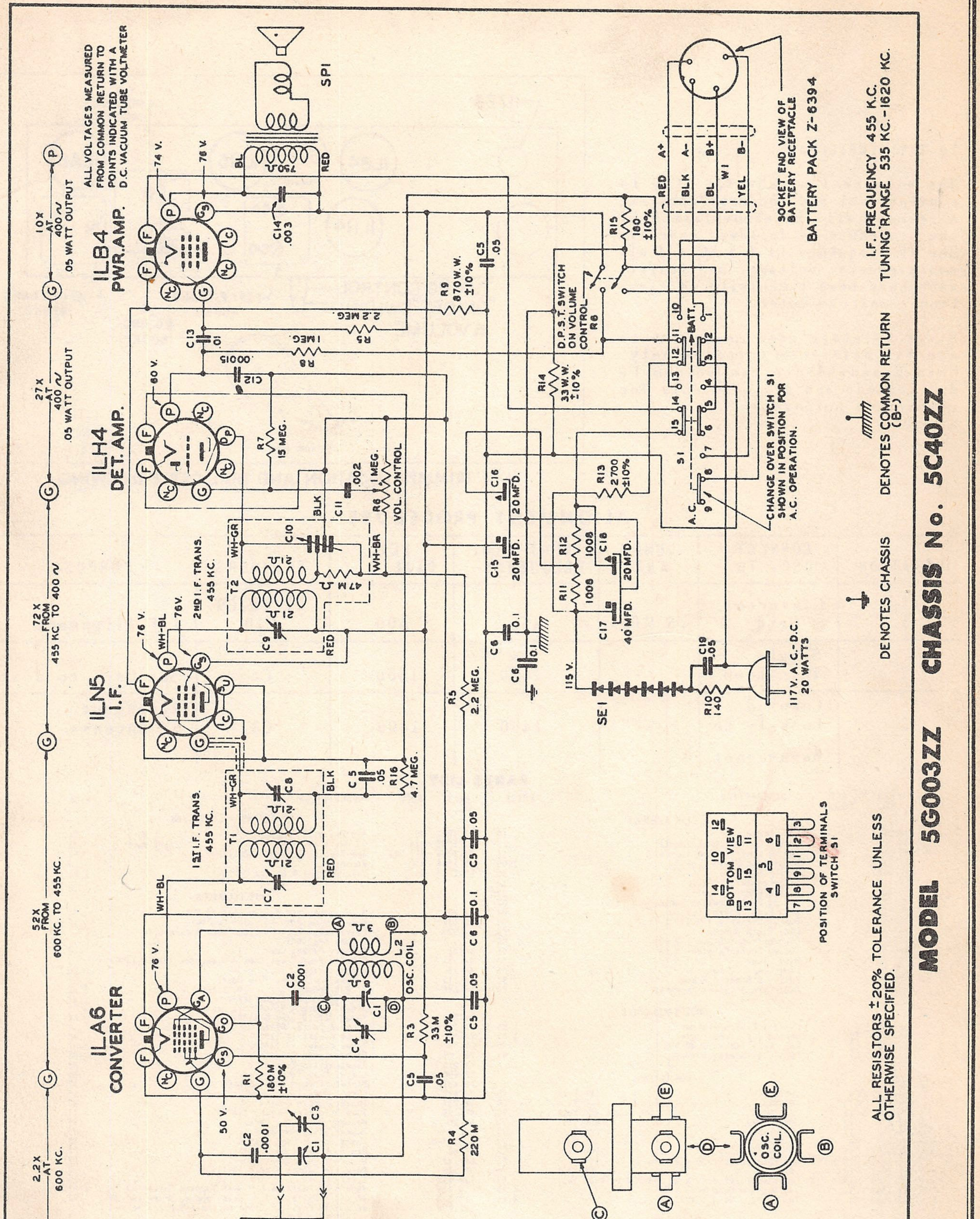
ZENITH RADIO CORP.


ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A D.C. VACUUM TUBE VOLTMETER
ANT.
2.2X AT 600 KC.
52 X FROM 600 KC. TO 455 KC.
72 X FROM 455KC TO 400~
27 X AT 400~ .05 WATT OUTPUT
10X AT 400~ .05 WATT OUTPUT
1LA6 CONVERTER
1LN5 I.F.
1LH4 DET.-AMP.
1LB4 PWR. AMP.
117Z3 RECT.
1ST I.F. TRANS. 455 KC.
2ND I.F. TRANS. 455 KC.
OSC. COIL
VOL. CONTROL
D.P.S.T. SWITCH ON VOLUME CONTROL R6
SP1
76 V.
74 V.
60 V.
50 V.
R1 180M ±10%
R2 2200
R3 33M ±10%
R4 220M
R5 2.2 MEG.
R7 15 MEG
R8 1 MEG
R9 870 W.W. ±10%
R10 140
R11 1008
R12 1008
R13 2700 ±10%
R14 33 W.W. ±10%
R15 180 ±10%
R16 4.7 MEG.
R6 1 MEG
C2 .0001
C5 .05
C6 0.1
C11 .002
C12 .00015
C13 .01
C14 .003
C15 20 MFD
C16 20 MFD
C17 40 MFD
C18 20 MFD
C19 .05
47 M
1.5 Ω
L1
L2
117 V. A.C.-D.C. 20 WATTS
THIS LINE OMITTED ON 5C40Z
DOTTED LINES SHOW WIRING FOR 5C40Z WHERE SELENIUM RECTIFIER REPLACES 117Z3
SE1
BOTTOM VIEW
POSITION OF TERMINALS SWITCH S1
A.C.
BATT.
S1
CHANGE OVER SWITCH S1 SHOWN IN POSITION FOR A.C. OPERATION.
SOCKET END VIEW OF BATTERY RECEPTACLE
RED A+
BLK A-
BL B+
W1
YEL B-
BATTERY PACK Z-6394
I.F. FREQUENCY 455 KC.
TUNING RANGE 535 KC.-1620 KC.
DENOTES CHASSIS
DENOTES COMMON RETURN (B-)
RED DOT
DUMMY LUG
OSC COIL
BOTTOM VIEW OF TUBE SOCKETS.
ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

## MODEL 5G003 5G003Z CHASSIS No. 5C40 5C40Z

For other data, see P.16-6

MODEL 5G003ZZ, Chassis 5C40ZZ


ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A D.C. VACUUM TUBE VOLTMETER
10X AT 400~ .05 WATT OUTPUT
27X AT 400~ .05 WATT OUTPUT
72X FROM 455 KC TO 400~
52X FROM 600 KC. TO 455 KC.
2.2X AT 600 KC.
ANT.
BOTTOM VIEW OF TUBE SOCKETS.
1.5 Ω
L1
1LA6 CONVERTER
1LN5 I.F.
1LH4 DET. AMP.
1LB4 PWR. AMP.
SP1
750 Ω
BL
RED
C14 .003
74 V.
76 V.
60 V.
50 V.
WH-BL
C13 .01
C12 .00015
R7 15 MEG.
R8 1 MEG.
R5 2.2 MEG.
R9 870 W.W. ±10%
C5 .05
C11 .002
R6 1 MEG. VOL. CONTROL
BLK
WH-GR
WH-BR
C10
T2 2ND I.F. TRANS. 455 KC.
47 M
C9
RED
T1 1ST I.F. TRANS. 455 KC.
C7
C8
R16 4.7 MEG.
C2 .0001
C1
C3
C4
L2 OSC. COIL
R1 180 M ±10%
R3 33 M ±10%
R4 220 M
C6 0.1
C16 20 MFD.
C15 20 MFD.
C17 40 MFD.
C18 20 MFD.
R11 100 Ω
R12 100 Ω
R13 2700 ±10%
R14 33 W.W. ±10%
R15 180 ±10%
R10 140
C19 .05
SE1
115 V.
117 V. A.C.-D.C. 20 WATTS
D.P.S.T. SWITCH ON VOLUME CONTROL R6
BATT.
A.C.
S1
CHANGE OVER SWITCH S1 SHOWN IN POSITION FOR A.C. OPERATION.
RED A+
BLK A-
BL B+
W1
YEL B-
SOCKET END VIEW OF BATTERY RECEPTACLE
BATTERY PACK Z-6394
I.F. FREQUENCY 455 K.C.
TUNING RANGE 535 KC.-1620 KC.
DENOTES COMMON RETURN (B-)
DENOTES CHASSIS
BOTTOM VIEW
POSITION OF TERMINALS SWITCH S1
OSC. COIL
A B C D E

ALL RESISTORS ± 20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

**MODEL 5G003ZZ CHASSIS No. 5C40ZZ**

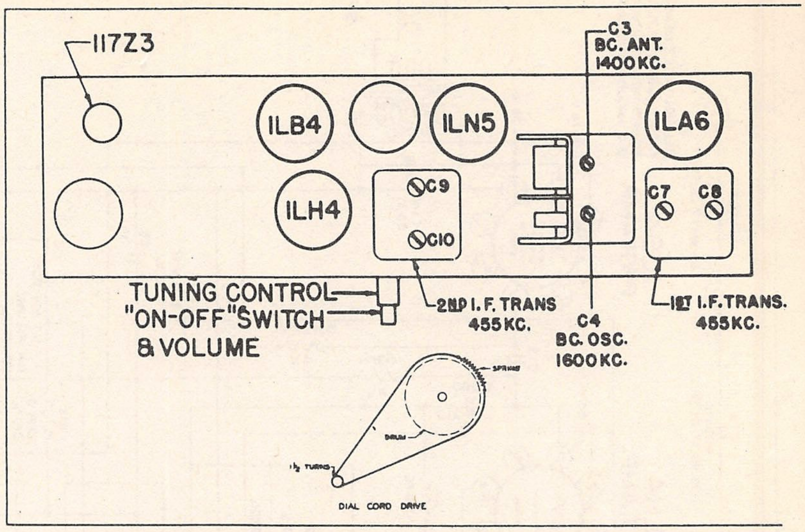
**MODELS 5G003,5G003Z**
**MODEL 5G003ZZ**

## ZENITH RADIO CORP.

TO THE SERVICEMAN:

The alignment of chassis 5C40 is conventional and the most accurate alignment will be accomplished if the procedure is followed exactly. The IF frequency is 455 KC and all measurements, voltage, and resistance have been taken with an electronic voltohm meter.

Stage by stage gain measurements are for reference purposes only. Gain measurements can seldom be duplicated, and are used only for comparison purposes.



TUBE TRIMMER LOCATION AND DIAL CABLE DRAWING

## ALIGNMENT PROCEDURE

| OPERATION | CONNECT OSC. TO | DUMMY ANT. | INPUT SIG. FREQUENCY | SET DIAL AT | TRIMMERS | PURPOSE |
|---|---|---|---|---|---|---|
| 1 | Converter Grid | .5 Mfd. | 455 | 600 | C7, C8, C9 C10 | I.F. Alignment |
| 2 | Single Turn Loop | -- | 1600 | 1600 | C4 | Set Osc. to scale |
| 3 | Coupled Loosely to Wavemagnet | -- | 1400 | 1400 | C3 | Alignment of Antenna |

## PARTS LIST

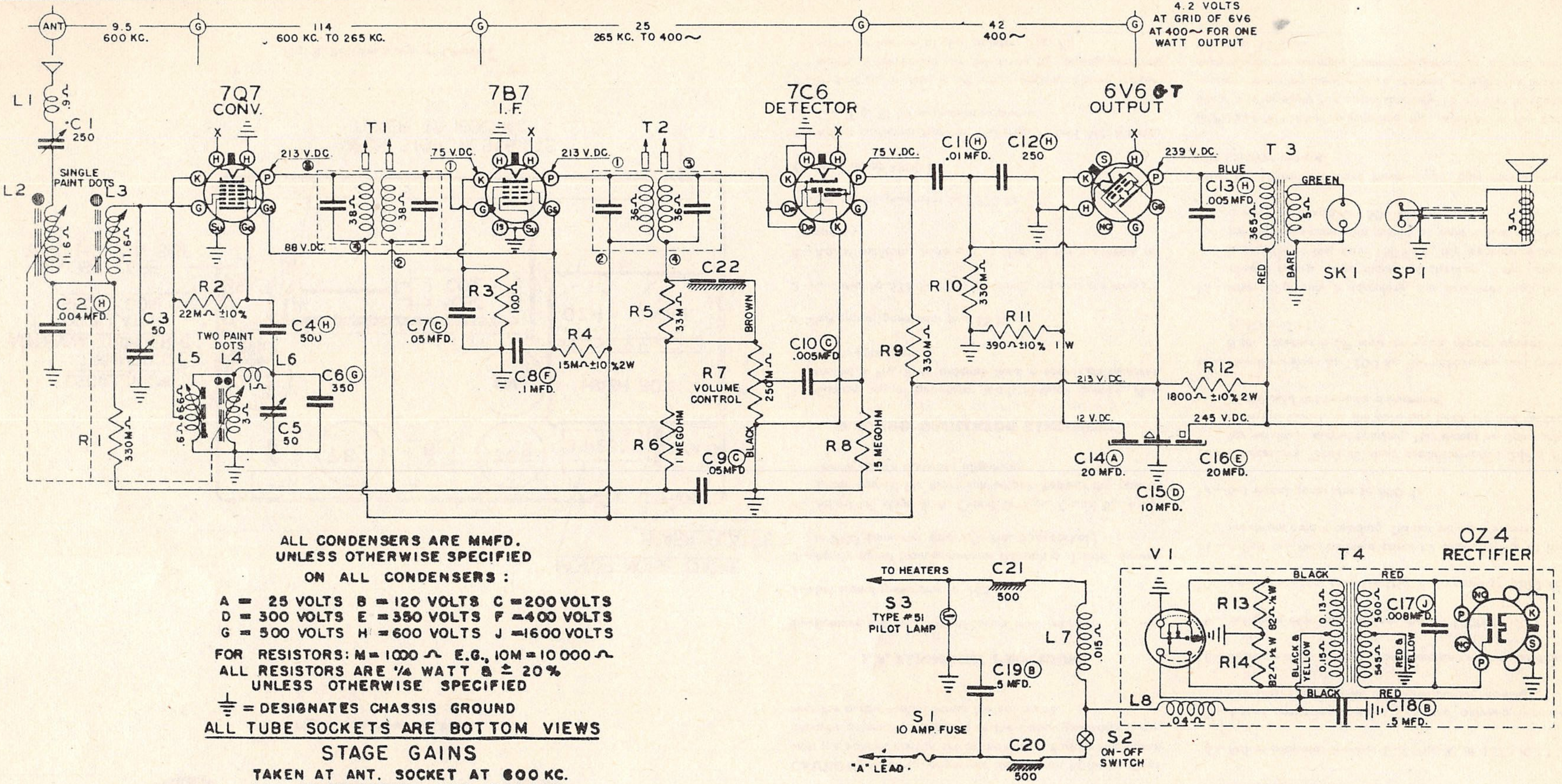
| PART NO. | REF. NO. | DESCRIPTION | | PRICE |
|---|---|---|---|---|
| | | DIAL ASSEMBLY | | |
| 26-366 | | Dial Scale | | .12 |
| 46-530 | | Volume Control Knob (Small) | | .17 |
| 46-587 | | Tuning Control Knob (Large) | | .11 |
| 57-1120 | | Escutcheon Plate | | 1.00 |
| 57-1187 | | Dial Plate | | .60 |
| 59-164 | | Dial Pointer | | .19 |
| 76-488 | | Tuning Control Shaft | | .28 |
| 80-365 | | Tuning Shaft Tension Spring (63-1459) | | .03 |
| 80-508 | | Dial Cord Tension Spring | | .04 |
| 125-17 | | Rubber Grommets (22-1450) | | .03 |
| 147-148 | | Dial Plate Spacer | | .02 |
| 159-50 | | Plug Button (26-366-192-99) | | .01 |
| 188-53 | | Tuning Shaft Retainer Ring | | .01 |
| 192-99 | | Dial Glass | | .20 |
| 196-88 | | Dial Glass Gasket | | .06 |
| S-11098 | | Pulley & Bushing Assembly | | .33 |
| S-11137 | | Dial Cord & Eyelet Assembly | | .09 |
| | | CHOKES AND COILS | | |
| 95-937 | T1 | First I.F. Transformer | | 1.85 |
| 95-938 | T2 | Second I.F. Transformer | | 1.85 |
| S-11830 | L2 | Osc. Coil Assem. 5C40-40Z | | .95 |
| S-13765 | L2 | Osc. Coil Assem. 5C40ZZ | | .95 |
| | | CONDENSERS | | |
| 22-162 | C2 | .0001 Mfd. | 500 Volt | .20 |
| 22-196 | C13 | .01 Mfd. | 600 Volt | .20 |
| 22-326 | C14 | .003 Mfd | 400 Volt | .20 |
| 22-470 | C12 | .00015 Mfd. | 600 Volt | .20 |
| 22-492 | C11 | .002 Mfd. | 600 Volt | .20 |
| 22-827 | C6 | .1 Mfd. | 200 Volt | .23 |
| 22-829 | C5 | .05 Mfd. | 200 Volt | .20 |
| 22-1014 | C15 & C16 | Dry Electrolytic 20 x 20 Mfd. | 150 Volt | .95 |
| 22-1017 | C19 | .05 Mfd. | 200 Volt | .20 |
| 22-1081 | C17 & C18 | Dry Electrolytic 40 x 20 Mfd. | 150 Volt-25 Volt | .83 |
| 22-1450 | C1 | Two Section Gang 5C40-40Z | | 4.15 |
| 22-1653 | C1 | Two Section Gang 5C40ZZ | | 4.15 |
| | | RESISTORS | | |
| 63-271 | R8 | 1 Megohm | 1/4 Watt | .09 |
| 63-296 | R4 | 220 M Ohm | 1/4 Watt | .09 |
| 63-439 | R13 | 2700 Ohm | 1/4 Watt | .09 |
| 63-579 | R2 | 220 Ohm | 1/4 Watt | .09 |
| 63-600 | R5 | 2.2 Megohm | 1/4 Watt | .09 |
| 63-602 | R16 | 4.7 Megohm | 1/4 Watt | .09 |
| 63-627 | R15 | 180 Ohm | 1/4 Watt | .09 |
| 63-646 | R3 | 33 M Ohm | 1/4 Watt | .09 |
| 63-654 | R1 | 180 M Ohm | 1/4 Watt | .09 |
| 63-976 | R7 | 15 Megohm | 1/4 Watt | .09 |

| PART NO. | REF. NO. | DESCRIPTION | | PRICE |
|---|---|---|---|---|
| | | RESISTORS - continued | | |
| 63-1097 | R9 | 870 Ohm W. W. Insl. | 1 Watt | .24 |
| 63-1099 | R14 | 33 Ohm W. W. Insl. | 1/2 Watt | .21 |
| 63-1363 | R11-R12 | Two Section Candohm (63-1132) | | .60 |
| 63-1366 | R10 | Zipohn | | .24 |
| 63-1549 | R6 | Vol. Control & Switch D P S T. | | 1.81 |
| | | MISCELLANEOUS | | |
| 11-70 | | A. C. Line Cord & Plug (Alt 11-90) | | .60 |
| 12-1322 | | Reinforcing Brkt. (2 used Handle) | | .15 |
| 14-903 | | Polystyrene Cabinet Front Less Accessories (use S-13209) | | ... |
| 15-51 | | Battery Socket Cap | | .09 |
| 24-371 | | Cabinet Rear Cover Less Accessories (Use S-11999) | | ... |
| 40-28 | | Cabinet Hinge | | .20 |
| 43-111 | | Handle End Pieces (Die Cast) | | .65 |
| 49-540 | | 4" P M Speaker . . . . (Complete) | | 7.25 |
| | | 206-540 Output Transformer | | 1.67 |
| | | 208-540 Cone & Voice Coil Assem. | | 1.73 |
| 54-224 | | Speed Nut (2 used S-11999) | | .02 |
| 57-1119 | | Chassis Bottom Plate | | .24 |
| 64-98 | | Brass Eyelet (S-11999) | | .02 |
| 64-99 | | Brass Eyelet (S-11999) | | .01 |
| 78-229 | | Electrolytic Socket | | .03 |
| 78-275 | | Electrolytic Socket | | .03 |
| 78-400 | | Loktal Base Tube Socket | | .19 |
| 78-437 | | Miniature Base Tube Socket | | .12 |
| 78-446 | | Loktal Base Tube Socket (3 used) | | .19 |
| 78-637 | | Battery Cable Socket | | .23 |
| 80-436 | | Tube Retaining Spring (117Z3) | | .15 |
| 82-20 | | Battery Retaining Strip | | .25 |
| 83-1393 | | Rubber Strip (Handle) | | .30 |
| 85-367-S1 | | Power Change Over Switch | | .82 |
| 86-66 | | Pin Jack Terminal (Gang) | | .02 |
| 86-142 | | Pin Jack Terminal (Gang) | | .02 |
| 93-743 | | Bakelite Spacer Washer (S-11999) | | .03 |
| 110-119 | | Grille Cloth | | .15 |
| 112-468 | | #6 x 5/16 Phillips B H Self Tapping Screw (82-20) | | 1.83C |
| 112-533 | | #6 x 1/4 Phillips R.H. Self Tapping Screw (40-28) | | .02 |
| 112-604 | | #6 x 5/16 Phillips Stove Hd. Self Tapping Screw (Chassig Mtg.) | | .03 |
| 126-482 | | Spiral Shield | | .05 |
| 139-61 | | Baffle Board (or 139-66) | | .08 |
| 156-27 | | Cover Catch (2 used) | | .09 |
| 199-53 | | Flexible Handle Sleeve | | .40 |
| 202-429 | | Instruction Book | | .03 |
| 212-2 | | Selenium Rectifier | | |
| S-11999 | L1 | Cabinet Back & Wavemagnet Assem. Complete (24-371) 5C40-5C40Z | | 4.75 |
| S-13767 | | Cabinet Back & Wavemagnet Assem. ZZ Model | | |
| S-13209 | | Front Cabinet & Hinge Assem. (14-903) | | 6.25 |
| S-13210 | | Strap & Rivet Assem. (Handles) | | .20 |

Prices subject to change without notice.

25M 4-29-47

ZENITH RADIO CORP.


ANT
9.5
600 KC.
114
600 KC. TO 265 KC.
25
265 KC. TO 400~
42
400~
4.2 VOLTS
AT GRID OF 6V6
AT 400~ FOR ONE
WATT OUTPUT
7Q7
CONV.
7B7
I.F.
7C6
DETECTOR
6V6 GT
OUTPUT
L1
C1
250
L2
SINGLE PAINT DOTS
L3
C2 (H)
.004 MFD.
C3
50
R1
330M
R2
22M ±10%
TWO PAINT DOTS
L5
L4
L6
C4 (H)
500
C5
50
C6 (G)
350
213 V.DC.
88 V.DC.
T1
75 V.DC.
7.5 V.DC.
C7 (C)
.05 MFD.
R3
100
C8 (F)
.1 MFD.
R4
15M ±10% ½W
T2
C22
BROWN
R5
33M
R6
1 MEGOHM
R7
VOLUME CONTROL
250M
BLACK
C9 (C)
.05 MFD
C10 (C)
.005 MFD
R8
15 MEGOHM
C11 (H)
.01 MFD.
C12 (H)
250
R9
330M
R10
330M
R11
390 ±10% 1W
213 V.DC.
12 V.DC.
245 V.DC.
C14 (A)
20 MFD.
C15 (D)
10 MFD.
C16 (E)
20 MFD.
R12
1800 ±10% 2W
239 V.DC.
BLUE
C13 (H)
.005 MFD
365
T3
GREEN
5
RED
BARE
SK1
SP1
3
OZ4
RECTIFIER
V1
T4
R13
R14
BLACK
RED
YELLOW
BLACK & YELLOW
RED & YELLOW
C17 (J)
.008 MFD.
C18 (B)
.5 MFD.
L8
.04
TO HEATERS
S3
TYPE #51
PILOT LAMP
C21
500
L7
.015
C19 (B)
.5 MFD.
S1
10 AMP. FUSE
"A" LEAD
C20
500
S2
ON-OFF SWITCH

ALL CONDENSERS ARE MMFD.
UNLESS OTHERWISE SPECIFIED

ON ALL CONDENSERS:

A = 25 VOLTS B = 120 VOLTS C = 200 VOLTS
D = 300 VOLTS E = 350 VOLTS F = 400 VOLTS
G = 500 VOLTS H = 600 VOLTS J = 1600 VOLTS

FOR RESISTORS: M = 1000 Ω E.G., 10M = 10 000 Ω
ALL RESISTORS ARE ¼ WATT & ± 20%
UNLESS OTHERWISE SPECIFIED

⏚ = DESIGNATES CHASSIS GROUND

ALL TUBE SOCKETS ARE BOTTOM VIEWS

### STAGE GAINS

TAKEN AT ANT. SOCKET AT 600 KC.
AND AT CONVERTER GRID AT 265 KC.

### DUMMY ANTENNA

30 MMFD SERIES & 30 MMFD. SHUNT AT ANT.
SOCKET & 0.1 MFD. SERIES TO CONVERTER GRID

### BATTERY CONDITIONS

6.3 VOLTS AT STORAGE BATTERY TERMINALS
WITH POSITIVE GROUNDED

### TEST CONDITIONS

VOLUME CONTROL SET AT MAXIMUM
WITH NO INCOMING SIGNAL

VOLTAGES READ FROM POINT SHOWN TO
CHASSIS WITH 1000 OHM PER VOLT METER

SCHEMATIC DIAGRAM FOR 5 TUBE
**CROSLEY 5MX080**
I.F. 265 KC.
TUNING RANGE 540 KC. TO 1600 KC.

**SENSITIVITY:**.......... **10 microvolts at one watt output.**

**UNDISTORTED POWER OUTPUT:**...........
**2 watts measured at the voice coil.**

**MAXIMUM POWER OUTPUT:**..............
**4.25 watts measured at the voice coil.**

**SPEAKER:**.........**6" x 9" oval, instrument panel mounting.**

**CURRENT CONSUMPTION:**.......**5. amperes**

MODEL 5MX080

# ZENITH RADIO CORP.

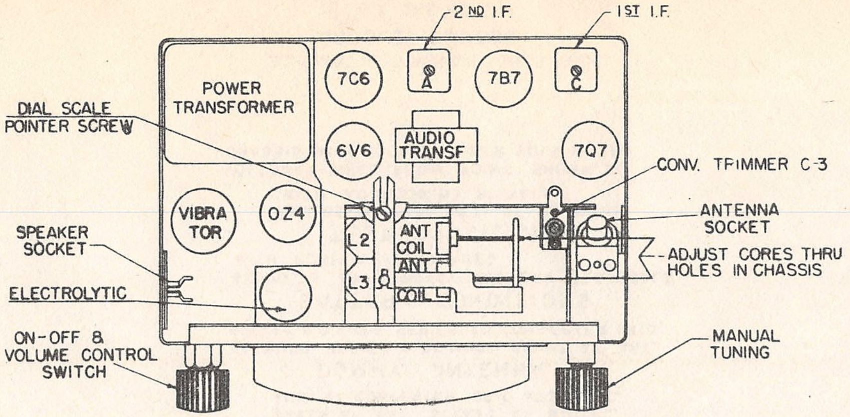

2 ND I.F.
1ST I.F.
POWER TRANSFORMER
7C6
7B7
A
C
6V6
AUDIO TRANSF
7Q7
DIAL SCALE POINTER SCREW
CONV. TRIMMER C-3
VIBRA TOR
0Z4
L2
ANT COIL
ANTENNA SOCKET
SPEAKER SOCKET
L3
ANT COIL
ADJUST CORES THRU HOLES IN CHASSIS
ELECTROLYTIC
ON-OFF & VOLUME CONTROL SWITCH
MANUAL TUNING

Fig. 7. Top View of Chassis

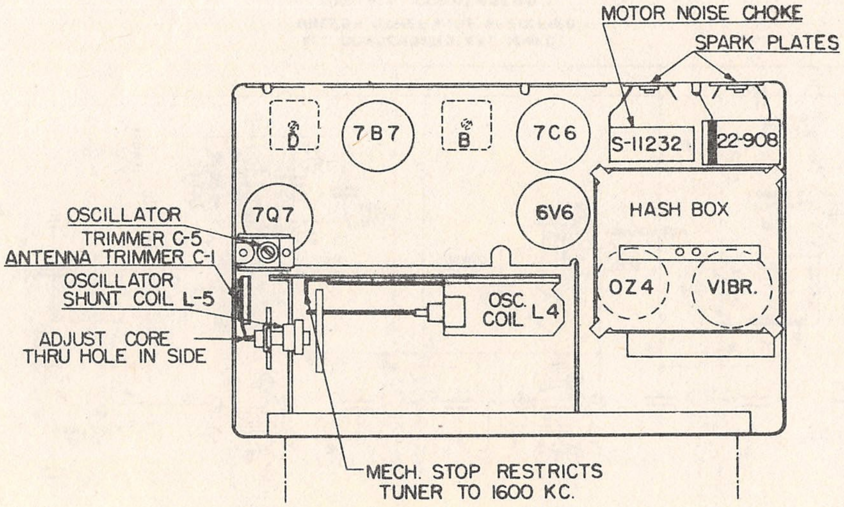

MOTOR NOISE CHOKE
SPARK PLATES
D
7B7
B
7C6
S-11232
22-908
OSCILLATOR TRIMMER C-5
ANTENNA TRIMMER C-I
7Q7
6V6
HASH BOX
OSCILLATOR SHUNT COIL L-5
OZ4
VIBR.
OSC. COIL L4
ADJUST CORE THRU HOLE IN SIDE
MECH. STOP RESTRICTS TUNER TO 1600 KC.

Fig. 8. Bottom View of Chassis

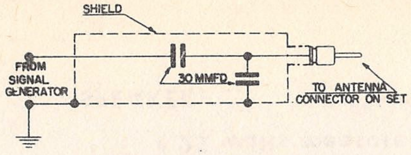

SHIELD
FROM SIGNAL GENERATOR
30 MMFD.
TO ANTENNA CONNECTOR ON SET

Fig. 9. Dummy Antenna

Fig. 9 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

## ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

**CAUTION:** Make all alignment adjustments to the receiver with the volume control set at maximum. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

### I. F. ALIGNMENT PROCEDURE

1—Remove top and bottom covers from receiver.

2—Set signal generator to 265 Kc.

3—Apply signal from generator through a .1 Mfd. dummy to 7Q7 converter grid. (Pin No. 6 on socket.)

4—Adjust I.F. slugs A, B, C and D (Figs. 7 and 8), in the order named for maximum output. Repeat the operation to assure accurate alignment.

### R. F. AND OSCILLATOR ALIGNMENT

1—Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna lead in socket on receiver. This is important.

2—Set signal generator to 535 Kc.

3—Set dial to 535 Kc. (End of travel, against the stop.)

4—Adjust oscillator trimmer C-5 (Fig. 8) for maximum response.

5—Set signal generator to 1200 Kc.

6—Tune set to 1200 Kc.

7—Adjust converter trimmer C-3 (Fig. 7) and Ant. trimmer C-1 (Fig. 8) for maximum response.

8—If dial calibration is off after making above adjustments, a correction can be made by turning eccentric screw at fulcrum of dial pointer. (Fig. 7.)

### CORE OR COIL REPLACEMENT ONLY

**WARNING:** The following adjustments are to be made ONLY if a core or coil is replaced.

1—Replace coil or core.

2—Set signal generator to 1675 Kc.

3—Connect signal generator leads through dummy, illustrated in Figure 9, to antenna receptacle on the receiver. This is important.

4—Set receiver dial to 1600 Kc. (maximum high frequency end of dial.)

5—Break cement loose on all cores and, using the special tuning wrench part No. S-13064, screw the core completely out of the antenna coil, the converter coil, and the oscillator coil.

6—Adjust oscillator trimmer C-5 (Fig. 8) at 1675 Kc.

7—Adjust converter trimmer C-3 and antenna trimmer C-1 (Fig. 7 and 8) for maximum output reading.

8—Replace cores to their approximate original position.

9—Set generator and receiver dial to 1200 Kc.

10—Adjust oscillator core L-4 (Fig. 8) to scale at 1200 Kc.

11—Adjust the two antenna cores L2 and L3 (Fig. 7) for maximum output reading. Do not adjust trimmers.

12—Set signal generator to 600 Kc.

13—If necessary, "rock in" shunt oscillator core L-5 (Fig. 8) for maximum output reading. This should be done only as a last resort, as the core has been set and sealed and should not require adjustment.

14—Check receiver at 1200 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10 and 11.

15—After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the mechanical stop for the tuner cross arm should be bent to limit the frequency coverage to 1605 Kc.

After all adjustments have been made, glue core screws with speaker cement.

**IMPORTANT:** After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station near 1200 Kc.

# ZENITH RADIO CORP.

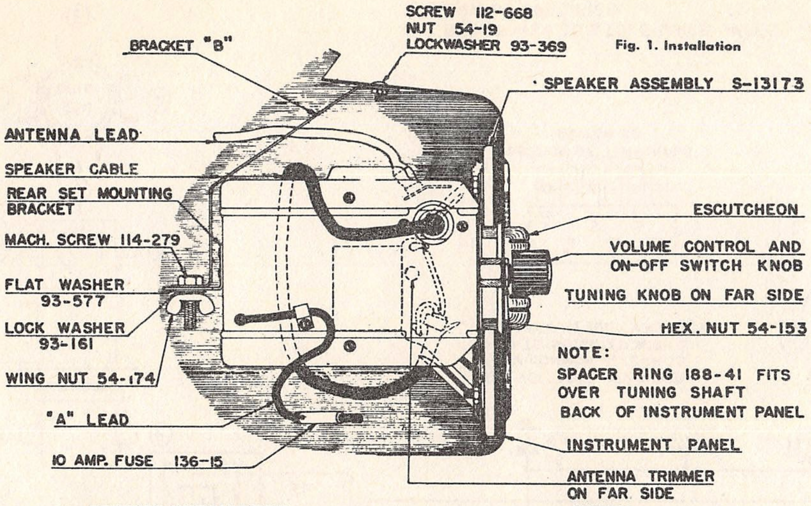

SCREW 112-668
NUT 54-19
LOCKWASHER 93-369
BRACKET "B"
SPEAKER ASSEMBLY S-13173
ANTENNA LEAD
SPEAKER CABLE
REAR SET MOUNTING BRACKET
MACH. SCREW 114-279
FLAT WASHER 93-577
LOCK WASHER 93-161
WING NUT 54-174
"A" LEAD
10 AMP. FUSE 136-15
ESCUTCHEON
VOLUME CONTROL AND ON-OFF SWITCH KNOB
TUNING KNOB ON FAR SIDE
HEX. NUT 54-153
NOTE: SPACER RING 188-41 FITS OVER TUNING SHAFT BACK OF INSTRUMENT PANEL
INSTRUMENT PANEL
ANTENNA TRIMMER ON FAR SIDE

Fig. 1. Installation

### RECEIVER INSTALLATION

Figures 1 and 2, illustrating the installed receiver, the escutcheon plate, and the control knobs, are given here to assist in the removal and reinstallation of this receiver when service is necessary.

To take the receiver from the car, remove the control knobs and mounting nuts from the front panel, and remove the wing-nut, 54-174, lock washer 93-161, flat washer 93-577, and machine screw 114-279 from the set mounting bracket "B."

The speaker is held to the rear of the panel by four hex. nuts.

### OFF-ON SWITCH AND VOLUME CONTROL

To turn the receiver on, turn the volume control knob to the right until it clicks and the dial is illuminated. Allow the receiver to reach operating temperature. (Approximately 20 seconds.) To increase the volume, continue to rotate this knob to the right. To turn the receiver off turn the volume control knob to the left until it clicks. (Fig. 2.)

### TUNING

Turn the tuning knob (Fig. 1) to tune in the desired station. Tune to the exact frequency to prevent distortion. The pointer in front of the illuminated dial scale indicates the frequency to which the receiver is tuned. (Fig. 2.)

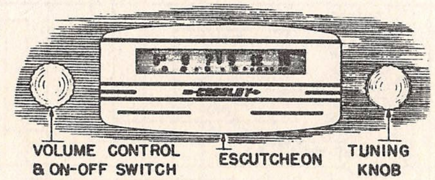

VOLUME CONTROL & ON-OFF SWITCH
ESCUTCHEON
TUNING KNOB

Fig. 2. Front View

### CONDENSERS

| | | | |
|---|---|---|---|
| C- 8 | 22-170 | .1 mfd. | 400 volt |
| C-12 | 22-182 | 250 mmfd. | 600 volt |
| C- 9 | 22-250 | .05 mfd. | 200 volt |
| C- 4 | 22-716 | 500 mmfd. | 600 volt |
| C-13 | 22-838 | .005 mfd. | 600 volt |
| C-10 | 22-906 | .005 mfd. | 200 volt |
| C-18<br>C-19 | 22-908 | .5 mfd. | 120 volt |
| C-11 | 22-1170 | .01 mfd. | 600 volt |
| C-22 | 22-1076 | Dual 250 mmfd. | 100 volt |
| C- 7 | 22-250 | .05 mfd. | 200 volt |
| C- 2 | 22-1244 | .004 mfd. | 600 volt |
| C- 3 | 22-1376 | Detector trimmer | |
| C- 5 | 22-1378 | Oscillator trimmer | |
| C-14<br>C-15<br>C-16 | 22-1387 | Dry electrolytic—20 mfd.—25 v. x 10 mfd.—300 v. x 20 mfd.—350 volt | |
| C- 1 | 22-1420 | Antenna trimmer | |
| C-17 | 22-1448 | .008 mfd. | 1600 volt |
| C- 6 | 22-1641 | 350 mmfd. | 500 volt |

### RESISTORS

| | | | |
|---|---|---|---|
| R- 4 | 63-942 | 15M ohm | 2 watt insl. |
| R-12 | 63-1368 | 1800 ohm W.W. | 2 watt insl. |
| R-11 | 63-1372 | 390 ohm. W.W. | 1 watt insl. |
| R- 6 | 63-1390 | 1 megohm | ¼ watt insl. |
| R- 5 | 63-1391 | 33M ohm | ¼ watt insl. |
| R- 1<br>R- 9 | 63-1392 | 330M ohm | ¼ watt insl. |
| R-10<br>R- 2 | 63-1395 | 22M ohm | ¼ watt. insl. |
| R-13<br>R-14 | 63-1399 | 82 ohm | ½ watt insl. |
| R- 8 | 63-1400 | 15 megohm | ¼ watt insl. |
| R- 3 | 63-1414 | 100 ohm | ¼ watt insl. |
| R- 7 | 63-1513 | Vol. con. and sw. | |

### SPEAKER AND GASKET ASSEMBLY

| | | |
|---|---|---|
| | S13173 | Speaker and gasket assem. (comp.) |
| SP-1 | 49-576 | 6" x 9" P.M. speaker |
| | 196-91 | Speaker gasket and screen |
| | 208-576 | Cone and voice coil assem. |

### INTERFERENCE ELIMINATION

There should be no interference from the ignition system if the receiver has been installed according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:

IMPORTANT: Be sure that good contacts are made between the car frame, or body, and the interference condensers. If necessary, clean away paint or dirt with emery paper. Be sure all nuts and bolts are tightened securely.

The distributor supressor No. 63-1046 and the flexible ground strap No. 83-1335 should be connected as shown in figure 3.

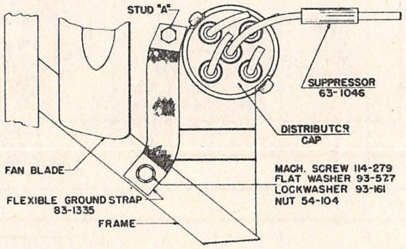

STUD "A"
SUPPRESSOR 63-1046
DISTRIBUTOR CAP
FAN BLADE
MACH. SCREW 114-279
FLAT WASHER 93-577
LOCKWASHER 93-161
NUT 54-104
FLEXIBLE GROUND STRAP 83-1335
FRAME

Fig. 3

The fuel gauge condenser No. 22-919 should be installed as shown in figure 4.

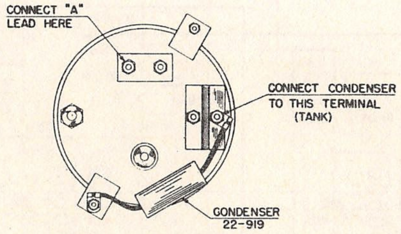

CONNECT "A" LEAD HERE
CONNECT CONDENSER TO THIS TERMINAL (TANK)
GONDENSER 22-919

Fig. 4

### MISCELLANEOUS

| | | |
|---|---|---|
| | 52-294 | Vol. con. cable |
| | 52-397 | Speaker cable and plug |
| | 52-417 | Battery cable (set to fuse) |
| | 52-418 | Battery cable (fuse to ammeter) |
| | 54-184 | Set spacer nut (used on 63-1513) |
| | 78-281 | Vibrator socket |
| | 78-596 | Loktal base tube socket (8 contact) |
| | 78-684 | Octal base tube socket (moulded) |
| | 78-749 | Speaker plug socket |
| | 78-756 | Loktal base tube socket |
| | 78-758 | Octal base tube socket |
| | 93-456 | Vibrator cushion washer |
| T-3 | 95-915 | Output transformer |
| T-4 | 95-1002 | Power transformer |
| S-1 | 136-15 | 10 amp. fuse (3AG) |
| V-1 | 190-20 | Vibrator |
| | 202-486 | Instruction book |
| | S11391 | Ant. con. socket and brkt. assem. |

The generator condenser No. 22-920 should be installed as shown below in figure 5.

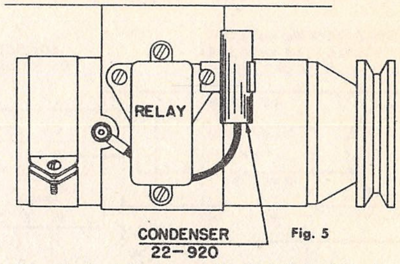

RELAY
CONDENSER 22-920

Fig. 5

The motor hood bond spring No. 80-145 should be installed as shown in Figure 6. Note that the sharp extrusions are facing down toward the front of the car before the hood grounding strip is bent back.

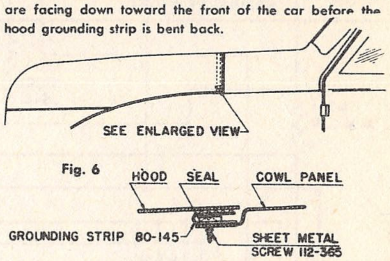

SEE ENLARGED VIEW
HOOD
SEAL
COWL PANEL
GROUNDING STRIP 80-145
SHEET METAL SCREW 112-365

Fig. 6

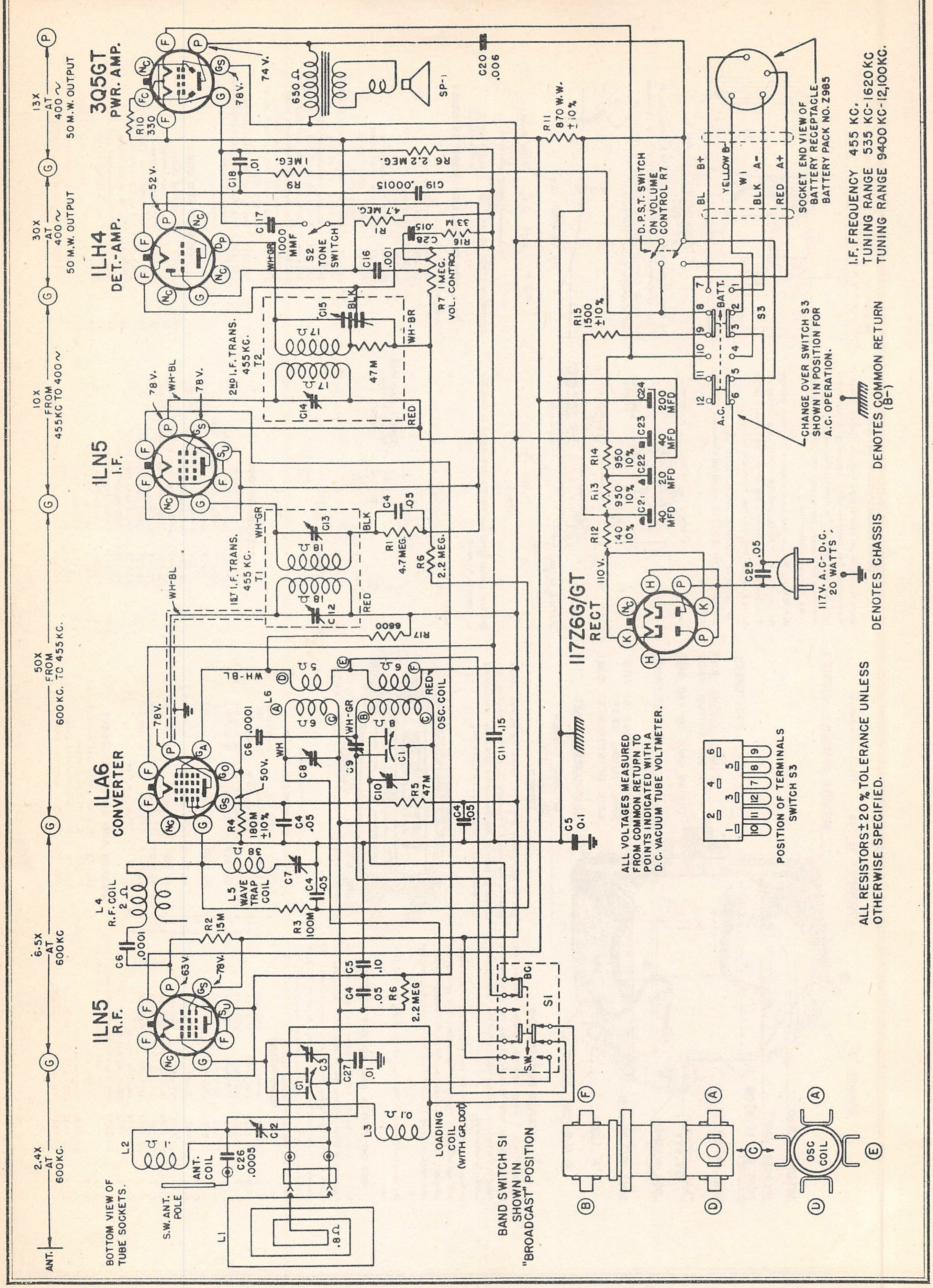
### DIAL AND TUNING MECHANISM ASSEMBLY

| Diagram No. | Part No. | Description |
|---|---|---|
| | 26-380 | Dial scale |
| | 57-1228 | Escutcheon |
| | 59-180 | Dial pointer |
| | 80-329 | Gear indexing spring |
| | 80-331 | Cross arm return spring |
| | 80-379 | Pointer retainer spring |
| S-3 | 100-32 | Dial light bulb |
| | 149-44 | Adjusting spring and core (3 used) |
| | 188-45 | Turret screw lock ring |
| | S10826 | Solenoid end plug and brkt. assem. |
| | S12439 | Pointer mtg. brkt. and stud assem. |
| | S12440 | Pointer drive brkt. and stud assem. |
| | S12447 | Dial light socket and wire assem. |
| | S12594 | Manual tuner assem. (final) |
| | S13156 | Tuning and vol. con. knob assem. (46-639 red) |
| | S13161 | Tuning shaft and gear assem. |
| | S13162 | Mtg. plate and retaining strip assem. |
| | S13178 | Cross arm assem. |
| | S13238 | Turret assem. |

### CHOKES AND COILS

| | | |
|---|---|---|
| L8 | 20-213 | Main hash choke |
| T1 | 95-1003 | 1st I.F. transformer |
| T2 | 95-1004 | 2nd I.F. transformer |
| L1 | S8819 | Ant. motor noise choke assem. |
| | S11040 | R. F. coil and shield assem. |
| L6 | S11229 | Osc. series coil assem. |
| L7 | S11232 | Motor noise choke coil assem. |
| L4 | S12053 | Osc. tuning coil assem. |
| L2<br>L3 | S12060 | R. F. coil tuning assem. (2 used) |
| L5 | S13155 | Osc. shunt coil assem. |
| | S13160 | Ant. coil and shield assem. |

MODEL 6G004Y, Chassis 6C41 ZENITH RADIO CORP.


ANT.
2.4X AT 600KC.
G
6.5X AT 600KC
50X FROM 600KC. TO 455KC.
10X FROM 455KC TO 400~
30X AT 400~ 50 M.W. OUTPUT
13X AT 400~ 50 M.W. OUTPUT
P
1LN5 R.F.
1LA6 CONVERTER
1LN5 I.F.
1LH4 DET.-AMP.
3Q5GT PWR. AMP.
117Z6G/GT RECT
63V
78V.
50V.
52V.
74V.
110V.
L1 .8Ω
L2 1Ω
ANT. COIL
S.W. ANT. POLE
C26 .0005
C2
C1
C3
C27 .01
L3 1.0Ω
LOADING COIL (WITH GR. DOT)
C6 .0001
L4 R.F. COIL 2Ω
R2 15M
C5 .10
C4 .05
R6 2.2 MEG
L5 WAVE TRAP COIL 3Ω
C7
C4 .05
R3 100M
R4 180M ±10%
C4 .05
C6 .0001
C8
C9
C10
C11
L6
6Ω
8Ω
R5 47M
OSC. COIL
WH
WH-GR
WH-BL
RED
BLK
5Ω
9Ω
C11 .15
C4 .05
C5 0.1
R17 6800
1ST I.F. TRANS. 455 KC. T1
C12
C13
18Ω
R1 4.7 MEG.
C4 .05
R6 2.2 MEG.
2ND I.F. TRANS. 455 KC. T2
C14
C15
17Ω
47M
WH-BR
C16 .001
R7 1 MEG. VOL. CONTROL
C17 1000 MMF
S2 TONE SWITCH
R1 4.7 MEG.
C28 .015
R16 33 M
C18 .01
R9 1 MEG.
C19 .00015
R6 2.2 MEG.
R10 330
650Ω
SP-1
C20 .006
R11 870 W.W. ±10%
R15 1500 ±10%
R12 140 10%
R13 950 10%
R14 950 10%
C21 40 MFD
C22 20 MFD
C23 40 MFD
C24 200 MFD
C25 .05
117V. A.C.-D.C. 20 WATTS
D.P.S.T. SWITCH ON VOLUME CONTROL R7
BATT.
A.C.
S3
BL
B+
YELLOW B-
W1
BLK A-
RED A+
S1
BC
S.W.
A
B
C
D
E
F
G
OSC COIL
1 2 3 4 5 6 7 8 9 10 11 12

BOTTOM VIEW OF TUBE SOCKETS.

BAND SWITCH S1 SHOWN IN "BROADCAST" POSITION

ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A D.C. VACUUM TUBE VOLTMETER.

POSITION OF TERMINALS SWITCH S3

ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

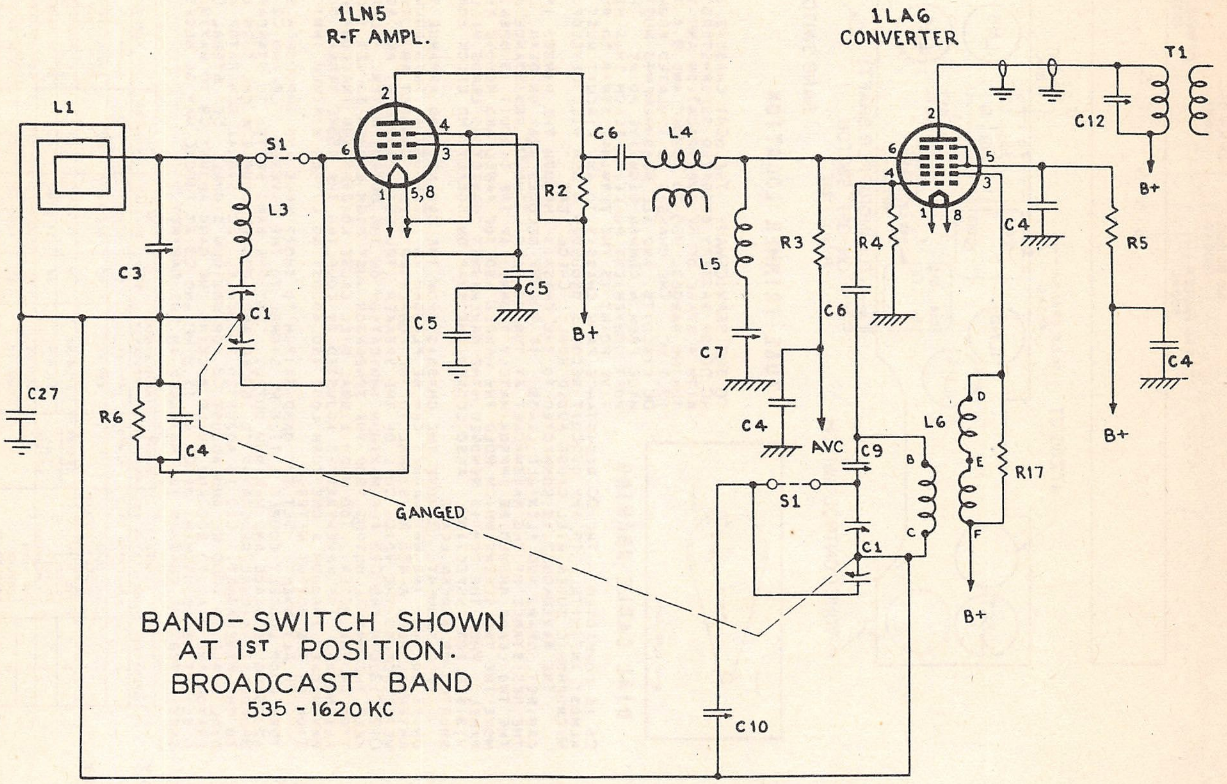
DENOTES CHASSIS

DENOTES COMMON RETURN (B-)

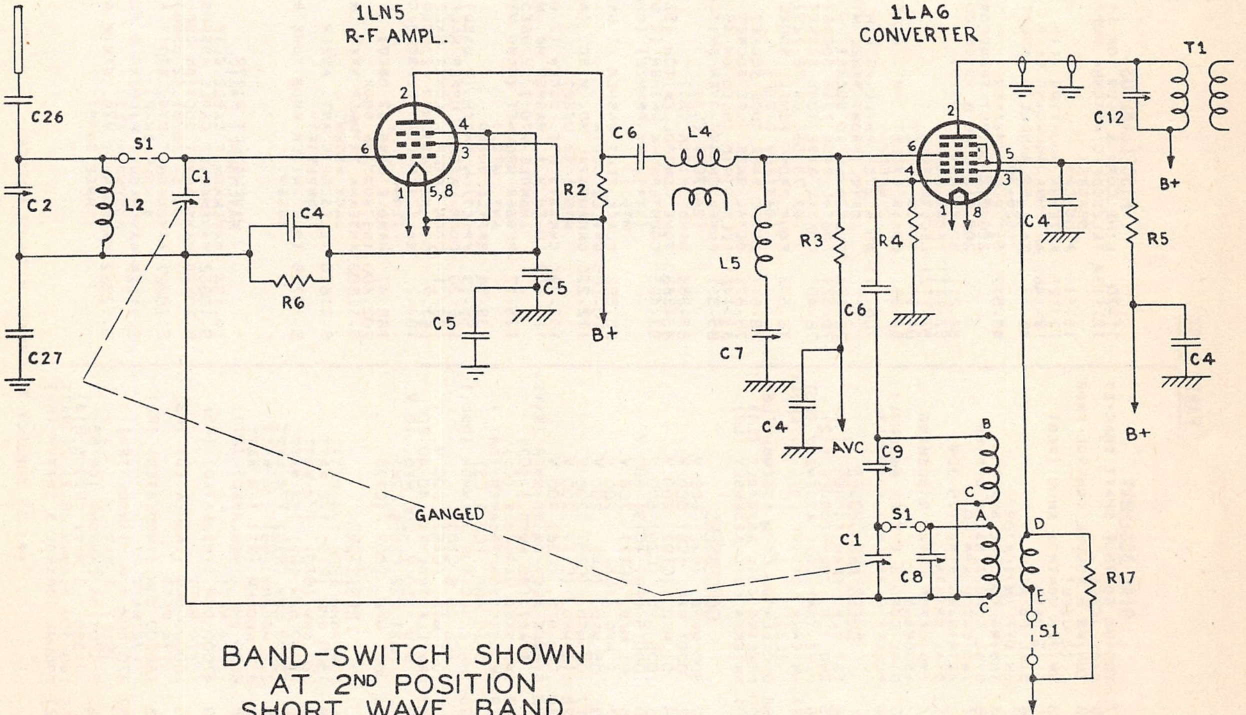
CHANGE OVER SWITCH S3 SHOWN IN POSITION FOR A.C. OPERATION.

SOCKET END VIEW OF BATTERY RECEPTACLE BATTERY PACK NO. Z985

I.F. FREQUENCY 455 KC.
TUNING RANGE 535 KC-1620KC
TUNING RANGE 9400KC-12,100KC.


1LN5
R-F AMPL.
1LA6
CONVERTER
L1
S1
L3
C3
C1
C27
R6
C4
2
4
6
3
1
5,8
R2
C6
L4
C5
C5
B+
L5
C7
R3
C4
AVC
R4
C6
C9
S1
C1
C10
B
C
L6
D
E
F
R17
B+
T1
C12
B+
5
3
8
C4
R5
C4
B+
GANGED

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
535-1620 KC


1LN5
R-F AMPL.
1LA6
CONVERTER
C26
S1
C1
C2
L2
C4
R6
C27
C5
C5
2
4
6
3
1
5,8
R2
B+
C6
L4
L5
C7
R3
C4
AVC
R4
C6
C9
B
C
S1
A
C1
C8
C
D
E
S1
R17
B+
T1
C12
B+
5
3
8
C4
R5
C4
B+
GANGED

BAND-SWITCH SHOWN
AT 2ND POSITION
SHORT WAVE BAND
9.4-12.1 MC

# ZENITH RADIO CORP.

## PARTS LIST

### DIAL ASSEMBLY

| | |
|---|---|
| 12-887 | TUNING CONTROL SHAFT BRACKET |
| 26-349 | DIAL SCALE |
| 46-518 | TUNING & VOLUME CONTROL KNOB (2 USED) |
| 46-573 | SWITCH CONTROL KNOB (RED) (2 USED) |
| 59-146 | DIAL POINTER |
| 59-167 | ON-OFF INDICATOR |
| 76-304 | TUNING CONTROL SHAFT |
| 80-209 | DIAL CORD TENSION SPRING |
| 80-421 | INDICATOR SPRING |
| 188-32 | RETAINING RING (76-304) |
| 192-112 | DIAL CRYSTAL |
| S-9534 | INDICATOR LEVER & BUSHING ASSEMBLY |
| S-9653 | DIAL CORD & EYELET ASSEMBLY |
| MS-684 | PULLEY & BRACKET ASSEMBLY |

### COILS AND CHOKES

| | |
|---|---|
| 95-804 | 1ST I.F. TRANSFORMER (T1) |
| 95-805 | 2ND I.F. TRANSFORMER (T2) |
| S-8326 | WAVE TRAP COIL ASSEMBLY (L5) |
| S-11591 | ANTENNA LOADING COIL ASSEMBLY (L3) |
| S-11798 | OSCILLATOR COIL ASSEMBLY(L6) |
| S-11800 | PEAKING COIL ASSEMBLY (L4) |
| S-11801 | ANTENNA COIL ASSEMBLY (L2) |

### CONDENSERS

| | |
|---|---|
| 22-147 | 500 MMFD. (C26) 600 V. |
| 22-162 | .0001 MFD. (C6) 500 V. |
| 22-196 | .01 MFD. (C18) 600 V. |
| 22-458 | .006 MFD. (C20) 600 V. |
| 22-470 | .00015 MFD. (C19) 600 V |
| 22-826 | .01 MFD. (C27) 200 V. |
| 22-827 | .1 MFD. (C5) 200 V. |
| 22-829 | .05 MFD. (C4) 200 V. |
| 22-1017 | .05 MFD. (C25) 200 V. |
| 22-1025 | .15 MFD. (C11) 200 V. |
| 22-1120 | .015 MFD. (C28) 400 V. |
| 22-1388 | SINGLE SECTION TRIMMER (WAVE-TRAP) (85 MMFD.) (C7) |
| 22-1427 | TWO GANG VARIABLE (C1) |
| 22-1428 | TWO SECTION TRIMMER (ANT.) 2-20 MMF. (C2 & C3) |
| 22-1429 | THREE SECTION TRIMMER (OSC.) (C8, C9 & C10) |
| 22-1431 | .001 MFD. (C16) 600 V. |
| 22-1443 | DRY ELECTROLYTIC 40-40-20 MFD.-150 V.-200 MFD. 10 V. (C21, C22, C23 & C24) |
| 22-1444 | .001 MFD. 200V (C17) |

### RESISTORS

| | |
|---|---|
| 63-271 | 1 MEGOHM (R9) 1/4 WATT |
| 63-418 | 1500 OHM (R15) 1/2 WATT |
| 63-580 | 330 OHM (R10) 1/4 WATT |
| 63-590 | 15000 OHM (R2) 1/4 WATT |
| 63-592 | 33000 OHM (R16) 1/4 WATT |
| 63-600 | 2.2 MEGOHM (R6) 1/4 WATT |
| 63-602 | 4.7 MEGOHM (R1) 1/4 WATT |
| 63-708 | 6800 OHM (INSULATED) (R17) 1/4 WATT |
| 63-713 | 47000 OHM (INSULATED) (R5) 1/4 WATT |
| 63-715 | 100000 OHM (INSULATED) (R3) 1/4 WATT |
| 63-773 | 180000 OHM (INSULATED) (R9) 1/4 WATT |
| 63-1097 | 870 OHM W.W (INSULATED) (R11) 1 WATT |
| 63-1362 | 2 SECTION CANDOHM (OR 63-1365) .3 WATT (R13 & R14) |
| 63-1366 | 140 OHM ZIPOHM (R12) 2½ WATT |
| 63-1537 | VOLUME CONTROL & SWITCH (R7) |

### MISCELLANEOUS

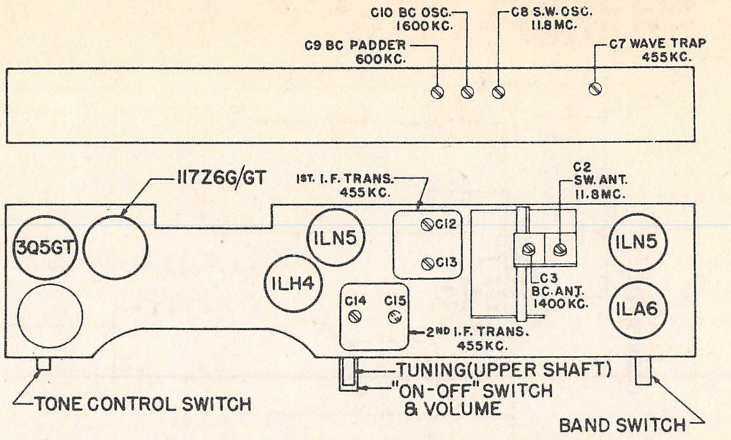
| | |
|---|---|
| 11-70 | LINE CORD & PLUG (OR 11-90) |
| 12-1134 | TELESCOPIC ANTENNA SUPPORT BRACKET |
| 15-51 | PLUG CAP |
| 19-125 | ANTENNA MOUNTING CLIP |
| 19-148 | ANTENNA MOUNTING CLIP |
| 36-37 | CABINET HANDLE & INSERT (36-38) |
| 49-512 | 5¼" P.M. SPEAKER<br>206-512 OUTPUT TRANSFORMER<br>208-512 CONE & VOICE COIL |
| 54-211 | SPEED NUT (3 USED) |
| 57-1111 | FRONT PANEL |
| 57-1121 | ESCUTCHEON: |
| 64-98 | BRASS EYELET |
| 64-99 | BRASS EYELET (ANT. LEAD) (2 USED) |
| 700-111 | #5 X 3/8" PHILLIPS B.H. WOOD SCREW (FRONT PANEL MTG.) |
| 78-274 | ELECTROLYTIC SOCKET |
| 78-371 | LOKTAL BASE TUBE SOCKET |
| 78-401 | LOKTAL BASE TUBE SOCKET (OR 78-596 OR 78-729) |
| 78-543 | FOUR PRONG FEMALE SOCKET (BATTERY CABLE) |
| 78-611 | OCTAL BASE TUBE SOCKET |
| 78-671 | OCTAL BASE TUBE SOCKET |
| 83-1401 | FELT STRIP (USED ON 46-573) |
| 85-311 | POWER CHANGE-OVER SWITCH (244705) (S3) |
| 85-364 | BAND SWITCH (S1) |
| 85-368 | TONE CONTROL SWITCH (S2) |
| 93-485 | COUNTERSUNK WASHER (2 USED) (STATUARY BRONZE) (CHASSIS MTG.) |
| 93-553 | BLACK FELT WASHER (2 USED) |
| 110-105 | GRILLE CLOTH |
| 112-236 | ORNAMENTAL HD. M.SC. (ANT. MTG.) (2 USED) |
| 112-290 | CHASSIS MTG. SCREW (2 USED) |
| 112-403 | 10-24 X 1" WASHER HD. M.S. (HANDLE MTG.) (2 USED) |
| 125-17 | RUBBER GROMMET (GANG MTG. & ANT. MTG.) |
| 139-54 | BAFFLE BOARD |
| 156-19 | FRICTION CATCH (2 USED) |
| 156-20 | DOOR LATCH - UPPER HALF |
| 156-21 | DOOR LATCH - LOWER HALF |
| 157-7 | STRIKE FASTENER (2 USED) |
| 184-7 | BALL TIP FOR TELESCOPIC ANTENNA |
| 188-47 | HANDLE RING (2 USED) |
| 202-400 | INSTRUCTION BOOK |
| S-11802 | ANTENNA TRIMMER BRKT. & PIN JACK ASSEM. |
| S-11820 | TELESCOPIC ANT. ASSEM. (COMPLETE) |
| S-13719 | TONE SWITCH KNOB YOKE & PLATE ASSEM. |

### WAVEMAGNET PARTS

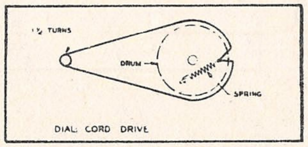
| | |
|---|---|
| 19-134 | WAVEMAGNET CABLE CLIP |
| S-10862 | WAVEMAGNET CABLE ASSEMBLY |
| S-10865 | WAVEMAGNET SUCTION CUP ASSEM. (OR S-12528) (2 USED) |
| S-10867 | WAVEMAGNET MTG. STRIP ASSEMBLY (SINGLE SNAP) |
| S-11928 | WAVEMAGNET WINDING & PLATE ASSEMBLY (L1) |
| S-12382 | WAVEMAGNET MTG. STRIP ASSEMBLY (THREE SNAP) |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

3-10-47



TUBE TRIMMER LOCATION



DIAL CABLE DRAWING

TO THE SERVICEMAN: The 6C41 chassis is a AC,DC or battery operated superheterodyne with a stage of RF amplification and two tuning ranges, 935 to 1620KC and 9.4 to 12.1 MC. The chassis is isolated from the DC circuits, and all measurements must be made from a common negative point. The most convenient place to reach this negative point is the terminal strip to which C5 is connected. The DC resistance from chassis to any circuit must be almost infinite. If any circuit becomes grounded a hum will develop. Microphonic tubes will cause audio howl. Check 1LA6.

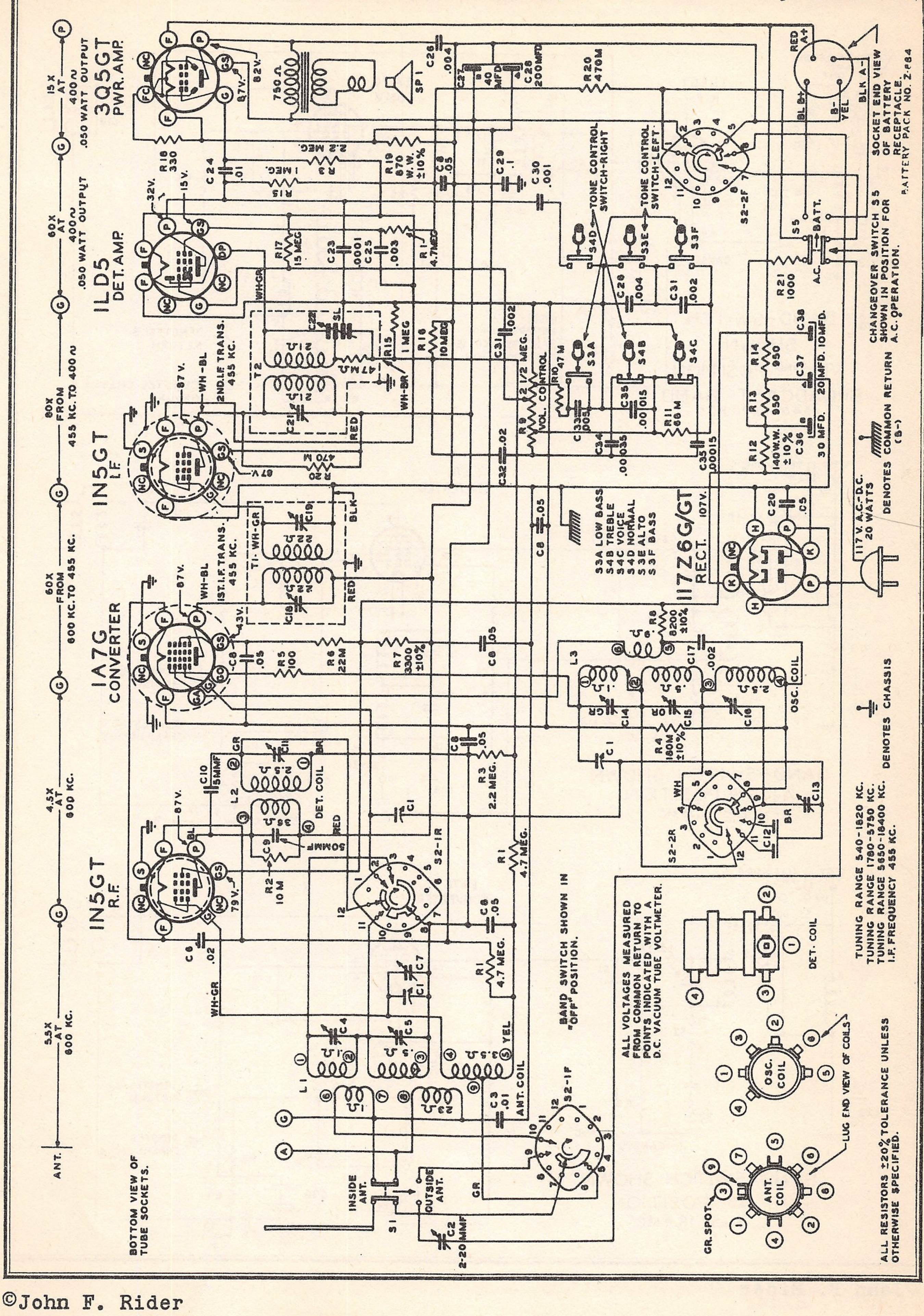
The Wavemagnet is connected to the chassis through the hinges in the cabinet, snaps and flexible leads. If the RF becomes weak or dead, check the resistance of the Wavemagnet at tuning gang. The DC resistance across the two leads should be approximately 1 ohm. If the circuit is open, remove the two screws which hold the handle and top panel and remove the top panel. When the top is removed, the Wavemagnet connecting leads will be visible for inspection. Also loosen the snap-on socket and check for shorted or broken leads.

IF Alignment: Remove the chassis from the cabinet and arrange the units so that the Wavemagnet can be plugged in Through a 1MFD dummy antenna, feed a 455 KC signal to the converter grid. Connect an output meter across the voice coil of the speaker (two lugs provided) and adjust C12, C13, C14 and C15 for maximum indication on the output meter. Always keep the signal output from the generator just high enough to get indication on the meter. Too much signal will cause loading and inaccurate alignment. The wave-trap is adjusted by coupling the 455KC signal to the Wavemagnet through a one turn loop and adjusting C7 for minimum indication on the output meter.

RF Alignment: Set the band switch to short wave and through a single turn loop loosely couple a 11.8 MC signal to the Waverod. C8 and C2 are adjusted to scale and maximum output. Set the band switch to standard Broadcast, signal generator to 1600KC and loosely couple a one turn loop to the Wavemagnet. C10 is adjusted to scale. Set signal generator and dial scale to 1400 KC and adjust C3 for maximum signal. Set signal generator and dial to 600 and while rocking the gang adjust C9 to maximum A slight re-adjustment of C2 at 11.8 MC and C3 at 1400KC may be necessary after the chassis is installed in the cabinet.

| OPERATION | CONNECT OSCILLATOR TO | DUMMY ANTENNA | INPUT SIGNAL FREQUENCY | BAND | SET DIAL AT | TRIMMERS | PURPOSE |
|---|---|---|---|---|---|---|---|
| 1 | CONVERTER GRID | 5 MFD | 455 KC | BC | 600 KC | C12 C13, C14 C15 | ALIGN I.F |
| 2 | ONE TURN LOOSELY COUPLED TO WAVEMAGNET | | 455 KC | BC | 600 KC | C7 | ADJUST WAVETRAP TO TO MINIMUM |
| 3 | ONE TURN LOOSELY COUPLED TO WAVEROD | EXTEND WAVEROD FULL LENGTH | 11.8 MC | SW | 11.8 MC | C8 | SET OSCILLATOR TO SCALE |
| 4 | | | 11.8 MC | SW | 11.8 MC | C2 | ALIGN WAVEROD |
| 5 | ONE TURN LOOSELY COUPLED TO WAVEMAGNET | | 1600 KC | BC | 1600 KC | C10 | SET OSCILLATOR TO SCALE |
| 6 | | | 1400 KC | BC | 1400 KC | C3 | ALIGN WAVEMAGNET |
| 7 | | | 600 KC | BC | ROCK GANG AT 600 KC | C9 | ADJUST PADDER |

ZENITH RADIO CORP. MODEL 6G038, Chassis 6C50


1N5GT R.F.
1A7G CONVERTER
1N5GT I.F.
1LD5 DET. AMP.
3Q5GT PWR. AMP.
117Z6G/GT RECT.
ANT.
5.5X AT 600 KC.
4.5X AT 600 KC.
60X FROM 600 KC. TO 455 KC.
80X FROM 455 KC. TO 400~
60X AT 400~ .050 WATT OUTPUT
15X AT 400~ .050 WATT OUTPUT
1ST. I.F. TRANS. 455 KC.
2ND. I.F. TRANS. 455 KC.
T1
T2
L1
L2
L3
DET. COIL
OSC. COIL
ANT. COIL
S1
S2-1F
S2-1R
S2-2R
S2-2F
S5
INSIDE ANT.
OUTSIDE ANT.
C2 2-20 MMF
C3 .01
C6 .02
C8 .05
C9 50MMF
C10 5MMF
C20 .05
C23 .0001
C24 .01
C25 .003
C26 .004
C27 40 MFD
C28 200MFD
C29 .1
C30 .001
C31 .002
C32 .02
C33 .005
C34 .0035
C35 .015
C35 .00015
C36 30 MFD.
C37 20 MFD.
C38 10MFD.
C17 .002
R1 4.7 MEG.
R2 10 M
R3 2.2 MEG.
R3 1 MEG.
R4 180M ±10%
R5 100
R6 22M
R7 3300 ±10%
R8 8200 ±10%
R9 1 1/2 MEG. VOL. CONTROL
R10 47 M
R11 68 M
R12 140 W.W. ±10%
R13 950
R14 950
R15 1 MEG
R16 10 MEG
R17 15 MEG
R18 330
R19 670 W.W. ±10%
R20 470 M
R21 1000
47 M
2.2 MEG.
750 Ω
SP 1
TONE CONTROL SWITCH-RIGHT
TONE CONTROL SWITCH-LEFT
S3A
S4B
S4C
S4D
S3E
S3F
BATT.
A.C.
RED A+
BLK A-
BL B+
B- YEL
117 V. A.C.-D.C. 20 WATTS
87 V.
79 V.
43 V.
32 V.
15 V.
82 V.
107 V.
WH-GR
WH-BL
WH-BR
RED
BLK
GR
BR
WH
YEL
GR. SPOT
LUG END VIEW OF COILS

BOTTOM VIEW OF TUBE SOCKETS.

BAND SWITCH SHOWN IN "OFF" POSITION.

ALL VOLTAGES MEASURED FROM COMMON RETURN TO POINTS INDICATED WITH A D.C. VACUUM TUBE VOLTMETER.

ALL RESISTORS ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.

TUNING RANGE 540-1620 KC.
TUNING RANGE 1780-5750 KC.
TUNING RANGE 5650-18400 KC.
I.F. FREQUENCY 455 KC.

S3A LOW BASS
S4B TREBLE
S4C VOICE
S4D NORMAL
S3E ALTO
S3F BASS

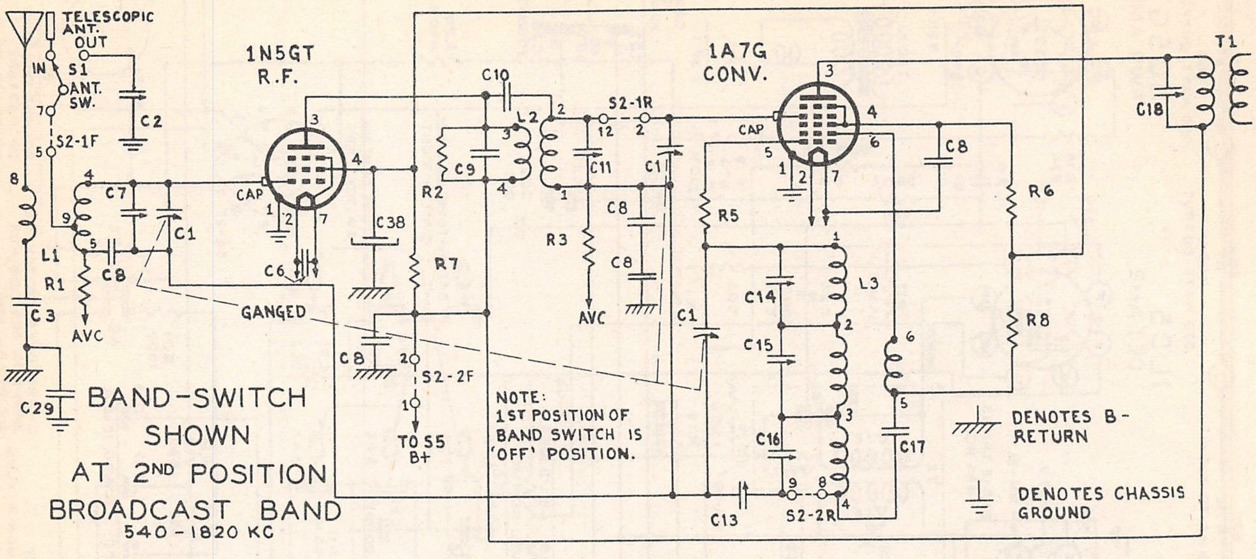
DENOTES CHASSIS

DENOTES COMMON RETURN (B-)

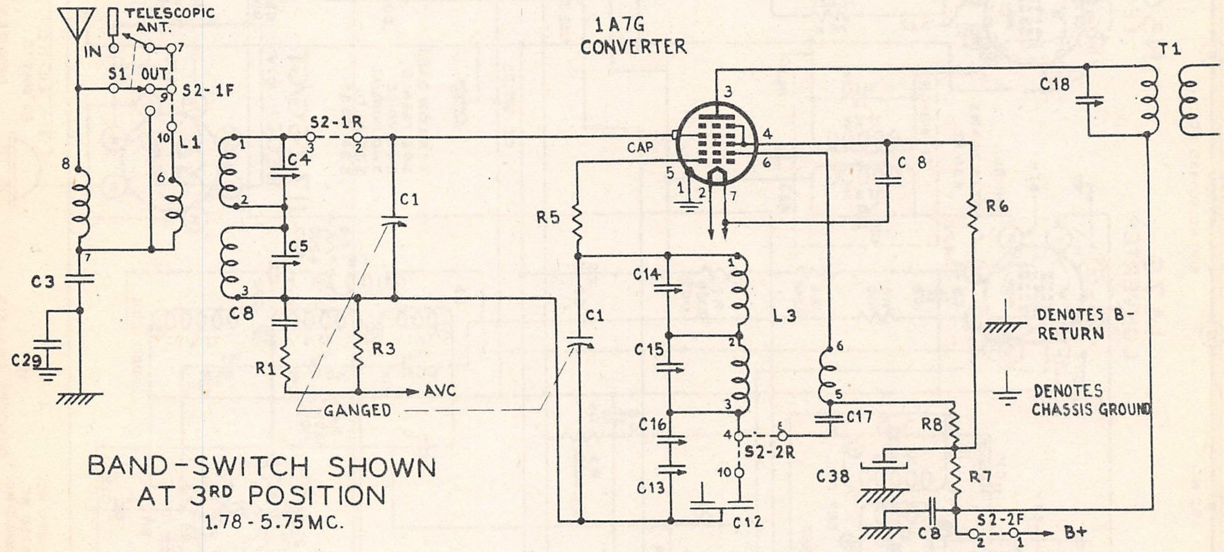
CHANGEOVER SWITCH S5 SHOWN IN POSITION FOR A.C. OPERATION.

SOCKET END VIEW OF BATTERY RECEPTACLE.
BATTERY PACK NO. Z-984

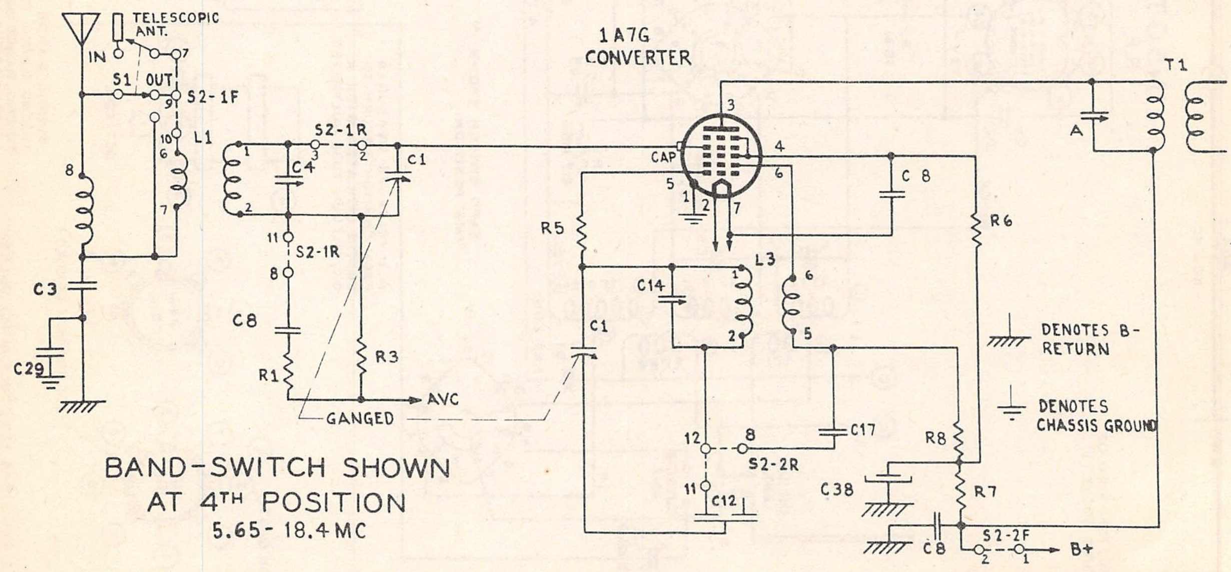
## ZENITH RADIO CORP.


TELESCOPIC ANT.
OUT
IN
S1 ANT. SW.
S2-1F
C2
8
7
5
4
9
L1
R1
C3
AVC
C29
C7
C8
C1
CAP
1N5GT R.F.
C6
C38
R7
C8
GANGED
S2-2F
TO S5 B+
C10
L2
C9
R2
S2-1R
12
C11
C1
R3
C8
AVC
1A7G CONV.
CAP
R5
C8
R6
R8
C14
C15
C16
L3
C17
C13
S2-2R
T1
C18
NOTE: 1ST POSITION OF BAND SWITCH IS 'OFF' POSITION.
DENOTES B- RETURN
DENOTES CHASSIS GROUND

BAND-SWITCH SHOWN AT 2ND POSITION BROADCAST BAND 540-1820 KC


TELESCOPIC ANT.
IN
OUT
S1
S2-1F
L1
8
C3
C29
S2-1R
C4
C5
C8
R1
R3
GANGED
AVC
C1
1A7G CONVERTER
CAP
R5
C1
C14
C15
C16
C13
C12
L3
S2-2R
C17
C8
R6
R8
R7
C38
C8
S2-2F
B+
T1
C18
DENOTES B- RETURN
DENOTES CHASSIS GROUND

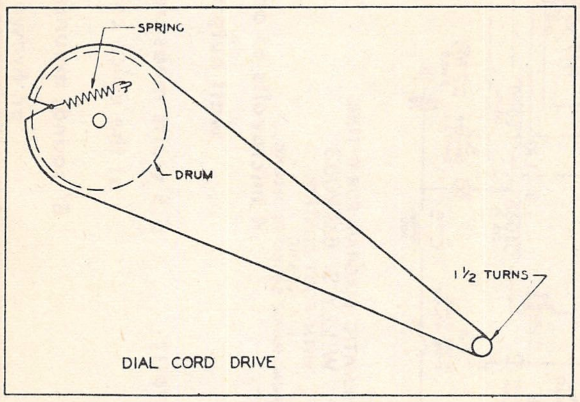
BAND-SWITCH SHOWN AT 3RD POSITION 1.78-5.75 MC.


TELESCOPIC ANT.
IN
OUT
S1
S2-1F
L1
8
C3
C29
S2-1R
C4
C1
S2-1R
C8
R1
R3
GANGED
AVC
1A7G CONVERTER
CAP
R5
C1
C14
L3
C12
S2-2R
C17
C8
R6
R8
R7
C38
C8
S2-2F
B+
T1
A
DENOTES B- RETURN
DENOTES CHASSIS GROUND

BAND-SWITCH SHOWN AT 4TH POSITION 5.65-18.4 MC

## ALIGNMENT PROCEDURE

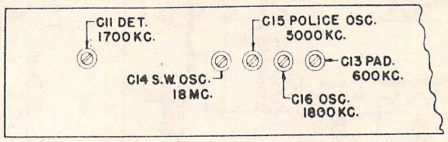
| OPERATION | CONNECT OSCILLATOR TO | DUMMY ANTENNA | INPUT SIG. FREQUENCY | SET DIAL AT | TRIMMERS | PURPOSE |
|---|---|---|---|---|---|---|
| 1 | Converter grid | .5 mfd | 455 Kc | 600 Kc | C18, C19, C21, C22 | Align I.F. |
| 2 | One turn | | 18 Mc | 18 Mc | C14 | Adjust oscillator to scale |
| 3 | | | 16 Mc | 16 Mc | C4 | Adjust for max. |
| 4 | Loosely | | 5 Mc | 5 Mc | C15 | Adjust oscillator to scale |
| 5 | Coupled | | 5 Mc | 5 Mc | C5 | Adjust for max. |
| 6 | To | | 1800 Kc | 1800 Kc | C16 | Adjust oscillator to scale |
| 7 | Waverod | | 1700 Kc | 1700 Kc | C11 & C7 | Adjust for max. |
| 8 | | | 600 Kc | 600 Kc | C13 | Rock gang and adjust for max. |

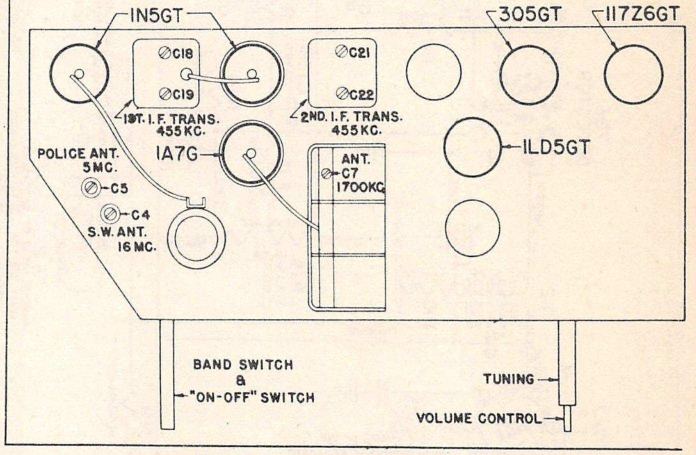


DIAL CABLE DRAWING

## PARTS LIST

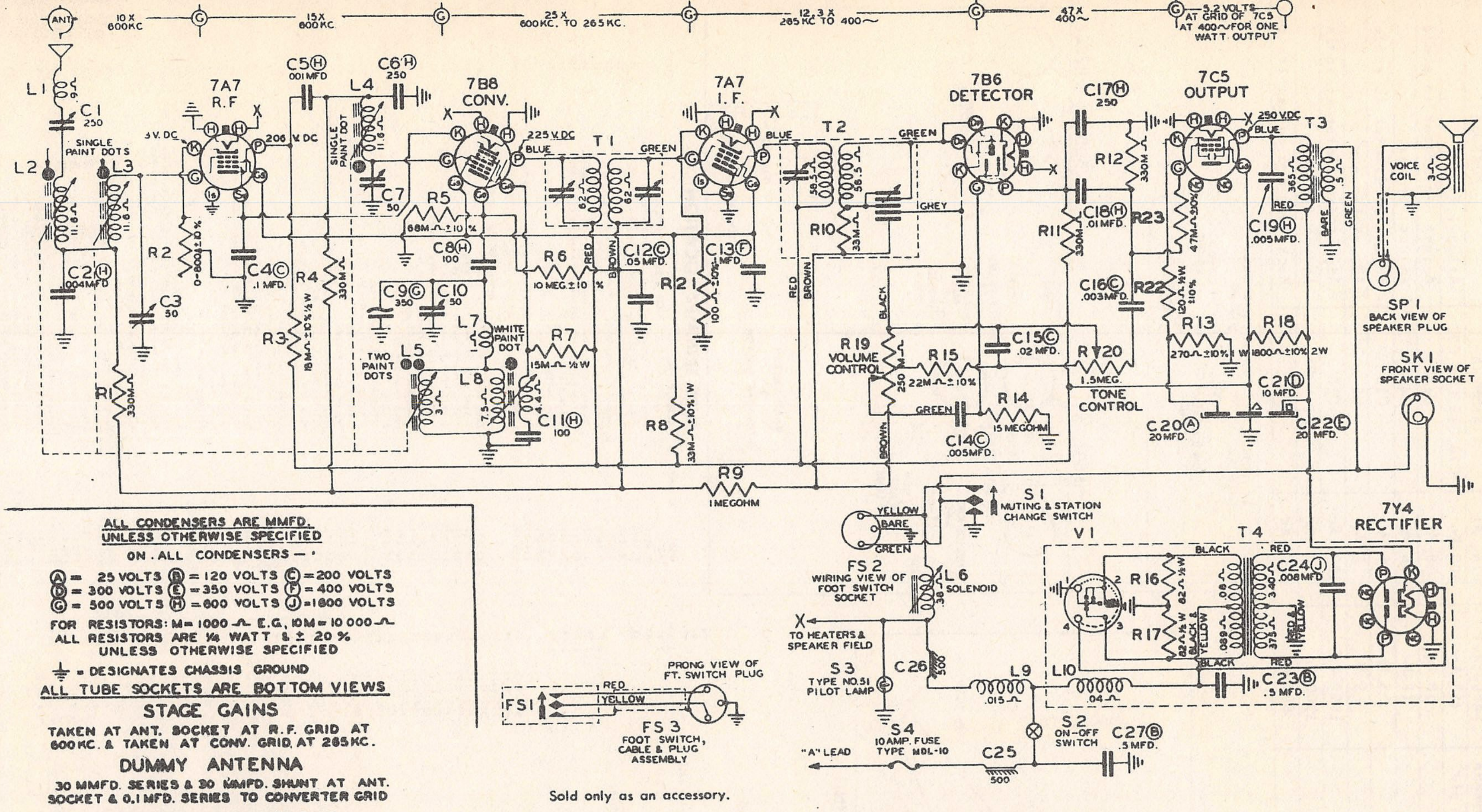
| PART NO. | REF. NO. | DESCRIPTION | | PRICE |
|---|---|---|---|---|
| | | DIAL ASSEMBLY | | |
| 59-121 | | Dial pointer | | .19 |
| 76-305 | | Tuning Control shaft | | .12 |
| 80-69 | | Dial Cord Tension Spring | | .02 |
| 80-227 | | Tuning Shaft Tension Spring | | .02 |
| 93-482 | | Black Bakelite Washer (used with 59-121) | | .72C |
| 188-27 | | Retaining Ring (76-305) | | 1.20C |
| S-9643 | | Dial Scale & Indicator Assembly (26-293) | | 1.20 |
| S-9758 | | Dial Cord Assembly | | .07 |
| MS-586 | | Pulley & Bracket Assembly | | .12 |
| | | COILS & CHOKES | | |
| 95-821 | T1 | 1st I.F. Transformer | | 1.77 |
| 95-822 | T2 | 2nd I.F. Transformer | | 1.77 |
| S-9689 | L3 | Oscillator Coil & Wire Assembly | | 1.26 |
| S-9690 | L2 | Detector Coil Assembly | | 1.04 |
| S-11815 | L1 | Antenna Coil Assembly | | 1.65 |
| | | CONDENSERS | | |
| 22-162 | C23 | .0001 Mfd | 500 Volt. | .20 |
| 22-196 | C24 | .01 Mfd | 600 Volt | .20 |
| 22-229 | C33 | .005 Mfd | 600 Volt. | .20 |
| 22-289 | C9 | 50 Mmfd | 500 Volt. | .20 |
| 22-303 | C10 | 5 Mmfd. | 500 Volt | 20 |
| 22-326 | C25 | .003 Mfd. | 400 Volt. | .20 |
| 22-327 | C6 | .02 Mfd. | 200 Volt | .20 |
| 22-358 | C17 | .002 Mfd | 600 Volt. | .38 |
| 22-448 | C26 | .004 Mfd. | 600 Volt. | .20 |
| 22-470 | C35 | .00015 Mfd. | 600 Volt. | .20 |
| 22-492 | C30 | .002 Mfd. | 600 Volt | .20 |
| 22-827 | C29 | .1 Mfd. | 200 Volt. | .23 |
| 22-829 | C8 | .05 Mfd | 200 Volt. | .20 |
| 22-830 | C32 | .02 Mfd | 600 Volt. | .20 |
| 22-887 | C31 | .001 Mfd | 600 Volt | .20 |
| 22-930 | C12 | Dual unit padder | | 83 |
| 22-954 | C34 | .00035 Mfd. | 600 Volt. | .16 |
| 22-1017 | C20 | .05 Mfd | 400 Volt. | .20 |
| 22-1047 | C36,37,38 | 10-20-30 Mfd. Dry Electrolytic | 150 Volt. | 1 63 |
| 22-1144 | C13,14,15,16 | Four Section Ceramic Trimmer | | .83 |
| 22-1183 | C3 | .01 Mfd | 400 Volt | 20 |
| 22-1217 | C1 | Three Gang Variable | | 4.48 |
| 22-1230 | C4,C5 | Two Section Ceramic Trimmer | | .38 |
| 22-1234 | C27,28 | 200 Mfd.- 10 V. x 40 Mfd. 150 V. Dry Electrolytic | | 1.92 |
| 22-1421 | C2,C11 | Trimmer Capacitor | | .40 |
| | | RESISTORS | | |
| 63-271 | R15 | 1 Megohm | 1/4 Watt | .09 |
| 63-577 | R5 | 100 Ohm | 1/4 Watt | .09 |
| 63-580 | R18 | 330 Ohm | 1/4 Watt | .09 |
| 63-589 | R2 | 10,000 Ohm | 1/4 Watt. | .09 |
| 63-591 | R6 | 22,000 Ohm. | 1/4 Watt. | .09 |
| 63-593 | R10 | 47,000 Ohm | 1/4 Watt | .09 |
| 63-594 | R11 | 68,000 Ohm | 1/4 Watt. | .09 |
| 63-597 | R20 | 470,000 Ohm | 1/4 Watt. | .09 |
| 63-600 | R3 | 2.2 Megohm. | 1/4 Watt. | .09 |
| 63-602 | R1 | 4.7 Megohm. | 1/4 Watt | .09 |
| 63-604 | R16 | 10 Megohm | 1/4 Watt. | .09 |
| 63-605 | R21 | 1000 Ohm. | 1/2 Watt. | .10 |
| 63-635 | R7 | 3300 Ohm | 1/4 Watt. | .09 |
| 63-640 | R8 | 8200 Ohm. | 1/4 Watt. | .09 |
| 63-654 | R4 | 180,000 Ohm | 1/4 Watt. | 09 |
| 63-976 | R17 | 15 Megohm | 1/4 Watt | .09 |
| 63-1097 | R19 | 870 Ohm. | W.W. Insul. 1 Watt. | .24 |
| 63-1244 | R9 | Volume Control | | 1 20 |
| 63-1259 | R13,14 | Candohm (2 section) | | .43 |
| 63-1366 | R12 | 140 Ohm Zipohm | W.W. 2-1/2 Watt | .24 |





TUBE TRIMMER LOCATION

| PART NO. | REF. NO. | DESCRIPTION | PRICE |
|---|---|---|---|
| | | RADIO ESCUTCHEON PARTS | |
| S-9995 | | Radiorgan Escutcheon & Knob Assem. L.H (Complete) | 1.20 |
| S-9996 | | Radiorgan Escutcheon & Knob Assem. R.H. (Complete) | 1.20 |
| MS-660 | | Bracket Assembly | .25 |
| S-9590 | | Knob & Eyelet Assem (3 used on L.H., 1 on R.H. | .12 |
| S-9591 | | Knob & Eyelet Assembly (2 used on R.H. only) | .12 |
| 57-911 | | Tenite Escutcheon (Black) (1 used on L.H. only) | .36 |
| 57-912 | | Tenite Escutcheon (Black) (1 used on R.H. only) | .36 |
| 76-337 | | Latch Shaft | .03 |
| 76-338 | | Knob Shaft | .04 |
| 80-264 | | Latch Spring | .72C |
| 114-159 | | #6 x 1/4" Hex Hd. Self Tapping Screw (2 used) | .72C |
| 156-10 | | Latch | .36C |
| | | MISCELLANEOUS | |
| 11-68 | | Line Cord & Plug (8 ft. long) | .65 |
| 12-782 | | Volume Control Mounting Bracket | .05 |
| 12-787 | | Tuning Sleeve Support Bracket | .04 |
| 12-1082 | | Antenna Rod Mounting Bracket | .06 |
| 15-34 | | Socket Cap (or 15-67) (Battery Cable) | .07 |
| 17-67 | | Antenna Rod Retaining Clamp | .08 |
| 19-77 | | Cable Retaining Clamp | .01 |
| 46-579 | | Band Selector Switch Knob | .20 |
| 49-464 | SP1 | 8" P.M. Speaker | 10.52 |
| | | 206-464 Output Transformer | 1.97 |
| | | 208-464 Cone & Voice Coil | 2.63 |
| 57-11A | | Antenna Lead Marker | .03 |
| 57-11G | | Ground Lead Marker | .03 |
| 57-905 | | Dial Escutcheon (or 57-1112) (Part of S-9580 or S-11777) | 2.41 |
| 57-1103 | | Antenna Knob Escutcheon | .70 |
| 70-124 | | #2 x 3/8" Oval Hd. Wood Screw (Ant. Esc. Mtg.) | 1.70C |
| 72-58 | | #2 x 3/8" Flat Hd. Wood Screw (Dial Esc. Mtg.) | .02 |
| 78-190 | | Speaker Plug Socket | .12 |
| 78-229 | | Electrolytic Capacitor Socket | .03 |
| 78-396 | | Four Contact Socket (Battery Cable) | .12 |
| 78-446 | | Loktal Base Tube Socket (7 contact) | .19 |
| 78-611 | | Octal Base Tube Socket (8 contact) | .12 |
| 78-671 | | Octal Base Tube Socket | .12 |
| 85-171 | S5 | Power Switch | .31 |
| 85-303 | S1 | Antenna Swtich | .35 |
| 85-366 | S2 | Band Selector Switch | 2.00 |
| 93-215 | | Rubber Washer (Chassis Mtg.) | .07 |
| 112-56 | | #6 x 1/4" Hex.Hd.Self Tapping Screw (Radiogran Switch Mtg.) | .55C |
| 114-40 | | #10-32 x 7/8" Hex Washer Hd.M.S.Steel (Chassis Mtg.) (3 used) | .72C |
| 114-128 | | #10 x 1-1/16" Hex Washer Hd Self Tapping Screw (Chassis Mtg.) (1 used) | 1.81C |
| 125-17 | | Rubber Grommet | .03 |
| 126-379 | | Tube Shield (for GT type) | .07 |
| 126-382 | | Tube Shield | .08 |
| 192-68 | | Dial Escutcheon Glass (Part of S-11777 or S-9580) | .43 |
| 196-47 | | Dial Escutcheon Gasket( " " " " " ) | .19 |
| 202-398 | | Instruction Book | .25 |
| S-8540 | | Dummy Knob & Set Screw Assembly (46-350) | .24 |
| S-9580 | | Dial Escutcheon Assembly (or S-11777) | 3.01 |
| S-9595 | S3.4 | Radiorgan Strip & Contact Assembly (2 used) | .31 |
| S-9816 | | Tuning Control Knob & Set Screw Assembly | .30 |
| S-11251 | | Telescopic Antenna Assembly | 7.85 |
| S-11899 | | Volume Control Knob Assembly (46-578) | .26 |


ANT
10 X 600KC
15X 600KC
25 X 600KC. TO 265KC.
12.3 X 265KC TO 400~
47X 400~
5.2 VOLTS AT GRID OF 7C5 AT 400~FOR ONE WATT OUTPUT
L1
C1 250
SINGLE PAINT DOTS
L2
L3
C2Ⓗ .004MFD
C3 50
R1 330M
R2 0-800-Ω±10%
7A7 R.F
3V. DC
206 V DC
C4Ⓒ .1 MFD.
R3 18M-Ω±10% ½W
R4 330M
C5Ⓗ .001MFD
L4
SINGLE PAINT DOT
C6Ⓗ 250
C7 50
7B8 CONV.
225 V.DC
BLUE
R5 68M-Ω±10%
C8Ⓗ 100
C9Ⓖ 350
C10 50
L5
TWO PAINT DOTS
L7
WHITE PAINT DOT
L8
R7 15M-Ω ½W
C11Ⓗ 100
T1
GREEN
RED
BROWN
R6 10 MEG.±10%
C12Ⓒ .05 MFD.
7A7 I.F.
R21 100-Ω±10%
C13Ⓕ 1 MFD
R8 33M-Ω±10% 1W
R9 1 MEGOHM
T2
GREEN
GREY
R10 33M-Ω
RED
BROWN
BLACK
R19 VOLUME CONTROL
R15 22M-Ω±10%
GREEN
C14Ⓒ .005MFD.
R14 15 MEGOHM
7B6 DETECTOR
C15Ⓒ .02 MFD.
R11 330M
C16Ⓒ .003MFD.
R20 1.5MEG. TONE CONTROL
C17Ⓗ 250
R12 330M
C18Ⓗ .01MFD.
R23
R22 120-Ω ½W ±10%
R13 270-Ω±10% 1W
7C5 OUTPUT
47M-Ω±10%
250 V.DC
BLUE
C19Ⓗ .005MFD.
RED
R18 1800-Ω±10% 2W
C20Ⓐ 20MFD
C21Ⓓ 10 MFD.
C22Ⓔ 20 MFD.
T3
365-Ω
BARE
GREEN
VOICE COIL
SP 1 BACK VIEW OF SPEAKER PLUG
SK1 FRONT VIEW OF SPEAKER SOCKET
S1 MUTING & STATION CHANGE SWITCH
YELLOW
BARE
GREEN
FS 2 WIRING VIEW OF FOOT SWITCH SOCKET
L6 SOLENOID
TO HEATERS & SPEAKER FIELD
S3 TYPE NO.51 PILOT LAMP
C26 500
S4 10AMP. FUSE TYPE MDL-10
"A" LEAD
C25 500
L9 .015-Ω
S2 ON-OFF SWITCH
C27Ⓑ .5MFD.
L10 .04-Ω
V1
R16 82-Ω ½W
R17 82-Ω ½W
T4
BLACK
RED
YELLOW
BLACK & YELLOW
RED & YELLOW
C24Ⓙ .008 MFD
C23Ⓑ .5 MFD.
7Y4 RECTIFIER
PRONG VIEW OF FT. SWITCH PLUG
RED
YELLOW
FS1
FS 3 FOOT SWITCH, CABLE & PLUG ASSEMBLY

Sold only as an accessory.

ALL CONDENSERS ARE MMFD.
UNLESS OTHERWISE SPECIFIED

ON . ALL CONDENSERS —

Ⓐ = 25 VOLTS Ⓑ = 120 VOLTS Ⓒ = 200 VOLTS
Ⓓ = 300 VOLTS Ⓔ = 350 VOLTS Ⓕ = 400 VOLTS
Ⓖ = 500 VOLTS Ⓗ = 600 VOLTS Ⓙ = 1600 VOLTS

FOR RESISTORS: M = 1000 Ω E.G. 10M = 10 000 Ω
ALL RESISTORS ARE ¼ WATT & ± 20 %
UNLESS OTHERWISE SPECIFIED

⏚ = DESIGNATES CHASSIS GROUND

ALL TUBE SOCKETS ARE BOTTOM VIEWS

### STAGE GAINS

TAKEN AT ANT. SOCKET AT R.F. GRID AT 600KC. & TAKEN AT CONV. GRID AT 265KC.

### DUMMY ANTENNA

30 MMFD. SERIES & 30 MMFD. SHUNT AT ANT. SOCKET & 0.1 MFD. SERIES TO CONVERTER GRID

### BATTERY CONDITIONS

6.3 VOLTS AT STORAGE BATTERY TERMINALS WITH POSITIVE GROUNDED

### TEST CONDITIONS

VOL. CONTROL SET AT "MAX." TONE CONTROL SET ON "HIGH"; WITH NO INCOMING SIGNAL

VOLTAGES READ FROM POINT SHOWN TO CHASSIS WITH 1000 OHM PER VOLT METER

**CURRENT CONSUMPTION:** . . . . . 7.5 amperes

**INSTANTANEOUS CURRENT CONSUMPTION DURING AUTOMATIC CHANGE CYCLE:** . . . . . . . . . . . . 20 amperes

SCHEMATIC DIAGRAM FOR 6 TUBE
WILLY'S 6MW083
WITH FOOT CONTROL
I. F. 265 KC.
TUNING RANGE 540KC. TO 1600KC.

**SENSITIVITY:** . . . . . . . . . . . 4 microvolts at one watt output.

**POWER OUTPUT:** . . . . . . . 5.5 watts measured at the voice coil.

**SPEAKER:** . . . . . . . . . . . . . . 8" round, mounted on firewall.

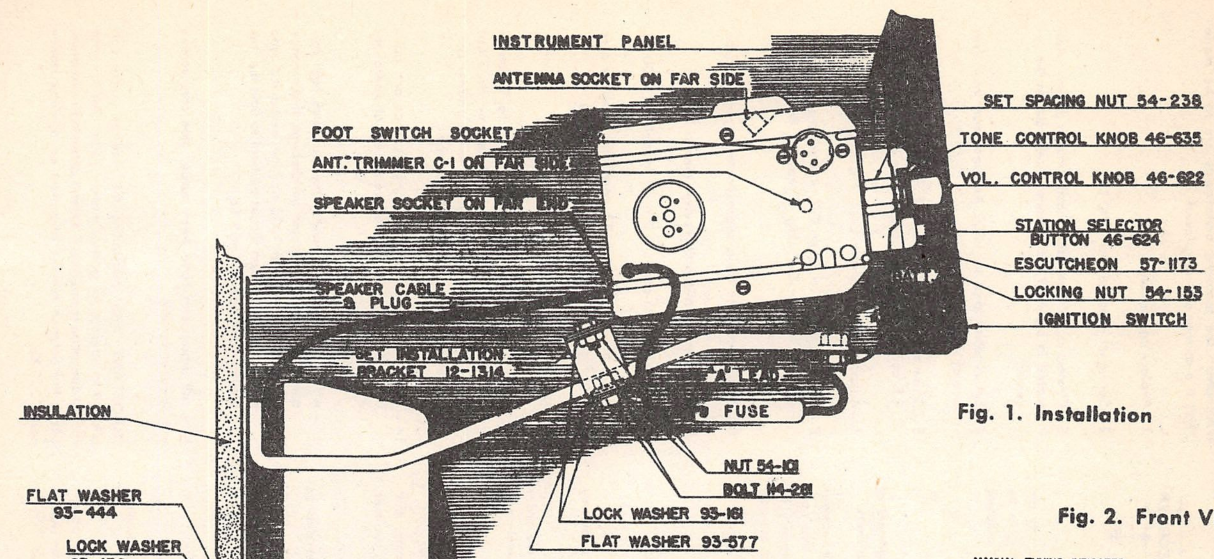

INSTRUMENT PANEL
ANTENNA SOCKET ON FAR SIDE
FOOT SWITCH SOCKET
ANT. TRIMMER C-1 ON FAR SIDE
SPEAKER SOCKET ON FAR END
SPEAKER CABLE & PLUG
SET INSTALLATION BRACKET 12-1314
"A" LEAD
FUSE
SET SPACING NUT 54-238
TONE CONTROL KNOB 46-635
VOL. CONTROL KNOB 46-622
STATION SELECTOR BUTTON 46-624
ESCUTCHEON 57-1173
LOCKING NUT 54-153
IGNITION SWITCH
BATT.
INSULATION
FLAT WASHER 93-444
LOCK WASHER 93-139
SPEAKER MTG. NUT 54-68
SPEAKER MTG. BLOCK 147-144
FIREWALL
SPEAKER ASSEMBLY S-13510
NUT 54-101
BOLT 114-281
LOCK WASHER 93-161
FLAT WASHER 93-577

Fig. 1. Installation

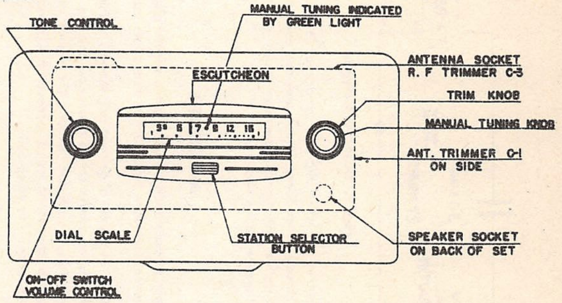

TONE CONTROL
MANUAL TUNING INDICATED BY GREEN LIGHT
ESCUTCHEON
ANTENNA SOCKET R. F TRIMMER C-3
TRIM KNOB
MANUAL TUNING KNOB
ANT. TRIMMER C-1 ON SIDE
SPEAKER SOCKET ON BACK OF SET
DIAL SCALE
STATION SELECTOR BUTTON
ON-OFF SWITCH VOLUME CONTROL
55 6 7 8 12 15

Fig. 2. Front View

## RECEIVER INSTALLATION

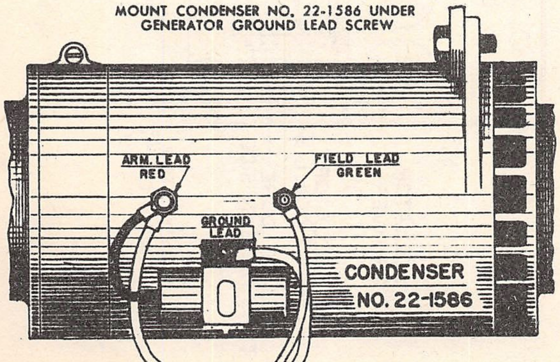
Figures 1 and 2, illustrating the installed receiver, the escutcheon plate, and the control knobs, are given here to facilitate removal and reinstallation of this receiver when service or repair is necessary.

To take the receiver from the car, remove the control knobs and mounting nuts from the front panel, and remove the set installation Bracket No. 12-1314 from the rear set mounting bracket.

## MANUAL TUNING

1. Press the Station Selector push button (Fig. 2) several times or until the green dot in the dial scale is illuminated.
2. Pull the Manual Tuning control knob (right hand) outward and turn to tune in desired station. Be sure to tune to exact frequency to assure the best tone quality.

MOUNT CONDENSER NO. 22-1586 UNDER GENERATOR GROUND LEAD SCREW

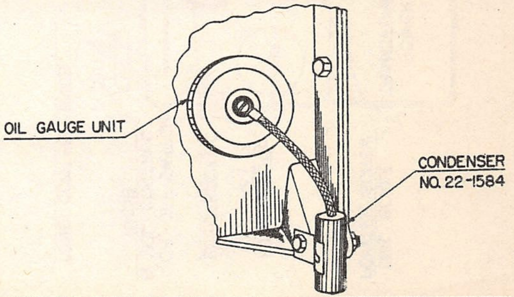

ARM. LEAD RED
FIELD LEAD GREEN
GROUND LEAD
CONDENSER NO. 22-1586

## AUTOMATIC TUNING

There are five automatic tuning positions which may be adjusted to five desired stations. If these positions have not been previously adjusted proceed as follows:

1. Press the station selector push button repeatedly until the green dot in the dial scale is illuminated.
2. Press the button once more to move the mechanism to the No. 1 Position.
3. Pull manual tuning knob outward to engage the automatic mechanism.
4. Select the station desired and tune to its frequency by turning the tuning knob. Tune very carefully for clearest reception.
5. Press the station selector push button, pull the manual tuning knob outward, and tune in the station desired for No. 2 position. Use same procedure for positions No. 3, 4 and 5.

When the five automatic positions have been adjusted to the five desired stations as instructed, it is only necessary to press the station selector push button to return to dial tuning, or any one of the stations adjusted on the Automatic.


OIL GAUGE UNIT
CONDENSER NO. 22-1584

# ZENITH RADIO CORP.

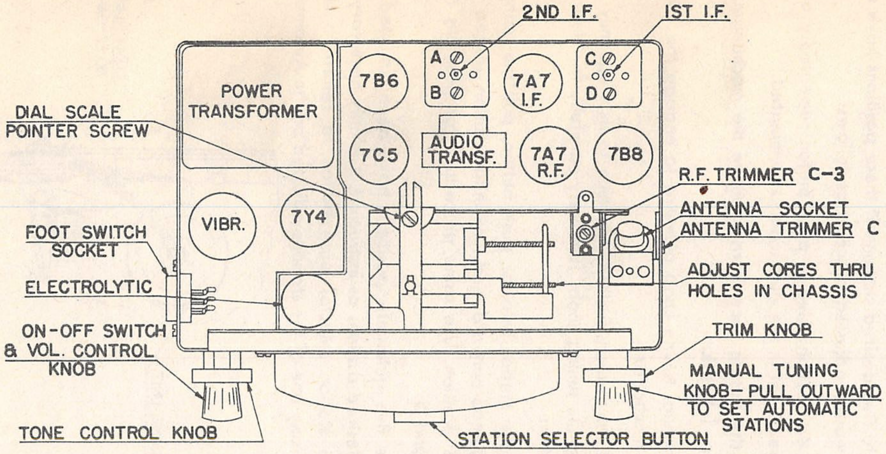

2ND I.F.
IST I.F.
POWER TRANSFORMER
7B6
A
B
7A7 I.F.
C
D
DIAL SCALE POINTER SCREW
7C5
AUDIO TRANSF.
7A7 R.F.
7B8
R.F. TRIMMER C-3
ANTENNA SOCKET
ANTENNA TRIMMER C I
VIBR.
7Y4
FOOT SWITCH SOCKET
ELECTROLYTIC
ADJUST CORES THRU HOLES IN CHASSIS
ON-OFF SWITCH & VOL. CONTROL KNOB
TRIM KNOB
MANUAL TUNING KNOB- PULL OUTWARD TO SET AUTOMATIC STATIONS
TONE CONTROL KNOB
STATION SELECTOR BUTTON

Fig. 7. Top View of Chassis

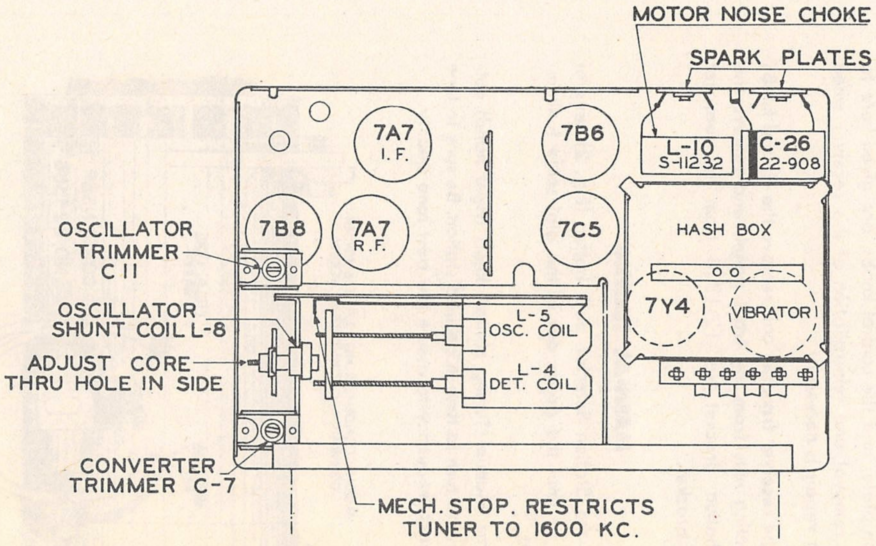

MOTOR NOISE CHOKE
SPARK PLATES
7A7 I.F.
7B6
L-10 S-11232
C-26 22-908
OSCILLATOR TRIMMER C II
7B8
7A7 R.F.
7C5
HASH BOX
OSCILLATOR SHUNT COIL L-8
L-5 OSC. COIL
7Y4
VIBRATOR
ADJUST CORE THRU HOLE IN SIDE
L-4 DET. COIL
CONVERTER TRIMMER C-7
MECH. STOP. RESTRICTS TUNER TO 1600 KC.

Fig. 8. Bottom View of Chassis

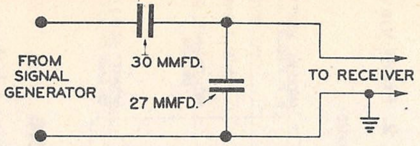

FROM SIGNAL GENERATOR
30 MMFD.
27 MMFD.
TO RECEIVER

Fig. 9. Dummy Antenna

Fig. 9 shows the schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver.

### ALIGNMENT

Maximum performance depends on accurate alignment of the receiver; therefore follow these instructions carefully.

**CAUTION:** Make all alignment adjustments to the receiver with the volume control set at maximum, and the tone control in the treble position. Reduce the signal intensity as much as possible at the signal generator. Connect the output meter across the voice coil.

### I.F. ALIGNMENT PROCEDURE

1—Remove top and bottom covers from receiver.

2—Set signal generator to 265 Kc.

3—Apply signal from generator through a .1 Mfd. dummy to 7B8 coverter grid. (Pin No. 6 on socket.)

4—Adjust I.F. trimmers, A, B, C and D (Fig. 7) in the order named for maximum output. Repeat the operation to assure accurate alignment.

### R.F. AND OSCILLATOR ALIGNMENT

1—Connect signal generator leads through dummy, illustrated in Fig. 9, to antenna lead in socket on receiver.

2—Set signal generator to 535 Kc.

3—Place set in manual tuning position and set dial to 535 Kc.

4—Adjust oscillator trimmer C-11 (Fig. 8) for maximum response.

5—Set signal generator to 1200 Kc.

6—Tune set to 1200 Kc.

7—Adjust converter trimmer C-7 (Fig. 8) and R.F. trimmer C-3 (Fig. 7) for maximum response.

8—If dial calibration is off after making above adjustments, a correction can be made by turning the slotted brass screw at the rear of the pointer bracket.

### CORE OR COIL REPLACEMENT ONLY

**WARNING:** The following adjustments are to be made ONLY if a core or coil is replaced.

1—Replace coil or core.

2—Set signal generator to 1700 Kc.

3—Connect signal generator leads through dummy, illustrated in Figure 9, to antenna receptacle on the receiver.

4—Set receiver dial to 1600 Kc. (maximum high frequency end of dial.)

5—Screw the core completely out of the antenna coil, the R.F. coil, the converter coil, and the oscillator coil.

6—Adjust oscillator trimmer C-11 (Fig. 8) at 1700 Kc.

7—Adjust converter trimmer C-7, R.F. trimmer C-3, and antenna trimmer C-1 (Fig. 7 and 8) for maximum output reading.

8—Replace cores to their approximate original position.

9—Set generator dial and receiver dial to 1200 Kc.

10—Adjust oscillator core L-5 (Fig. 8) to scale at 1200 Kc.

11—Adjust the antenna core, R.F. core, and converter core (Fig. 7 and 8) for maximum output reading.

12—Set signal generator to 600 Kc.

13—"Rock in" shunt oscillator coil L-8 (Fig. 8) for maximum output reading. This should be done only as a last resort. This is the same as rocking in the padder condenser on a ganged condenser receiver.

14—Check receiver at 1200 Kc. for calibration and gain. If the receiver is off scale or weak, repeat operations 9, 10 and 11.

15—After alignment is complete, the maximum high frequency tuning range should be checked. If the range is greater or less than 1605 Kc., the mechanical stop for the tuner cross arm should be bent to limit the frequency coverage to 1605 Kc.

After all adjustments have been made, glue core screws with speaker cement.

**IMPORTANT:** After reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature. Extend antenna to maximum. Check the antenna trimmer alignment on a weak station near 1200 Kc.

# PARTS LIST MODEL 6MW083 (CHASSIS 6C83)

## 1946 WILLYS OVERLAND LONG DISTANCE RADIO

### COILS AND CHOKES

| Diagram No. | Part No. | Description |
|---|---|---|
| L 9 | 20-213 | Main Hash Choke |
| T 1 | 95-916 | 1st I.F. Transformer |
| T 2 | 95-942 | 2nd I.F. Transformer |
| L 1 | S8819 | Ant. Motor Noise Choke Assem. |
| L 2<br>L 3 | S11040 | Ant. & R.F. Coil Assem. (Right Hand) |
| L 4<br>L 5 | S11041 | Osc. & Converter Coil Assem. (Left Hand) |
| L 7 | S11229 | Osc. Series Coil Assem. |
| L 8 | S11231 | Osc. Shunt Coil Assem. |
| L10 | S11232 | Motor Noise Choke Coil Assem. |

### CONDENSERS

| Diagram No. | Part No. | Description | |
|---|---|---|---|
| C 8<br>C11 | 22-162 | 100 Mmfd. | 600 V. |
| C13 | 22-170 | .1 Mfd. | 400 V. |
| C17 | 22-182 | 250 Mmfd. | 600 V. |
| C 4 | 22-190 | .1 Mfd. | 200 V. |
| C12 | 22-250 | .05 Mfd. | 200 V. |
| C19 | 22-838 | .005 Mfd. | 600 V. |
| C14 | 22-906 | .005 Mfd. | 200 V. |
| C23<br>C27 | 22-908 | .5 Mfd. | 120 V. |
| C 6 | 22-1136 | 250 Mmfd. | 600 V. |
| C 5 | 22-1169 | .001 Mfd. | 600 V. |
| C18 | 22-1170 | .01 Mfd. | 600 V. |
| C16 | 22-1180 | .003 Mfd. | 600 V. |
| C 2 | 22-1244 | .004 Mfd. | 600 V. |
| C15 | 22-1270 | .02 Mfd. | 200 V. |
| C 3 | 22-1376 | R.F. Trimmer | |
| C 7 | 22-1377 | Det. Trimmer | |
| C10 | 22-1378 | Osc. Trimmer | |
| C20<br>C21<br>C22 | 22-1387 | Dry Electrolytic—20 Mfd. 25 V. x 10 Mfd.—300 V. x 20 Mfd. 350 V. | |
| C 1 | 22-1420 | Ant. Trimmer | |
| C24 | 22-1448 | .008 Mfd. | 1600 V. |
| C 9 | 22-1478 | 350 Mmfd. Compensator | |
| | 22-1553* | Dry Electrolytic—20 Mfd.—25 V. | |
| | 22-1554* | Dry Electrolytic—10 Mfd.—300 V. x 20 Mfd.—350 V. | |
| C25 | 27-87 | Spark Plate | |
| C26 | 27-87 | Spark Plate | |

*Note: It is necessary to use one each 22-1553 and 22-1554 to replace one 22-1387.

### RESISTORS

| Diagram No. | Part No. | Description | |
|---|---|---|---|
| R 2 | 63-1267 | Sensitivity Control (Sub. for 63-1379) | |
| R18 | 63-1368 | 1800 Ohm, 2 Watt Insl. W.W. | |
| R13 | 63-1369 | 270 Ohm, 1 Watt Insl. W.W. | |
| R 2 | 63-1379 | Sensitivity Control | |
| R 9 | 63-1390 | 1 Megohm | 1/4 Watt. |

| Diagram No. | Part No. | Discription | |
|---|---|---|---|
| R 1<br>R 4<br>R11<br>R12 | 63-1392 | 330M Ohm | 1/4 Watt. |
| R15 | 63-1395 | 22M Ohm | 1/4 Watt. |
| R 5 | 63-1396 | 68M Ohm | 1/4 Watt. |
| R 8 | 63-1398 | 33M Ohm | 1 Watt. |
| R16<br>R17 | 63-1399 | 82 Ohm | 1/2 Watt. |
| R14 | 63-1400 | 15 Megohm | 1/4 Watt. |
| R 7 | 63-1401 | 15M Ohm | 1/2 Watt. |
| R22 | 63-1410 | 120 Ohm | 1/2 Watt. |
| R 3 | 63-1411 | 18M Ohm | 1/2 Watt. |
| R 6 | 63-1413 | 10 Megohm | 1/4 Watt. |
| R21 | 63-1414 | 100 Ohm | 1/4 Watt. |
| R23 | 63-1417 | 47M Ohm | 1/4 Watt. |
| R19<br>R20 | 63-1508 | Tone Con., Vol. Con. & Switch | |

### MISCELLANEOUS

| Diagram No. | Part No. | Description |
|---|---|---|
| | 19-114 | Foot Sw. Cable Retaining Clip |
| | 46-624 | Selector Sw. Knob |
| | 52-294 | Vol. Con. Cable |
| | 52-398 | Battery Cable (Set to Fuse) |
| | 52-399 | Battery Cable (Fuse to Ammeter) |
| | 57-1173 | Escutcheon |
| | 78-281 | Vibrator Socket (or 78-732-733) |
| | 78-596 | Loktal Tube Socket (or 78-717-726-729-730) |
| FS 2 | 78-646 | Foot Sw. Cable Socket (or 78-406) |
| SK 1 | 78-728 | Speaker Cable Socket |
| | 80-232 | Vol. Con. Knob Retaining Spring |
| | 80-454 | Selector Knob Spring |
| T 4 | 95-914 | Power Transformer (Alt. for 95-1013) |
| T 3 | 95-915 | Output Transformer |
| T 4 | 95-1013 | Power Transformer |
| | 112-310 | Foot Sw. Mtg. Screw |
| S 4 | 136-14 | Fuse—10 Amp.—Type MDL—10 |
| V 1 | 190-20 | Vibrator |
| | 202-430 | Instruction Book |
| FS 3 | S12042 | Foot Sw., Cable & Plug Assem. |
| FS 1 | S-9458 | Foot Switch & Plate Assembly |

*Note: Not used in production. Sold only as an accessory.

### DIAL AND TUNING MECHANISM ASSEMBLY

| Diagram No. | Part No. | Description |
|---|---|---|
| | 26-385 | Dial Scale |
| | 34-132 | Indexing Disc |
| | 34-138 | Tuning Gear |
| | 34-158 | Ratchet Gear |
| | 56-174 | Indicator Pin |
| | 57-1077 | Protector Plate |
| | 59-180 | Dial Pointer |
| | 76-378 | Guide Rod |
| | 80-329 | Gear Indexing Spring |

### DIAL AND TUNING MECHANISM ASSEMBLY (Continued)

| Diagram No. | Part No. | Description |
|---|---|---|
| | 80-331 | Cross Arm Return Spring |
| | 80-332 | Cam Lever Spring |
| | 80-336 | Ratchet Gear Return Spring |
| | 80-340 | Lever Spring |
| | 80-341 | Kick-off Spring |
| | 80-342 | Tuning Shaft Spring |
| | 80-379 | Pointer Retainer Spring |
| | 80-445 | Flag Spring |
| | 83-1030 | Return Spring Retainer Strip |
| | 83-1039 | Solenoid Insulating Strip |
| | 86-30 | #6 Shakeproof Terminal |
| | 93-125 | #6 Internal Shakeproof Lockwasher |
| | 93-501 | #4 Internal Shakeproof Lockwasher |
| | 93-631 | Retainer Washer |
| | 93-650 | Brass Washer (.010 x 3/16 x 7/16) |
| | 93-706 | Neoprene Washer (.020 x 7/16 x 3/4) |
| | 93-822 | Brass Washer (.008 x .125 x 7/32) |
| | 93-849 | Shim Washer |
| | 94-438 | Spacing Bushing |
| | 97-193 | Lever Stud |
| | 97-236 | Flag Stud |
| S3 | 100-32 | Dial Light Bulb |
| | 114-63 | #6-32 x 3/16 Hex Acorn Hd. M.S. |
| | 114-69 | #4-40 x 1/4 Hex Acorn Hd. M.S. |
| | 114-150 | #6-32 x 5/32 Hex Acorn Hd. M.S. |
| | 117-83 | Tuning Shaft Locking Lever |
| | 128-26 | Dial Indicator Cam |
| | 147-126 | Gear & Disc Spacer |
| | 149-44 | Adjusting Spring & Core |
| | S10826 | Solenoid End Plug & Bracket Assem. |
| | S10829 | Solenoid & Terminal Assem. |
| | S10381 | Ratcher & Bracket Assem. |
| | S10836 | Cross Arm Assem. |
| | S11056 | Tuning Shaft & Gear Assem. |
| | S11076 | Push-Pull Tuner Assem. (complete) |
| | S11082 | Turret Assem. |
| S1 | S11271 | Solenoid Sw. Assem. (Hand Selector & Muting) |
| | S11391 | Antenna Connector Socket & Bracket Assembly |
| | S12438 | Mounting Plate & Lever Assem. |
| | S12439 | Pointer Mounting Bracket & Stud Assem. |
| | S12440 | Pointer Drive Bracket & Stud Assem. |
| | S12447 | Dial Light Socket & Wire Assem. |
| | S12909 | Indicator Flag & Bracket Assem. (59-186) |
| | S12911 | Front Plate & Bushing Assem. |

### SET INSTALLATION AND SUPPRESSION KIT

| Diagram Part No. | | Description |
|---|---|---|
| | S13597 | Set Installation & Suppression Kit (complete) |
| | 12-1314 | Set Installation Bracket |
| | 22-1584 | Oil Gauge Cond. (.5 Mfd.—200 V.) |
| | 22-1585 | Temp. Gauge Cond. (.5Mfd.—200 V.) |
| | 22-1586 | Generator Cond. (1 Mfd.—200 V.) |
| | 54-68 | 5/16 x 9/16 x 7/32 Hex Nut |
| | 54-104 | 1/4-20 x 1/2 x 3/16 Hex Nut |
| | 54-153 | 7/16-28 x 19/32 x .120 Hex Nut |
| | 63-1512 | Distributor Suppressor |
| | 80-145 | Motor Hood Bond Spring |
| | 93-139 | 5/16 External Shakeproof Lockwasher |
| | 93-161 | 1/4 External Shakeproof Lockwasher |
| | 93-444 | 1/16 x 3/8 x 1 3/4 Steel Washer |
| | 93-577 | .062 x 17/64 x 3/4 Steel Washer |
| | 112-365 | #8 x 1/2 B.H. Sheet Metal Screw |
| | 114-281 | 1/4-20 x 5/8 Hex Hd. M.S. |
| | 147-144 | Specker Mounting Spacer |
| | 188-41 | Spacer Ring |

### KNOB KIT

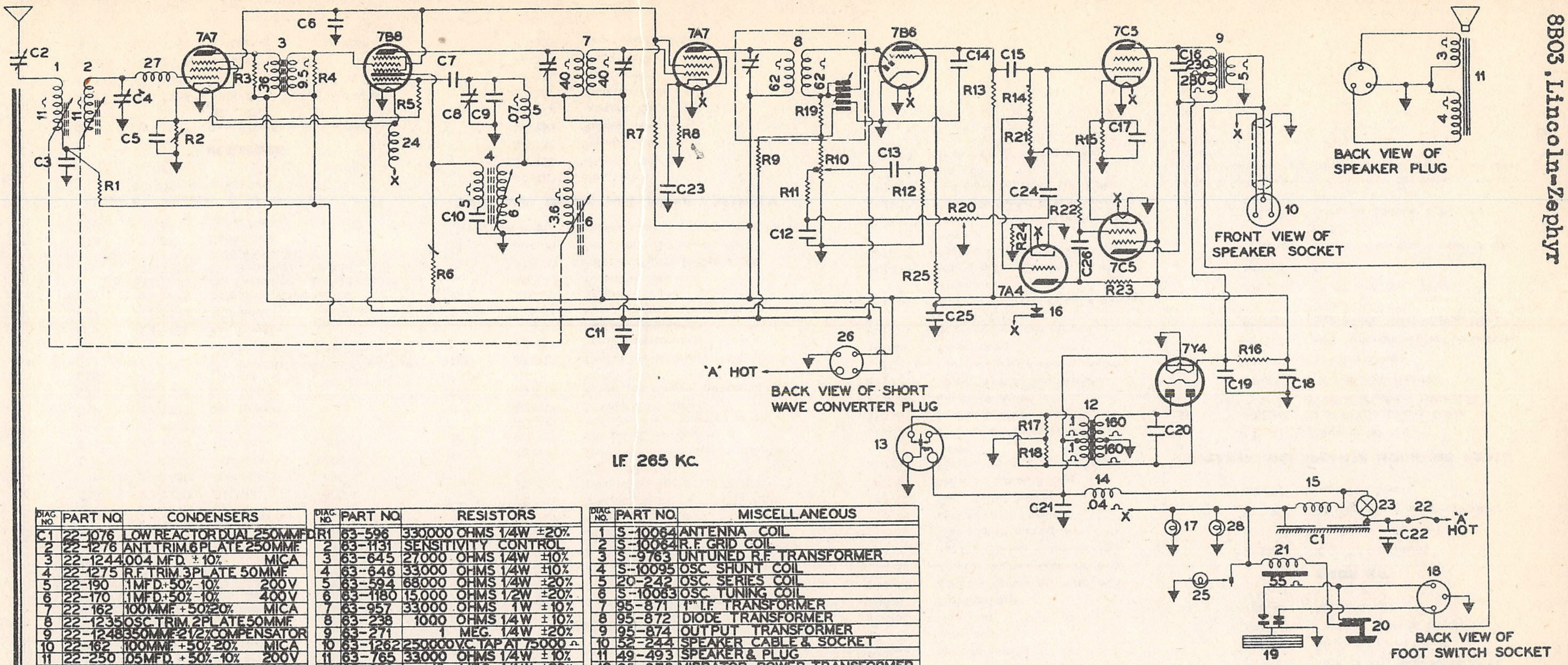
| Diagram No. | Part No. | Description |
|---|---|---|
| | S13174 | Knob Kit (complete) |
| | S12910 | Tuning & Trim Knob Assem. |
| | S13-239 | Vol. Con. Knob & Spring Assem. |
| | 46-635 | Tone Con. Knob |

### SPEAKER AND SPEAKER MOUNTING PARTS

| Diagram No. | Part No. | Description |
|---|---|---|
| | 43-131 | Speaker Housing |
| SP 1 | 49-566 | 7.6" PM Speaker & Cable<br>208-566 Cone & Voice Coil |
| | 54-30 | 8/32 x 5/16 x 7/64 Hex Nut |
| | 74-41 | Speaker Screen |
| | 93-126 | #8 Internal Shakeproof Lockwasher |
| | 93-783 | Stat. Bronze Steel Washer (1/32 x 3/16 x 3/8) |
| | 112-248 | #8-32 x 5/8 Oval B.H.M.S. |
| | 147-85 | Spacer |
| | S13066 | Speaker Mounting Bracket & Stud Assem. |
| | S13510 | Complete Speaker & Housing Assem. |

**Note:** When ordering cone and voice coil marked * be sure to add manufacturers' code letter that follows base part number.

# ZENITH RADIO CORP.


C2
1
2
27
C4
C5
R2
C3
R1
7A7
R3
3
36
9.5
R4
C6
7B8
R5
24
C7
C8
C9
.07
5
4
C10
5
6
3.6
6
R6
7
40
40
R7
7A7
R8
C23
C11
8
62
62
R19
R9
R10
R11
C12
C13
R12
7B6
C14
R13
C15
R14
R21
C24
R22
R24
7A4
C26
R20
R25
C25
16
7C5
R15
C17
7C5
R23
C16
230
230
9
5
11
3
4
BACK VIEW OF SPEAKER PLUG
10
FRONT VIEW OF SPEAKER SOCKET
'A' HOT
26
BACK VIEW OF SHORT WAVE CONVERTER PLUG
I.F. 265 KC.
13
R17
R18
12
160
160
C20
7Y4
R16
C19
C18
C21
14
.04
15
23
22
'A' HOT
C22
17
28
C1
21
55
25
18
20
19
BACK VIEW OF FOOT SWITCH SOCKET
X

| DIAG. NO. | PART NO. | CONDENSERS |
|---|---|---|
| C1 | 22-1076 | LOW REACTOR DUAL 250MMFD |
| 2 | 22-1276 | ANT. TRIM. 6 PLATE 250MMF. |
| 3 | 22-1244 | .004 MFD. ± 10% MICA |
| 4 | 22-1275 | R.F. TRIM. 3 PLATE 50MMF. |
| 5 | 22-190 | .1 MFD. +50% -10% 200V |
| 6 | 22-170 | .1 MFD. +50% -10% 400V |
| 7 | 22-162 | 100MMF. +50% 20% MICA |
| 8 | 22-1235 | OSC. TRIM. 2 PLATE 50MMF. |
| 9 | 22-1248 | 350MMF. ± 2 1/2% COMPENSATOR |
| 10 | 22-162 | 100MMF. +50% -20% MICA |
| 11 | 22-250 | .05 MFD. +50% -10% 200V |
| 12 | 22-185 | .01 MFD. +100% -10% 200V |
| 13 | 22-906 | .005 MFD. +20% -10% 200V |
| 14 | 22-182 | 250MMFD. +50% -10% MICA |
| 15 | 22-435 | .02 MFD. +100% -10% 600V |
| 16 | 22-912 | .002 MFD. +50% -10% 600V |
| 17 |  | 20 MFD. 25WV |
| 18 | 22-1272 | 20 MFD. 350WV |
| 19 |  | 20 MFD. 400WV |
| 20 | 22-1247 | .008 MFD. +20% -10% 1600V |
| 21 | 22-908 | .5 MFD. +50% -10% 120V |
| 22 | 22-908 | .5 MFD. +50% -10% 120V |
| 23 | 22-250 | .05 MFD. +50% -10% 200V |
| 24 | 22-906 | .005 MFD. +20% -10% 200V |
| 25 | 22-1270 | .02 MFD. +20% -10% 200V |
| 26 | 22-914 | .05 MFD. +100% -10% 600V |

| DIAG. NO. | PART NO. | RESISTORS |
|---|---|---|
| R1 | 63-596 | 330,000 OHMS 1/4W ±20% |
| 2 | 63-1131 | SENSITIVITY CONTROL |
| 3 | 63-645 | 27,000 OHMS 1/4W ±10% |
| 4 | 63-646 | 33,000 OHMS 1/4W ±10% |
| 5 | 63-594 | 68,000 OHMS 1/4W ±20% |
| 6 | 63-1180 | 15,000 OHMS 1/2W ±20% |
| 7 | 63-957 | 33,000 OHMS 1W ±10% |
| 8 | 63-238 | 1000 OHMS 1/4W ±10% |
| 9 | 63-271 | 1 MEG. 1/4W ±20% |
| 10 | 63-1262 | 250,000 V.C. TAP AT 75000 Ω |
| 11 | 63-765 | 33,000 OHMS 1/4W ±10% |
| 12 | 63-976 | 15 MEG. 1/4W ±20% |
| 13 | 63-657 | 330,000 OHMS 1/4W ±20% |
| 14 | 63-657 | 330,000 OHMS 1/4W ±10% |
| 15 | 63-1202 | 330 OHMS 2W ±10% |
| 16 | 63-1201 | 1800 OHMS 3W ±10% |
| 17 | 63-1197 | 82 OHMS 1/2W ±20% |
| 18 | 63-1197 | 82 OHMS 1/2W ±20% |
| 19 | 63-765 | 33,000 OHMS 1/4W ±10% |
| 20 | 63-1261 | 1 MEG. TONE CONTROL |
| 21 | 63-648 | 47,000 OHMS 1/4W ±10% |
| 22 | 63-598 | 330,000 OHMS 1/4W ±10% |
| 23 | 63-647 | 39,000 OHMS 1/4W ±10% |
| 24 | 63-282 | 2200 OHMS 1/4W ±10% |
| 25 | 63-271 | 1 MEG. 1/4W ±20% |

| DIAG. NO. | PART NO. | MISCELLANEOUS |
|---|---|---|
| 1 | S-10064 | ANTENNA COIL |
| 2 | S-10064 | R.F. GRID COIL |
| 3 | S-9763 | UNTUNED R.F. TRANSFORMER |
| 4 | S-10095 | OSC. SHUNT COIL |
| 5 | 20-242 | OSC. SERIES COIL |
| 6 | S-10063 | OSC. TUNING COIL |
| 7 | 95-871 | 1st I.F. TRANSFORMER |
| 8 | 95-872 | DIODE TRANSFORMER |
| 9 | 95-874 | OUTPUT TRANSFORMER |
| 10 | 52-244 | SPEAKER CABLE & SOCKET |
| 11 | 49-493 | SPEAKER & PLUG |
| 12 | 95-873 | VIBRATOR POWER TRANSFORMER |
| 13 | 190-15 | VIBRATOR |
| 14 | 20-213 | HASH CHOKE |
| 15 | S-5844 | MOTOR NOISE CHOKE |
| 16 |  | DELAYED MUTING SWITCH |
| 17 | 100-32 | DIAL LIGHT #51 |
| 18 | 78-406 | FOOT SWITCH SOCKET |
| 19 | S-10411 | SILENCING & SELECTOR SWITCH |
| 20 | S-10411 | SAFETY SWITCH-AUTOM. SET UP |
| 21 | S-10127 | SOLENOID |
| 22 | 136-12 | FUSE - 20 AMPS. |
| 23 | 63-1262 | ON-OFF SWITCH ON VOL. CONTROL |
| 24 | S-10508 | HEATER LINE CHOKE |
| 25 | 100-32 | MANUAL DIAL INDICATOR |
| 26 | 78-209 | CONVERTER PLUG |
| 27 | S-8819 | ANTENNA MOTOR NOISE CHOKE |
| 28 | 100-31 | PILOT LIGHT #51 |

SCHEMATIC DIAGRAM AND PARTS
LIST FOR 1942 LINCOLN-ZEPHYR
RECEIVER

**SENSITIVITY:** .........5 microvolts at one watt output.

**POWER OUTPUT:** ......7 watts measured at the voice coil.

**SPEAKER:** ........6" x 9" oval, instrument panel mounting.

**CURRENT CONSUMPTION:** ..9.2 amperes

**INSTANTANEOUS CURRENT CONSUMPTION DURING AUTOMATIC CHANGE CYCLE:** .........18.2 amperes

**TUBE COMPLEMENT:** ...........7A7 R.F., 7B8 converter, 7A7 I.F., 7B6 Detector and 1st Audio, 7A4 Phase Inverter, 2-7C5 Push pull power output. 7Y4 Rectifier.

## RECEIVER INSTALLATIONS:

**Figures 1-1A-2 and 2A, illustrating the escutcheon plate, control knobs and the installed receivers, are given here to facilitate removal and reinstallation of the receivers when service or repairs are necessary.**

**Remove the tuning and volume control knobs to expose the 8/32 flat head screws that support the receiver at the top. Remove the lower support brackets "D" next and finally loosen the hook bolts "A" to remove the receiver from the car.**

**NOTE: To set up a station on any automatic position pull the tuning knob out and tune the receiver as in manual tuning. Press the tuning knob in to its original position after the station has been accurately tuned in.**

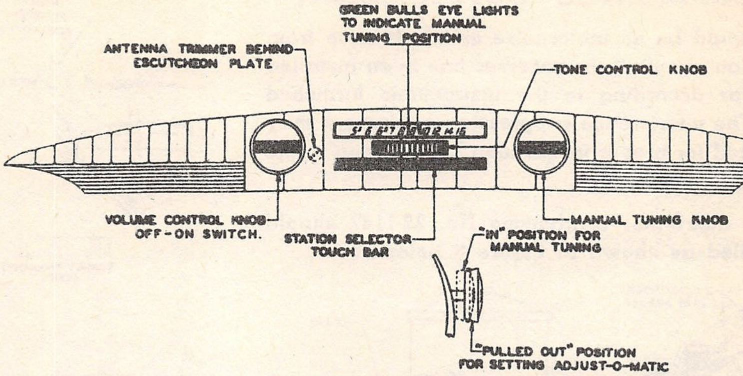

GREEN BULLS EYE LIGHTS TO INDICATE MANUAL TUNING POSITION
ANTENNA TRIMMER BEHIND ESCUTCHEON PLATE
TONE CONTROL KNOB
5' 6 6'7 8 9 10 12 14 16
VOLUME CONTROL KNOB OFF-ON SWITCH.
STATION SELECTOR TOUCH BAR
MANUAL TUNING KNOB
"IN" POSITION FOR MANUAL TUNING
"PULLED OUT" POSITION FOR SETTING ADJUST-O-MATIC

FIG. 1—Zephyr

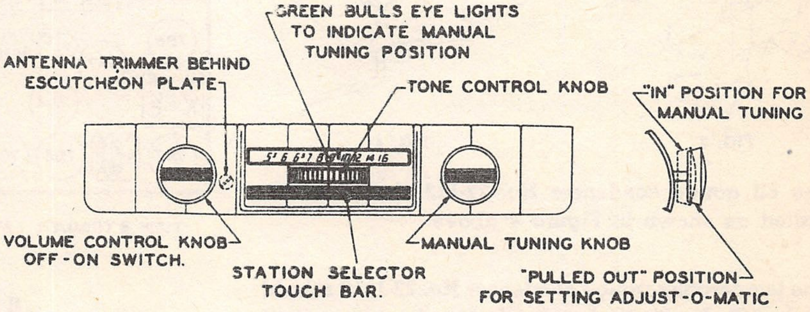

GREEN BULLS EYE LIGHTS TO INDICATE MANUAL TUNING POSITION
ANTENNA TRIMMER BEHIND ESCUTCHEON PLATE
TONE CONTROL KNOB
"IN" POSITION FOR MANUAL TUNING
5' 6 6'7 8 9 10 12 14 16
VOLUME CONTROL KNOB OFF-ON SWITCH.
STATION SELECTOR TOUCH BAR.
MANUAL TUNING KNOB
"PULLED OUT" POSITION FOR SETTING ADJUST-O-MATIC

FIG. 1A—Continental

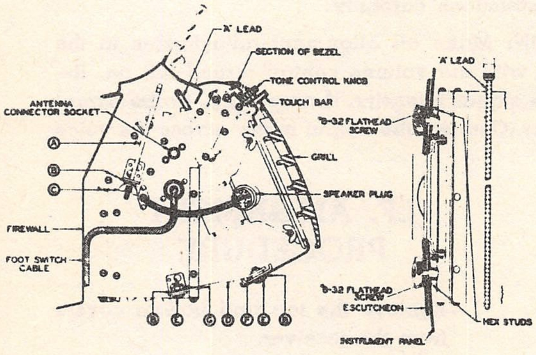

"A" LEAD
SECTION OF BEZEL
TONE CONTROL KNOB
TOUCH BAR
ANTENNA CONNECTOR SOCKET
A
B
C
GRILL
SPEAKER PLUG
FIREWALL
FOOT SWITCH CABLE
B
E
G
D
F
E
A
"A" LEAD
8-32 FLATHEAD SCREW
8-32 FLATHEAD SCREW
ESCUTCHEON
HEX STUDS
INSTRUMENT PANEL

FIG. 2—Zephyr

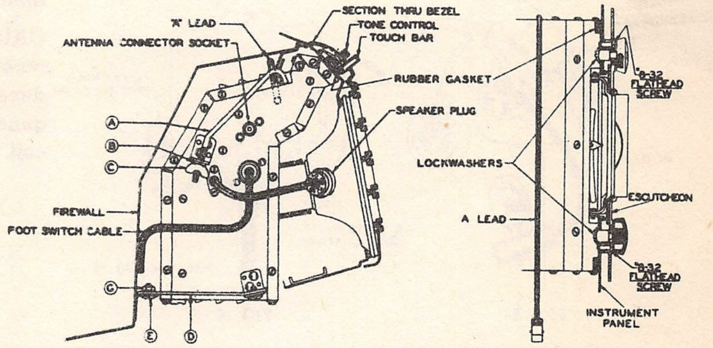

SECTION THRU BEZEL
"A" LEAD
TONE CONTROL
TOUCH BAR
ANTENNA CONNECTOR SOCKET
RUBBER GASKET
SPEAKER PLUG
A
B
C
FIREWALL
FOOT SWITCH CABLE
G
E
D
8-32 FLATHEAD SCREW
LOCKWASHERS
ESCUTCHEON
A LEAD
8-32 FLATHEAD SCREW
INSTRUMENT PANEL

FIG. 2A—Continental

## DELAYED AUTOMATIC MUTING CIRCUIT

**Pressing either the Touch-bar or the foot control switch automatically mutes the receiver for the duration of the change cycle. This action is accomplished by applying 6 volts negative to the 7B6 first audio grid through the 1 megohm resistor R-25. (See schematic diagram). This negative voltage blocks the grid of the 7B6 until the voltage bleeds off through the 15 megohm resistor R-12, when the receiver will again operate normally. NOTE: The storage battery in the car must be properly polarized to apply the negative muting voltage to the receiver. If the battery polarity is reversed the receiver will not mute and it may become distorted during the change cycle. Always connect the positive (+) terminal of the storage battery or power supply to the receiver case when checking the receiver.**

## INTERFERENCE SUPPRESSION

**There should be no motornoise or interference from the ignition circuit, if the receiver has been installed in the car according to the instructions furnished with it. The interference suppression equipment may be checked for proper installation by referring to the following illustrations:**

**The two distributor condensers No. 22-1147 should be installed as shown in Figure 3 below.**

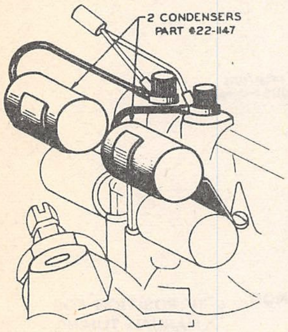

2 CONDENSERS
PART #22-1147

FIG. 3

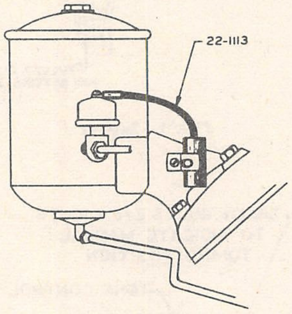


FIG. 4

**The oil gauge condenser No. 22-113 should be installed as shown in Figure 4 above.**

**The temperature gauge condenser No. 22-1113 should be installed with its bracket fastened under one of the cylinder head bolts as shown in Figure 5 below.**

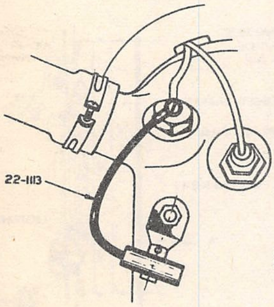


FIG. 5

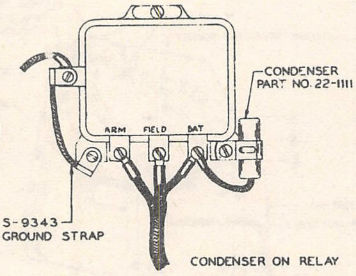

CONDENSER
PART NO. 22-1111
ARM
FIELD
BAT
S-9343
GROUND STRAP
CONDENSER ON RELAY

FIG. 6

**The No. S-9343 ground strap and the voltage regulator condenser No. 22-1111 should be installed as shown in Figure 6 above. The condenser lead should be connected to the "Batt" terminal.**

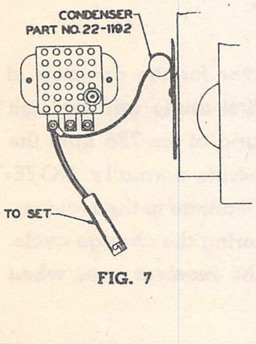

CONDENSER
PART NO. 22-1192
TO SET

FIG. 7

**The No. 22-1192 condenser and the "A" lead should be connected together at the terminal strip inside the car above the steering column as shown in Figure 7.**

**Check the antenna connector and the instrument panel bolts so they make a good ground contact with the car body.**

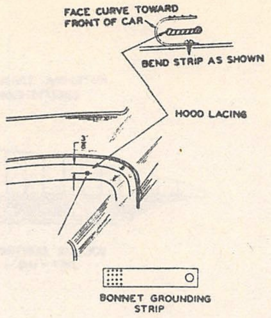
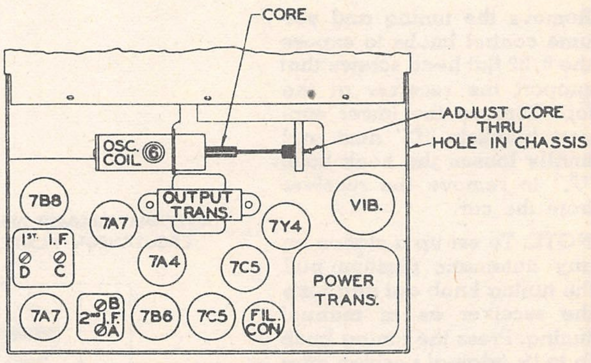

FACE CURVE TOWARD
FRONT OF CAR
BEND STRIP AS SHOWN
HOOD LACING
BONNET GROUNDING
STRIP

FIG. 8

**Install the No. 80-145 bonnet grounding strip as illustrated in figure 8.**


CORE
ADJUST CORE
THRU
HOLE IN CHASSIS
OSC. COIL
7B8
7A7
OUTPUT TRANS.
7Y4
VIB.
1st I.F.
D
C
7A4
7C5
POWER TRANS.
7A7
2nd I.F.
B
A
7B6
7C5
FIL. CON

TUBE & TRIMMER LAYOUT MOD. 8ML692 FIG. 9

## ALIGNMENT

**Maximum performance is dependent upon the accurate alignment of the receiver, so follow the alignment instructions carefully.**

**CAUTION: Make all alignment adjustments to the receiver with the volume control turned full on. Reduce the signal intensity, if necessary, at the signal generator. Connect the output meter across the voice coil.**

## I.F. ALIGNMENT PROCEDURE

**1—Remove the top and bottom covers from the receiver.**

**2—Place the receiver in the Manual tuning position and set the pointer at the low frequency end of the dial. (540 Kc.)**

**3—Set the signal generator at 265 Kc.**

**4—Apply the signal from the generator through a .1 mfd. dummy to the 7B8 converter grid.**

**5—Adjust trimmers A-B-C and D (Fig. 9) for maximum output. Repeat the operation to assure accurate alignment.**

# R. F. AND OSCILLATOR ALIGNMENT

1—Set the signal generator at 1640 Kc.

2—Connect the signal generator leads, through the dummy as illustrated in Figure 12, to the antenna receptacle on the receiver.

3—Set the receiver dial at 1640 Kc. (Maximum high frequency end of dial.)

4—Screw the cores completely out of the antenna, R.F. and oscillator coils.

5—Set the oscillator trimmer (F—Fig. 10) at 1640 Kc.

6—Peak R.F. and antenna trimmers (G—Fig. 10 and H—Fig. 11) for maximum output reading.

7—Replace the cores to their approximate original positions in the antenna, R.F. and oscillator coils.

8—Set the generator and the receiver dial at 1200 Kc.

9—Adjust the oscillator core (No. 6—Fig. 9) to scale at 1200 Kc.

10—Adjust the antenna and R.F. cores (No. 1 and No. 2—Fig. 10) for maximum output reading.

11—Set the signal generator at 600 Kc.

12—"Rock in" the Shunt oscillator core (No. 4—Fig. 10) for maximum output reading. (Same as rocking in the padder condenser on a ganged condenser receiver.)

13—Check receiver at 1200 Kc. for calibration and gain. If receiver is off scale or weak, repeat operation 9 and 10.

**IMPORTANT:** When reinstalling the receiver in the car, allow it to operate for approximately 15 minutes to reach normal operating temperature before checking the antenna trimmer alignment on a weak station at approximately 1200 Kc.

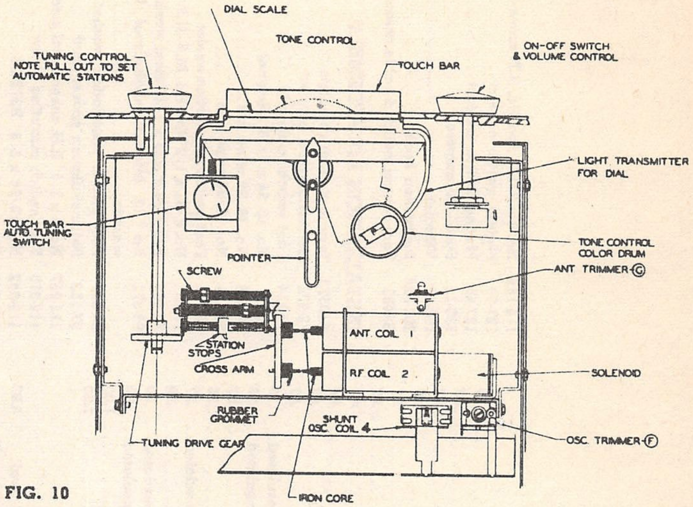
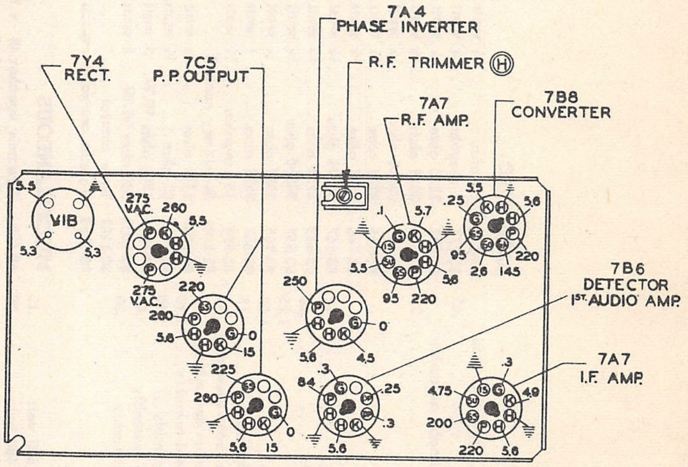

DIAL SCALE
TONE CONTROL
ON-OFF SWITCH & VOLUME CONTROL
TUNING CONTROL NOTE PULL OUT TO SET AUTOMATIC STATIONS
TOUCH BAR
LIGHT TRANSMITTER FOR DIAL
TOUCH BAR AUTO. TUNING SWITCH
TONE CONTROL COLOR DRUM
POINTER
ANT TRIMMER-Ⓖ
SCREW
ANT. COIL 1
STATION STOPS
CROSS ARM
RF COIL 2
SOLENOID
RUBBER GROMMET
SHUNT OSC. COIL 4
OSC. TRIMMER-Ⓕ
TUNING DRIVE GEAR
IRON CORE

FIG. 10


7A4 PHASE INVERTER
7Y4 RECT.
7C5 P.P. OUTPUT
R.F. TRIMMER Ⓗ
7A7 R.F. AMP.
7B8 CONVERTER
7B6 DETECTOR 1ST AUDIO AMP.
7A7 I.F. AMP.
VIB
5.5
5.3
5.3
275 V.A.C.
260
5.5
275 V.A.C.
220
260
5.8
0
15
225
260
5.6
15
0
250
0
5.8
4.5
.3
84
.25
.3
5.6
.1
5.7
5.5
95
220
5.8
.25
5.5
5.6
95
2.6
145
220
.3
4.75
4.9
200
220
5.6

BOTTOM VIEW OF CHASSIS

FIG. 11

Figure 11 shows the approximate voltages as measured with a 1000 ohm per volt meter measured between the socket terminals and the chassis. Volume control set at maximum with no signal. Battery Voltage—6.3.

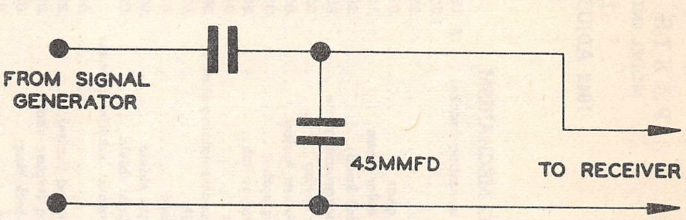

45MMFD
FROM SIGNAL GENERATOR
45MMFD
TO RECEIVER

FIG. 12

Schematic of a recommended dummy antenna, closely resembling actual antenna capacity, to be used in series with signal generator leads when aligning the R.F. section of the receiver Fig. 12.

# PARTS PRICE LIST

MODEL 8ML692 (CHASSIS 8B03)

LINCOLN

1942 ADJUST-O-MATIC RADIO

26H-18805

## DIAL AND TUNING MECHANISM

| | | |
|---|---|---|
| 12-894 | Rear magnet mounting bracket | $ .15 |
| 26-314 | Dial scale | 1.00 |
| 34-106 | Ratchet | .25 |
| 34-122 | Tone control gear | .03 |
| 35-6 | Tone control color drum | .15 |
| 46-478 | Volume control knob | .20 |
| 57-963 | Dial scale background plate | .60 |
| 80-272 | Ratchet lever spring | .02 |
| 80-274 | Tuning coil return spring | .05 |
| 80-300 | Gear indexing spring | .03 |
| 85-308 | Station selector switch | .60 |
| 93-558 | Brass washer | .01 |
| 97-156 | Tone control knob retaining stud | .30 |
| 100-32 | Dial light bulb | .07 |
| 126-437 | Dial light shield | .01 |
| 126-438 | Dial scale light shield | .005 |
| 126-439 | Color organ light shield | .02 |
| 147-118 | Manual automatic bakelite breaker collar | .04 |
| 187-5 | Indicator light rod (lucite) | .20 |
| 188-34 | Retaining ring (tuning shaft) | .01 |
| 188-39 | Turret screw lock ring | .02 |
| 188-43 | Retaining ring | .01 |
| S10109 | Ratchet drive lever & spring assembly | .35 |
| S10110 | Front magnet mounting bracket & detent lever spring assembly | .20 |
| S10117 | Bracket & index spring assembly | .20 |
| S10120 | Tuning adjustment screw & grommet assembly | .40 |
| S10127 | Magnet coil & terminal assembly | 1.00 |
| S10232 | Tuning shaft & gear assembly | .35 |
| S10411 | Manual automatic selector switch assembly | .25 |
| S10415 | Turret shaft, screw & stop assembly | 2.00 |
| S10514 | Magnet core, cross arm, pointer drive bracket & stud assembly | .90 |
| S10517 | Tone control knob assembly (46-476) | .45 |
| S10518 | Dial pointer, stud & bushing assy. (59-138) | .30 |
| S10521 | Manual dial light socket, switch, bracket and stud assembly | .75 |
| S10522 | Color organ light socket & wire assembly | .40 |
| S10523 | Dial light socket & wire assembly | .40 |
| S10524 | Station selector bar, bracket & stud assembly | .45 |
| S10568 | Tuning control knob assembly (46-477) | .35 |

## COILS AND CHOKES

| | | |
|---|---|---|
| 20-213 | Main hash choke | .25 |
| 20-242 | Oscillator series coil | .20 |
| 95-871 | 1st I. F. transformer | 1.25 |
| 95-872 | 2nd I. F. transformer | 1.50 |
| S5844 | Motor noise choke assembly | .15 |
| S8819 | Antenna motor noise choke assembly | .20 |
| S9762 | Untuned R. F. coil & core assembly | .50 |
| S10063 | Oscillator coil & shield asembly | 1.10 |
| S10064 | R. F. coil & shield assembly | 1.40 |
| S10095 | Oscillator shunt coil assembly | .60 |
| S10506 | Heater line choke assembly | .30 |

## CONDENSERS

| | | |
|---|---|---|
| 22-162 | .0001 mfd. 600 volt | .15 |
| 22-170 | .1 mfd. 400 volt | .20 |
| 22-182 | .00025 mfd. 600 volt | .20 |
| 22-185 | .01 mfd. 200 volt | .15 |
| 22-190 | 1 mfd. 200 volt | .18 |
| 22-250 | .05 mfd. 200 volt | .15 |
| 22-435 | .02 mfd. 600 volt | .15 |
| 22-906 | .005 mfd. 200 volt | .15 |
| 22-908 | .5 mfd. 120 volt | .25 |
| 22-912 | .002 mfd. 600 volt | .15 |
| 22-914 | .05 mfd. 600 volt | .20 |
| 22-1076 | Dual spark plate condenser | .20 |
| 22-1111 | Generator condenser | .45 |
| 22-1113 | Oil & water gauge condenser | .35 |
| 11-1147 | Distributor condenser | .35 |
| 22-1192 | "A" lead condenser | .50 |
| 22-1235 | Single section ceramic trimmer | .15 |
| 22-1244 | .004 mfd. 600 volt | .20 |
| 22-1247 | .008 mfd. 1600 volt | .20 |
| 22-1248 | 350 mmfd. compensator | .40 |
| 22-1270 | .02 mfd. 200 volt | .15 |
| 22-1272 | 20 mfd. 25 volt x 20 mfd. 400 volt x 20 mfd. 350 volt dry electrolytic | 1.25 |
| 22-1275 | Single section ceramic trimmer | .25 |
| 22-1276 | Antenna trimmer | .35 |

## RESISTORS

| | | |
|---|---|---|
| 63-238 | 1M ohm ¼ watt | .07 |
| 63-271 | 1 megohm ¼ watt | .07 |
| 63-282 | 2200 ohm ¼ watt | .07 |
| 63-594 | 68M ohm ¼ watt | .07 |
| 63-596 | 330M ohm ¼ watt | .07 |
| 63-645 | 27M ohm ¼ watt | .07 |
| 63-646 | 33M ohm ¼ watt | .07 |
| 63-647 | 39 M ohm ¼ watt | .07 |
| 63-648 | 47M ohm ¼ watt | .07 |
| 63-657 | 330M ohm ¼ watt | .07 |
| 63-765 | 33M ohm ¼ watt insulated | .15 |
| 63-957 | 33M ohm 1 watt insulated | .20 |
| 63-976 | 15 megohm ¼ watt | .07 |
| 63-1131 | Sensitivity control | .50 |
| 63-1180 | 15M ohm ½ watt insulated | .17 |
| 63-1197 | 82 ohm ½ watt | .08 |
| 63-1201 | 1800 ohm W.W. 3 watt insulated | .30 |
| 63-1202 | 330 ohm W.W. 2 watt insulated | .30 |
| 63-1261 | Tone control | 1.00 |
| 63-1262 | Volume control & switch | 1.50 |

## MISCELLANEOUS

| | | |
|---|---|---|
| 49-493 | Dynamic speaker (6" x 9" oval) | 5.00 |
| | 207-493 Field coil (not replaceable) | |
| | 208-493 Cone & voice coil assembly | 2.00 |
| 52-200 | Battery cable—fuse to ammeter | .20 |
| 52-244 | Speaker cable and plug | .45 |
| 52-253 | Battery cable—set to fuse | .20 |
| 52-266 | Antenna cable | 1.70 |
| 78-209 | Socket—short wave adaptor | .10 |
| 78-251 | Socket—antenna connector | .10 |
| 78-406 | Socket—foot switch | .10 |
| 78-454 | Socket—loktal tube (8 contact) | .15 |
| 78-455 | Socket—loktal tube (6 contact) | .15 |
| 78-467 | Socket—loktal tube (5 contact) | .15 |
| 78-477 | Socket—vibrator | .10 |
| 80-246 | Power transformer ground spring | .07 |
| 80-291 | Muting switch spring | .03 |
| 83-961 | Muting switch insulating strip | .35C |
| 83-962 | Muting switch insulating strip | .30C |
| 93-125 | No. 6 Internal shakeproof lockwasher | .25C |
| 93-573 | Muting switch fibre washer | .03 |
| 95-873 | Power transformer | 3.00 |
| 95-874 | Output transformer | 1.50 |
| 114-63 | No. 6/32 x 3/16" Hex acorn Hd. M.S.-N.P. | .25C |
| 114-149 | No. 6 x 3/16" Hex Hd. S.T. screw-N.P. | .45C |
| 127-39 | Muting switch contact | .03 |
| 127-40 | Muting switch contact | .03 |
| 136-12 | Fuse—20 ampere | .10 |
| 190-15 | Vibrator | 2.95 |
| 202-324 | Instruction book | .15 |
| S9462 | Foot control switch & cable assembly | 2.00 |

## INSTALLATION KIT ASSEMBLY

| | | |
|---|---|---|
| S10573 | Installation kit complete | 1.00 |
| 12-972 | Set installation bracket | .07 |
| 19-114 | Foot switch cable clip | .02 |
| 54-99 | No. 12/24 x 7/16" Hex nut | .35C |
| 54-146 | No. 10/32 wing nut | 1.50C |
| 54-151 | No. 12/24 wing nut | 1.50C |
| 64-141 | Foot switch installation eyelet | .04 |
| 71-59 | No. 8/32 x 1/2" flat Hd. M.S.-N.P. | .60C |
| 93-340 | No. 3/32 x .255 x 1/2" steel washer | .75C |
| 93-372 | No. 12 Internal shakeproof lockwasher | .40C |
| 93-524 | Foot switch installation washer | .04 |
| 97-153 | Set installation spacer stud | .15 |
| 112-257 | No. 4 x 1/4" R.H. sheet metal screw | .50C |
| 112-310 | Foot switch mounting screw | .85C |
| 112-342 | No. 12/24 x 5/8" B.H.M.S. | .01 |
| 112-348 | Set installation screw | .09 |

## MOTOR NOISE SUPPRESSION KIT ASSEMBLY

| | | |
|---|---|---|
| S10574 | Motor noise suppression kit complete | 2.60 |
| S9343 | Regulator ground lead assembly | .05 |
| 12-831 | Suppressor condenser bracket | 1.50C |
| 22-1111 | Generator condenser | .45 |
| 22-1113 | Water & oil gauge condenser | .35 |
| 22-1147 | Distributor condenser | .35 |
| 22-1192 | "A" lead condenser | .50 |
| 83-916 | Bonding strip | .04 |
| 114-39 | No. 8 x 1/4" Hex Hd. slotted S.T. screw | .50C |

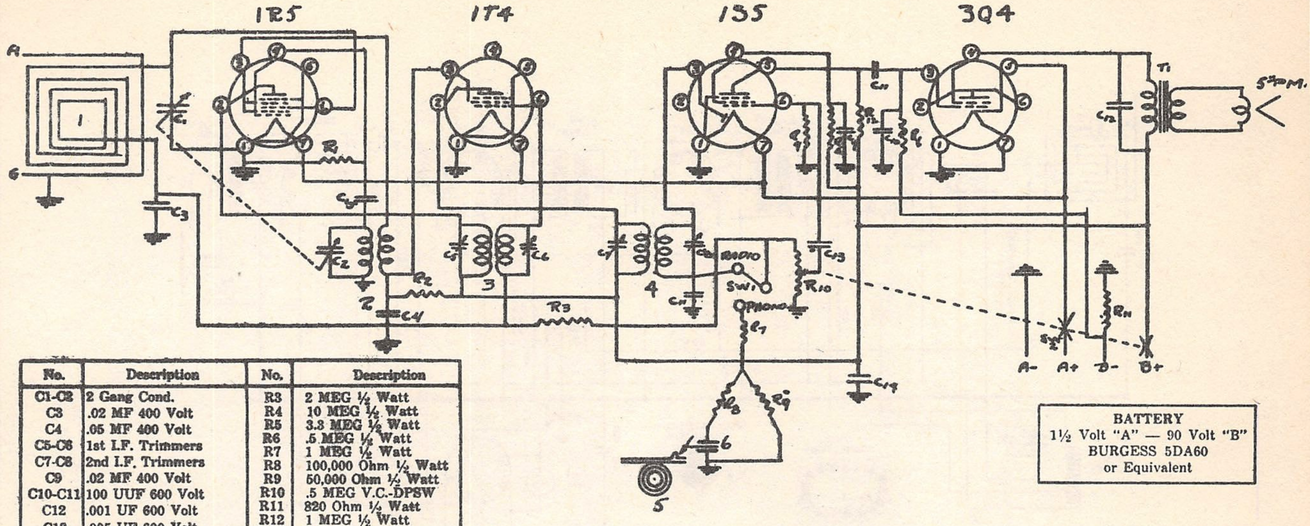
## TUNING KNOB KIT ASSEMBLY

| | | |
|---|---|---|
| S10577 | Tuning knob kit complete | .55 |
| S10568 | Tuning control knob assembly (46-477) | .35 |
| 46-478 | Volume control knob | .20 |

All Prices List—Subject to Regular Discount and Change Without Notice—9/15/41.

## AL AMO ELECTRONICS CORP.

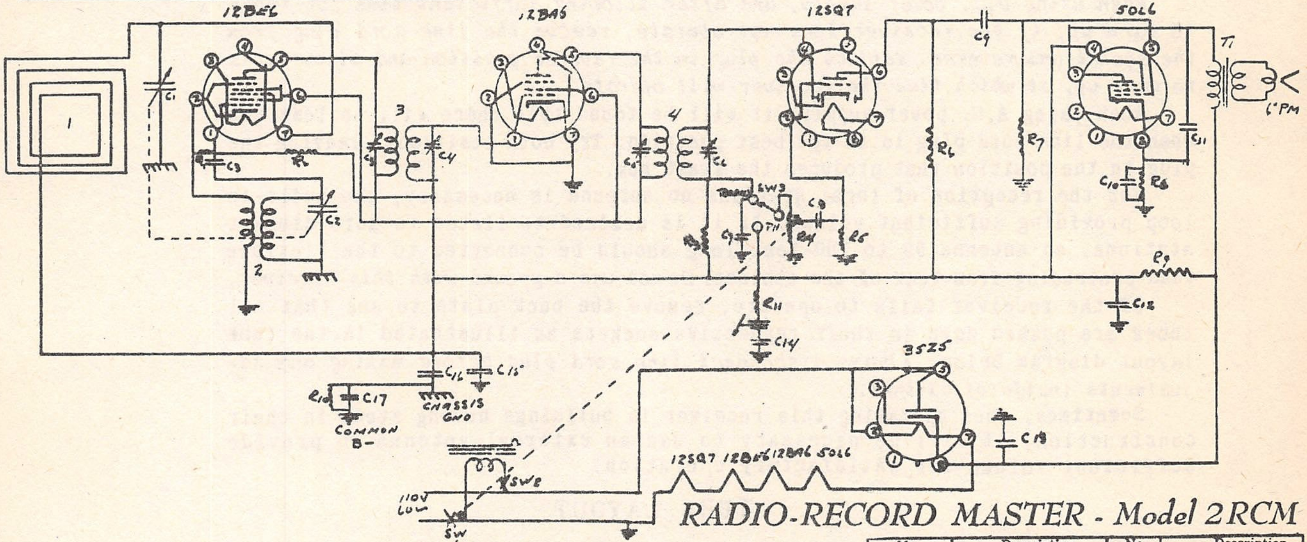
**MODEL AEC-3RCMB**
**MODEL 2RCM**



| No. | Description | No. | Description |
|---|---|---|---|
| C1-C2 | 2 Gang Cond. | R3 | 2 MEG ½ Watt |
| C3 | .02 MF 400 Volt | R4 | 10 MEG ½ Watt |
| C4 | .05 MF 400 Volt | R5 | 3.3 MEG ½ Watt |
| C5-C6 | 1st I.F. Trimmers | R6 | .5 MEG ½ Watt |
| C7-C8 | 2nd I.F. Trimmers | R7 | 1 MEG ½ Watt |
| C9 | .02 MF 400 Volt | R8 | 100,000 Ohm ½ Watt |
| C10-C11 | 100 UUF 600 Volt | R9 | 50,000 Ohm ½ Watt |
| C12 | .001 UF 600 Volt | R10 | .5 MEG V.C.-DPSW |
| C13 | .005 UF 600 Volt | R11 | 820 Ohm ½ Watt |
| C14 | 10 MFD 90 Volt | R12 | 1 MEG ½ Watt |
| C15 | 50 UUF 600 Volt | 1 | Loop |
| R1 | 100,000 Ohm ½ Watt | 2 | Osc. Coil |
| R2 | 18,000 Ohm ½ Watt | 3 | 1st I.F. |
| | | 4 | 2nd I.F. |
| | | 5 | Spring Motor |
| | | 6 | Crystal Pickup |
| 5-16-47 | A.E.C. | | App. C.E. |

BATTERY
1½ Volt "A" — 90 Volt "B"
BURGESS 5DA60
or Equivalent

MODEL AEC-3RCMB



RADIO-RECORD MASTER - Model 2RCM

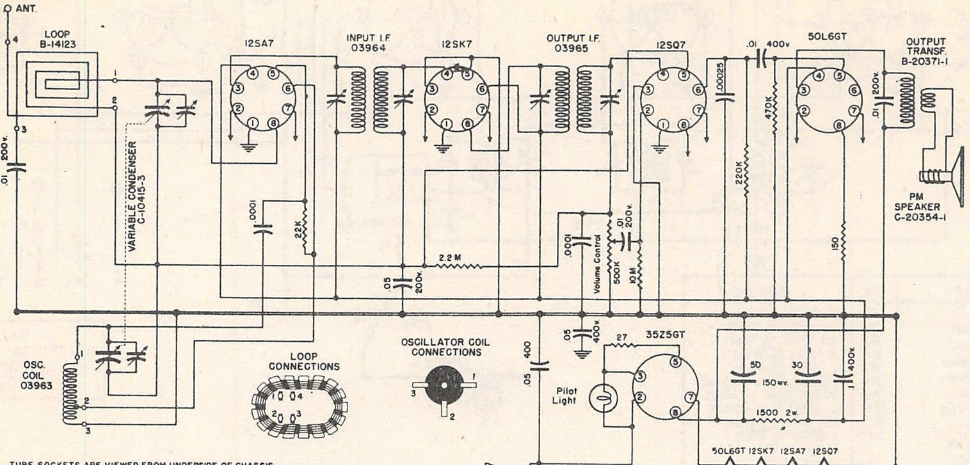
| No. | Description | No. | Description |
|---|---|---|---|
| C1 & C2 | 2 Gang Cond. | 1 | Loop |
| C3 | 50 UUF 600V | 2 | Osc. Coil |
| C3 & C4 | 1st I.F. | 4 | 1st I.F. 456 Kc |
| C5 & C6 | 2nd I.F. | 3 | 2nd I.F. 456 Kc |
| C7 | 100 UUF 600V | T1 | Output Trans. |
| C8 & C9 | .005 MF 600V | SW2 | T .T. Power |
| C10 | 10 MFD 25V | SW3 | Radio-Phono. |
| C11 | .03 MF 400V | | |
| C12 & C13 | 40 MFD 150V | | |
| C14 & C15<br>C16 & C17 | .05 MFD 400V | | |
| R1 | 20,000 ½ Watt | | |
| R2 | 10 MEG ½ Watt | | |
| R3 | 2 MEG ½ Watt | | |
| R4 | .5 MEG V.C. & SW1 | | |
| R5 | 4.7 MEG ½ Watt | | |
| R6 & R7<br>R10 | 470,000 ½ Watt | | |
| R8 | 15052 ½ Watt | | |
| R9 | 150052 ½ Watt | | |
| R11 | 1 MEG ½ Watt | | |
| 5-12-47 | AEC | | App. C. E. |

**GENERAL DATA.** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F., transformers have been properly adjusted and peaked, the oscillator and loop should be adjusted.

**I.F. ALIGNMENT.** Remove the chassis and loop antenna from the cabinet and set them up on the bench. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12BE6) through a .05 to .1 mfd condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter. Each I.F. has two adjustments at the top of the can.

**LOOP ALIGNMENT.** Connect the test oscillator to a dummy loop which can be made by coiling 2 turns of hookup wire about 6" in diameter. Place this dummy loop about a foot from the loop on the receiver and in the same plane as the receiver loop. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.


ANT.
LOOP B-14123
4
1
2
3
.01 200v.
VARIABLE CONDENSER C-10415-3
12SA7
INPUT I.F. 03964
12SK7
OUTPUT I.F. 03965
12SQ7
.01 400v
50L6GT
OUTPUT TRANSF. B-20371-1
.0001
22K
2.2 M
.05 200v.
.0001
Volume Control
500K
.01 200v.
10M
.00025
220K
470K
.01 200v.
150
PM SPEAKER C-20354-1
OSC. COIL 03963
LOOP CONNECTIONS
OSCILLATOR COIL CONNECTIONS
.05 400
.05 400v.
27
35Z5GT
Pilot Light
50
30
150wv.
400v.
1500 2w.
50L6GT 12SK7 12SA7 12SQ7
On-Off Switch On Volume Control

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
DOUBLE LINE SIGNIFIES QUASI GROUND
ALL RESISTOR ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED

*When using D.C. power supply, and after allowing sufficient time for tubes to warm up, if the receiver does not operate, remove the line cord plug from the socket and reverse. Replace the plug in the reverse position and allow tubes to warm up, at which time the receiver will operate*

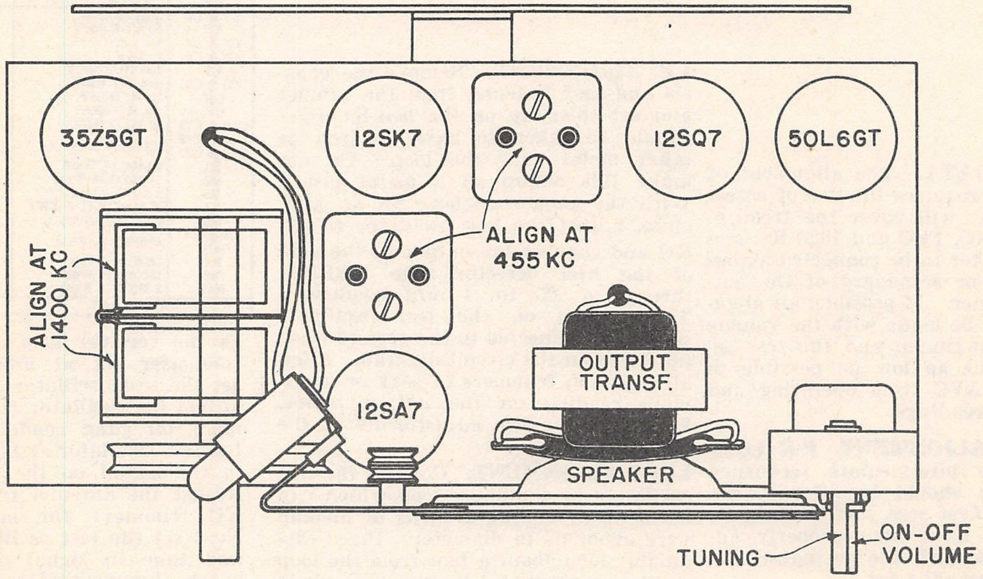
When using A.C. power supply, it will be found that there will be less hum when the line cord plug is in the best position. Try both positions, leaving the plug in the position that produces the least hum.

For the reception of local stations no antenna is necessary, the built-in loop providing sufficient volume. If it is desired to listen to more distant stations, an antenna 50 to 100 feet long should be connected to the flexible lead protruding from rear of the cabinet. *Donot use a ground with this receiver.*

If the receiver fails to operate, remove the back plate to see that all tubes are pushed down in their respective sockets as illustrated in the tube layout diagram below. *Always disconnect line cord plug before making any adjustments inside of cabinet.*

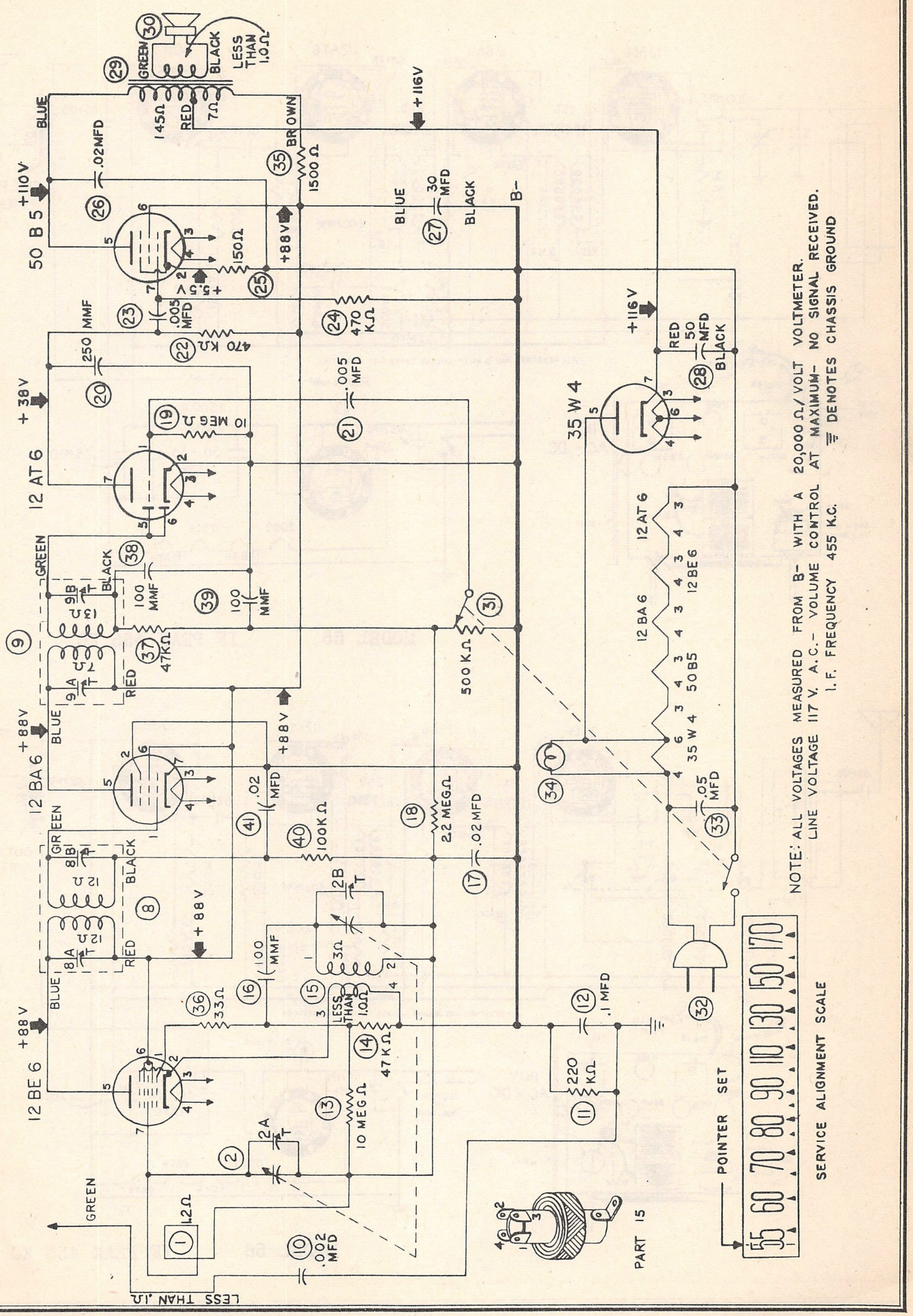
Sometimes, when operating this receiver in buildings having steel in their construction, it will be necessary to use an external antenna to provide sufficient volume for satisfactory operation.

## TUBE LAYOUT


35Z5GT
12SK7
12SQ7
50L6GT
ALIGN AT 1400 KC
ALIGN AT 455 KC
12SA7
OUTPUT TRANSF.
SPEAKER
TUNING
ON-OFF VOLUME

# ELECTRONIC CORP. OF AMERICA

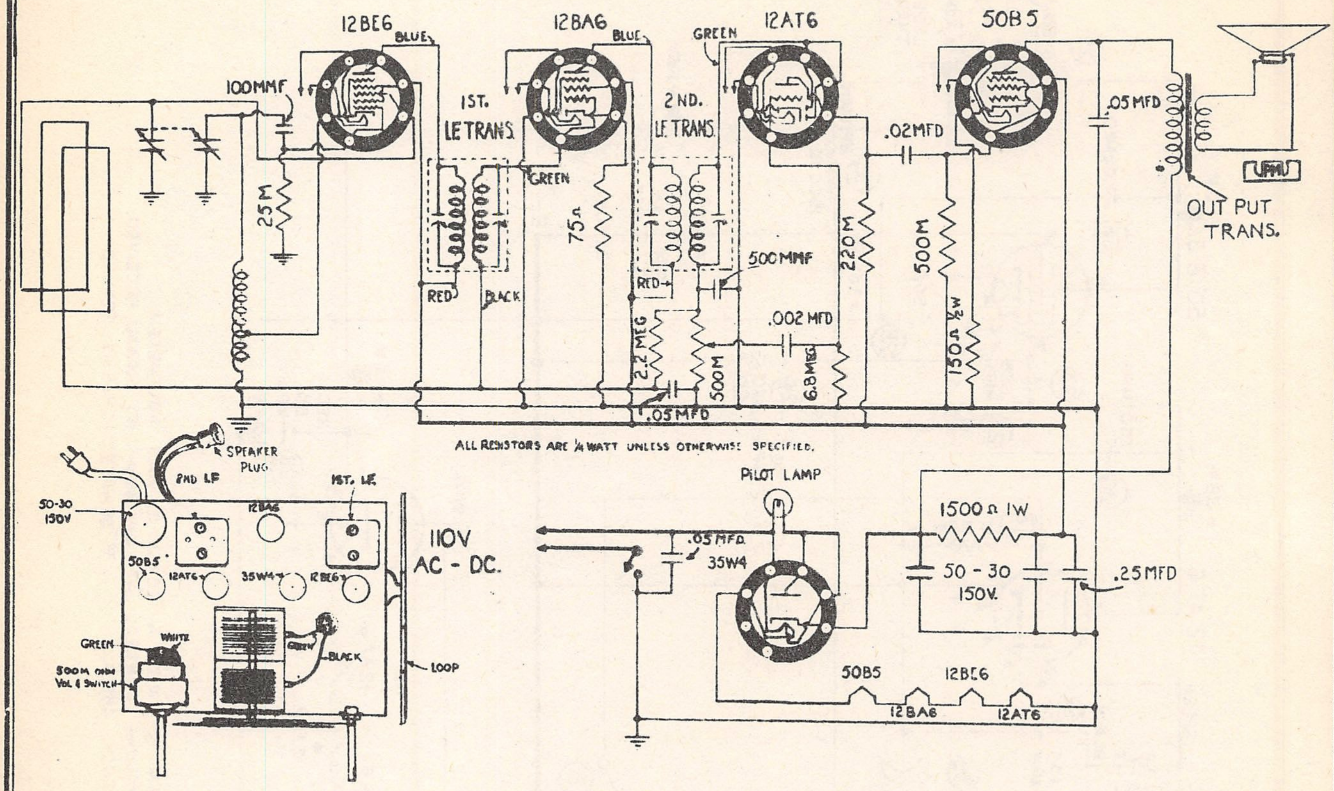
**MODEL 201**


12 BE 6
12 BA 6
12 AT 6
50 B 5
35 W 4
+88V
+38V
+110V
+5.5V
+116V
B-
BLUE
RED
GREEN
BLACK
BROWN
LESS THAN .1Ω
LESS THAN 1.0Ω
1.2Ω
.002 MFD
10 MEG Ω
33Ω
47 KΩ
100 MMF
3Ω
2A
2B
8A
8B
9A
9B
12Ω
13Ω
220 KΩ
.1 MFD
100 KΩ
.02 MFD
2.2 MEG Ω
500 KΩ
47KΩ
100 MMF
.005 MFD
250 MMF
470 KΩ
150Ω
1500Ω
30 MFD
.02MFD
145Ω
7Ω
50 MFD
.05 MFD
12 AT 6
12 BE 6
12 BA 6
50 B5
35 W 4
PART 15
POINTER SET
55 60 70 80 90 110 130 150 170
SERVICE ALIGNMENT SCALE

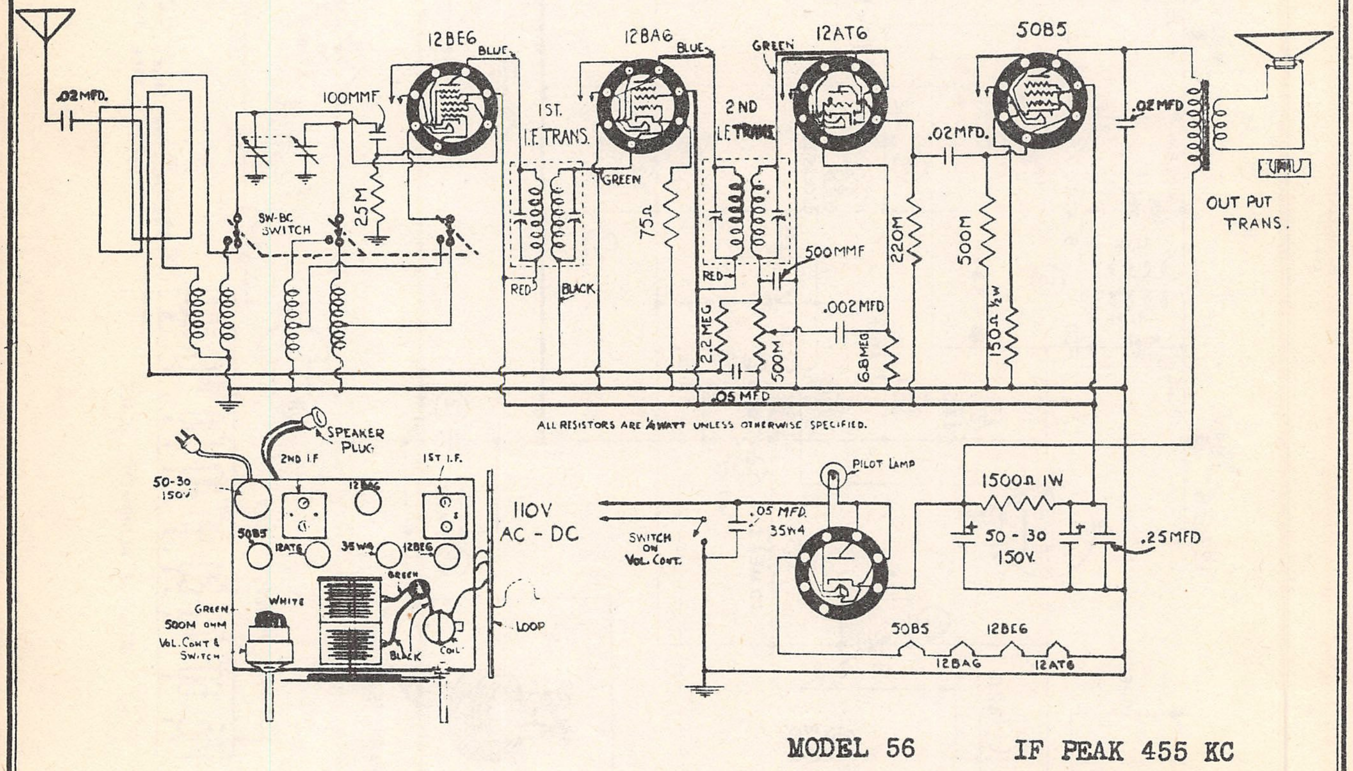
NOTE: ALL VOLTAGES MEASURED FROM B- WITH A 20,000 Ω/VOLT VOLTMETER.
LINE VOLTAGE 117 V. A.C.- VOLUME CONTROL AT MAXIMUM- NO SIGNAL RECEIVED.
I.F. FREQUENCY 455 K.C. ⏚ DENOTES CHASSIS GROUND

# EMPIRE DESIGNING CORP.

**MODEL 55**
**MODEL 56**


12BE6
BLUE
12BA6
BLUE
GREEN
12AT6
50B5
100MMF
1ST. I.F. TRANS.
2ND. I.F. TRANS.
GREEN
.05 MFD
.02 MFD
OUT PUT TRANS.
PM
25M
75Ω
500MMF
220M
500M
RED
BLACK
2.2 MEG
500M
.002 MFD
6.8 MEG
150Ω ½W
.05 MFD
ALL RESISTORS ARE ¼ WATT UNLESS OTHERWISE SPECIFIED.
SPEAKER PLUG
2ND I.F
1ST. I.F.
12BA6
50-30 150V
50B5
12AT6
35W4
12BE6
110V AC - DC.
GREEN
WHITE
500M OHM VOL & SWITCH
GREEN
BLACK
LOOP
PILOT LAMP
.05 MFD.
35W4
1500Ω 1W
50 - 30 150V.
.25 MFD
50B5
12BE6
12BA6
12AT6

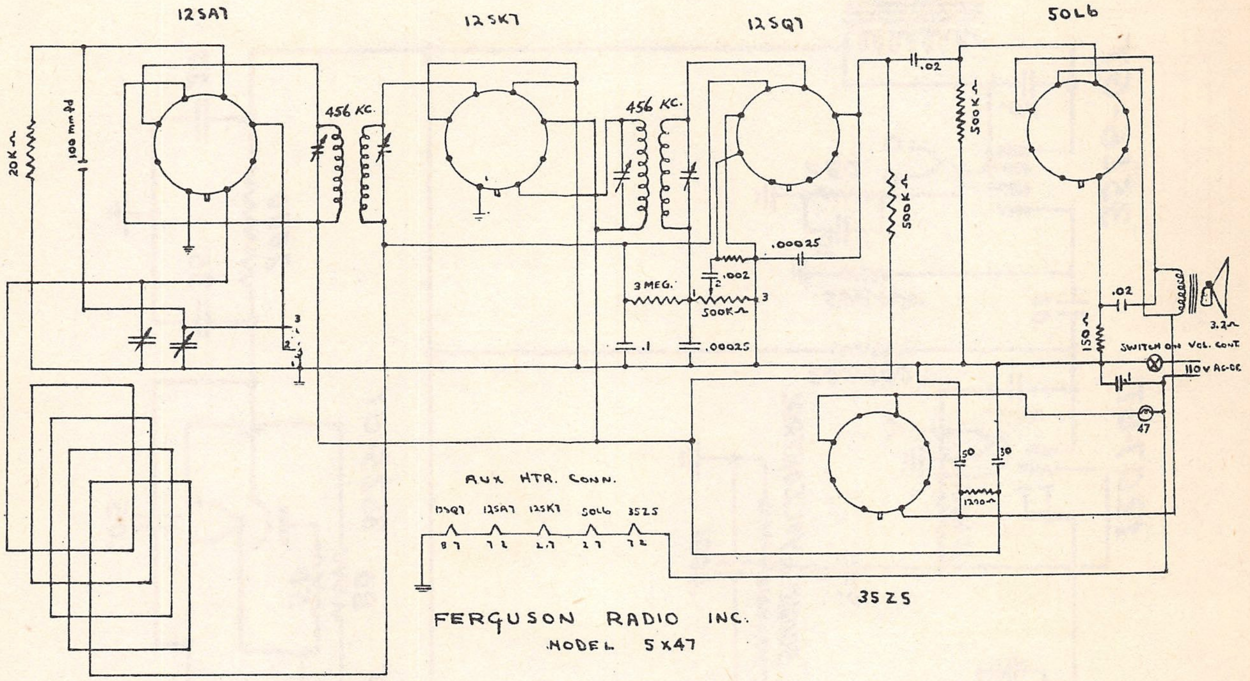
**MODEL 55** **IF PEAK 455 KC**


.02 MFD.
12BE6
BLUE
12BA6
BLUE
GREEN
12AT6
50B5
100MMF
1ST. I.F. TRANS.
2ND I.F. TRANS.
GREEN
SW-BC SWITCH
25M
75Ω
.02 MFD.
.02 MFD
OUT PUT TRANS.
PM
500MMF
220M
500M
RED
BLACK
2.2 MEG
500M
.002 MFD
6.8 MEG
150Ω ½W
.05 MFD
ALL RESISTORS ARE ¼ WATT UNLESS OTHERWISE SPECIFIED.
SPEAKER PLUG
2ND I.F
1ST I.F.
12BA6
50-30 150V
50B5
12AT6
35W4
12BE6
110V AC - DC
GREEN
WHITE
500M OHM VOL. CONT & SWITCH
GREEN
BLACK
COIL
LOOP
SWITCH ON VOL. CONT.
.05 MFD.
35W4
PILOT LAMP
1500Ω 1W
50 - 30 150V.
.25 MFD
50B5
12BE6
12BA6
12AT6

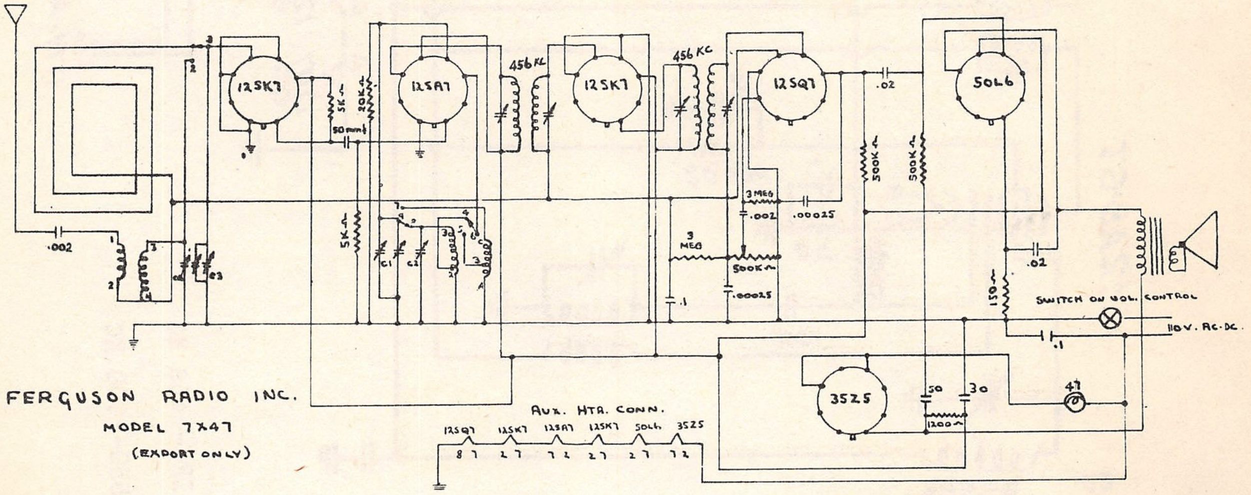
**MODEL 56** **IF PEAK 455 KC**

# FERGUSON RADIO CORP.

**MODEL 5X47**
**MODEL 7X47**


12SA7
12SK7
12SQ7
50L6
35Z5
456 KC.
456 KC.
20K
100 mmfd
.02
500K
500K
.00025
.002
3 MEG.
500K
.1
.00025
.02
150
3.2
SWITCH ON VOL. CONT.
110 V AC-DC
47
50
30
1200
AUX HTR. CONN.
12SQ7
12SA7
12SK7
50L6
35Z5
8 7
7 2
2 7
2 7
7 2

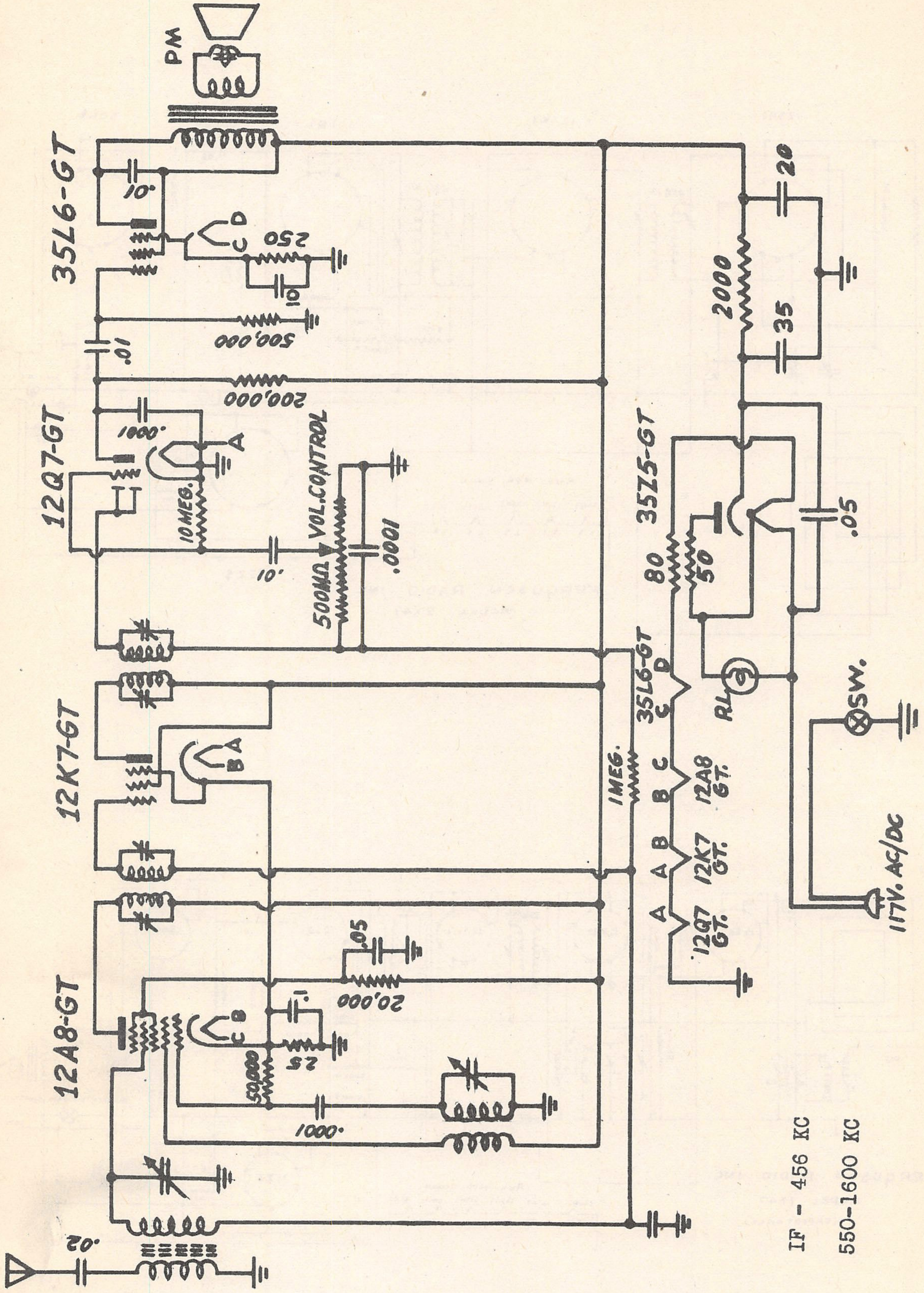
FERGUSON RADIO INC.
MODEL 5X47


12SK7
12SA7
12SK7
12SQ7
50L6
35Z5
456 KC
456 KC
5K
20K
50 mmf
.02
500K
500K
3 MEG
.002
.00025
3 MEG
500K
.1
.00025
.002
5K
C1
C2
C3
.02
150
SWITCH ON VOL. CONTROL
110 V. AC-DC
.1
47
50
30
1200
AUX. HTR. CONN.
12SQ7
12SK7
12SA7
12SK7
50L6
35Z5
8 7
2 7
7 2
2 7
2 7
7 2

FERGUSON RADIO INC.
MODEL 7X47
(EXPORT ONLY)

MODEL L-52

## LAUREHK RADIO MFG. CO.


PM
35L6-GT
10
C D
250
10
500,000
.01
200,000
12Q7-GT
1000
A
10 MEG.
VOL. CONTROL
500MΩ
.0001
10
20
2000
35
35Z5-GT
.05
80
50
RL
SW.
12K7-GT
B A
1 MEG.
35L6-GT C D
12A8 GT. B C
12K7 GT. A B
12Q7 GT. A
117V. AC/DC
12A8-GT
C B
.05
20,000
.1
25
50,000
1000
.02

IF - 456 KC

550-1600 KC

# NATIONAL ACOUSTIC PRODUCTS

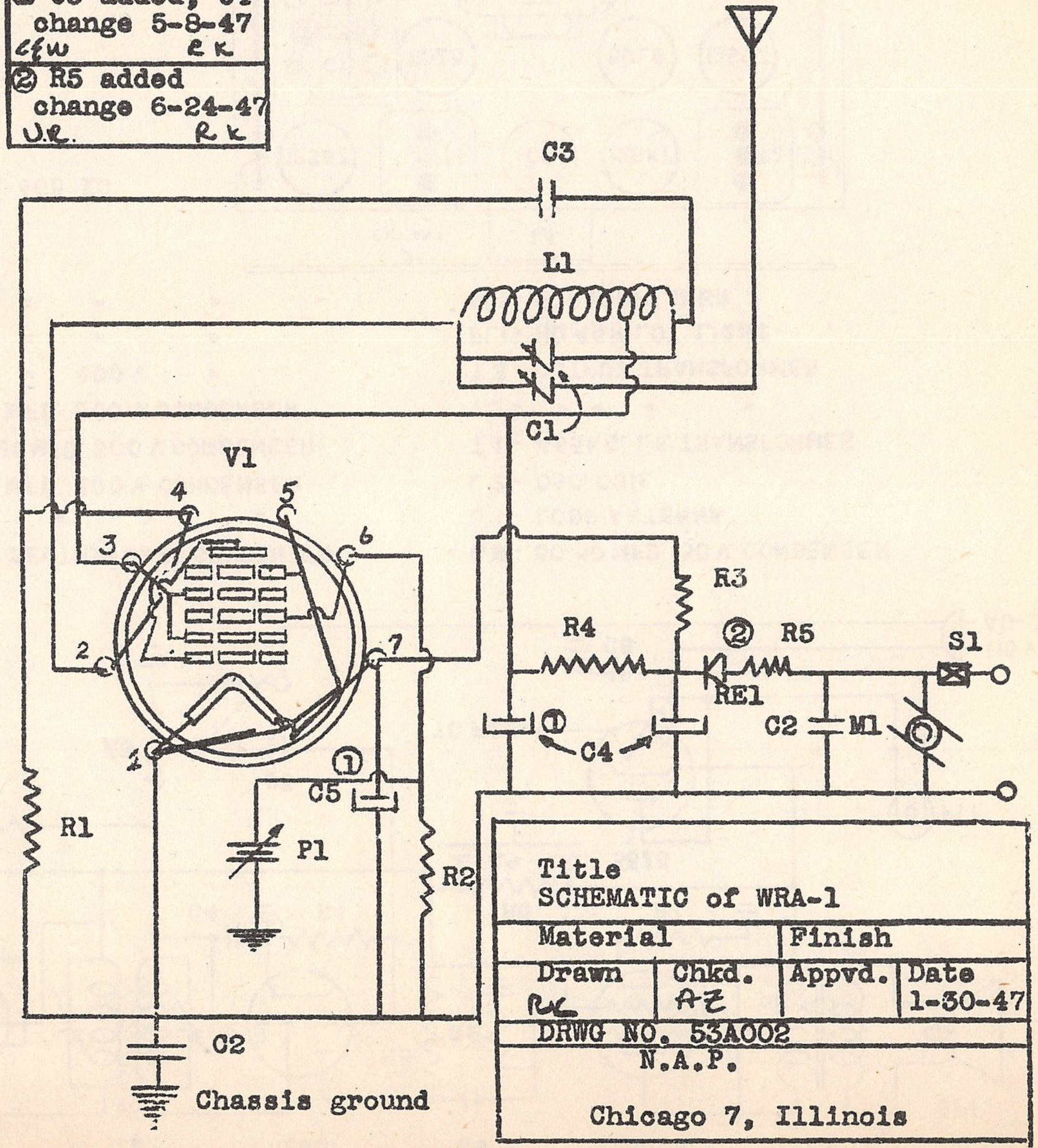
## MODEL WRA-1

| Sym.No. | Part No. | Part Value |
|---|---|---|
| C 1 | 44S001 | Trimmer Cond. |
| C 2 | 19S007 | .05 MFD 400 W.V. (2) |
| C 3 | 19S015 | 100 MMFD Mica |
| C 4 | 18S020 | 20-20 MFD 150 W.V. |
| C 5 | 19S011 | 100 MFD 10 W.V. |
| L 1 | 49S001 | Osc. Coil |
| M 1 | 24S042 | Changer Motor |
| P 1 | 24S042 | Crystal Pickup |
| R 1 | 16S011 | 27000 ohm $\frac{1}{2}$ W. |
| R 2 | 16S020 | 500000 ohm $\frac{1}{2}$ W. |
| R 3 | 16S028 | 2500 ohm 10 W. |
| R 4 | 16S029 | 5000 ohm $\frac{1}{2}$ W. |
| R 5 | | 110 ohm 2 W ± 10% |
| RE 1 | 48S001 | Selenium Rect. |
| S 1 | 24S042 | SPST Switch |
| V 1 | 24S025 | 1R5 Tube |

CAUTION: Remove AC plug before removing or installing V1

NOTE: C4 must be two separate 20 MFD. capacitors

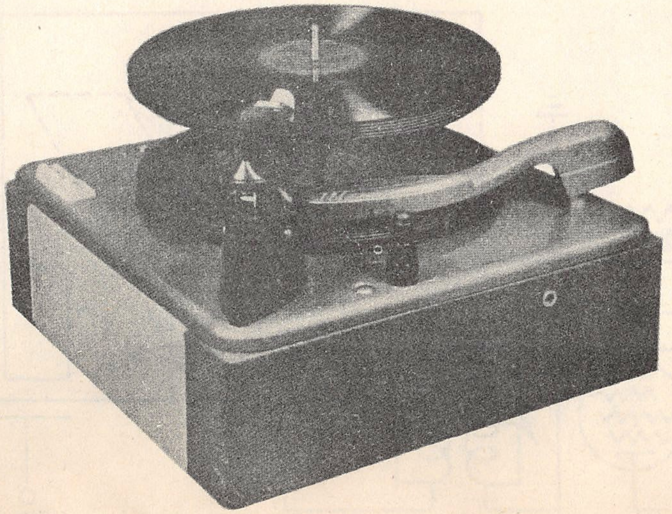
| CHANGE |
|---|
| Issue No. 1 |
| ① C5 added, C4 change 5-8-47<br>cfw RK |
| ② R5 added change 6-24-47<br>UR RK |



Title
SCHEMATIC of WRA-1

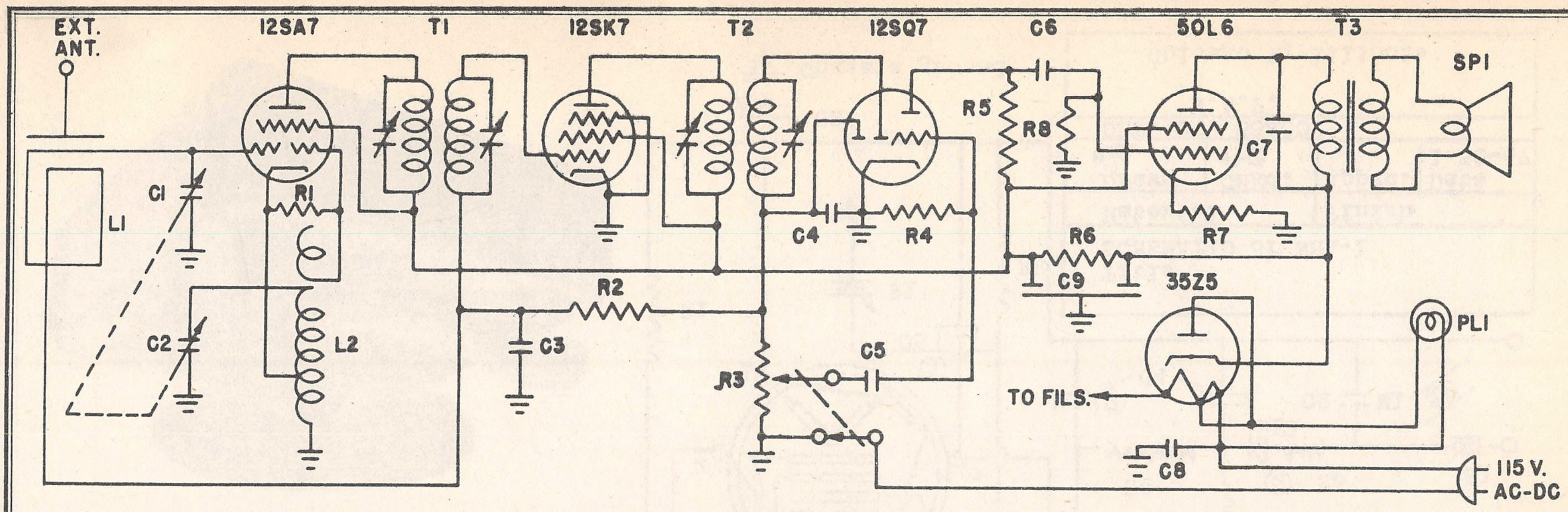
| Material | | Finish | |
|---|---|---|---|
| Drawn<br>RK | Chkd.<br>AZ | Appvd. | Date<br>1-30-47 |

DRWG NO. 53A002
N.A.P.
Chicago 7, Illinois



MODEL R-546

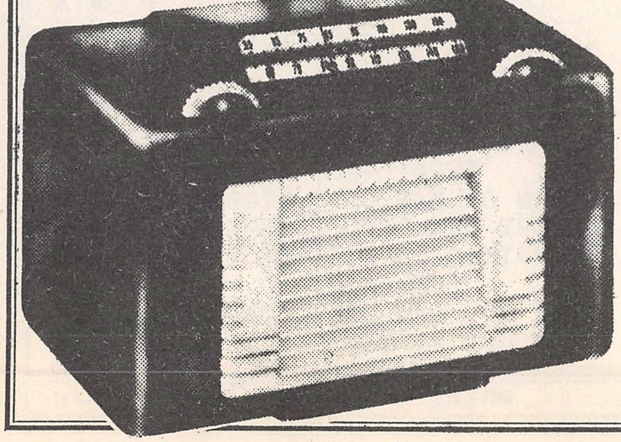
# NATIONAL CO-OPERATIVES INC.


EXT. ANT.
12SA7
T1
12SK7
T2
12SQ7
C6
50L6
T3
SP1
L1
C1
R1
C2
L2
C3
R2
R3
C4
R4
C5
R5
R8
C7
R6
C9
R7
35Z5
PL1
TO FILS.
C8
115 V. AC-DC

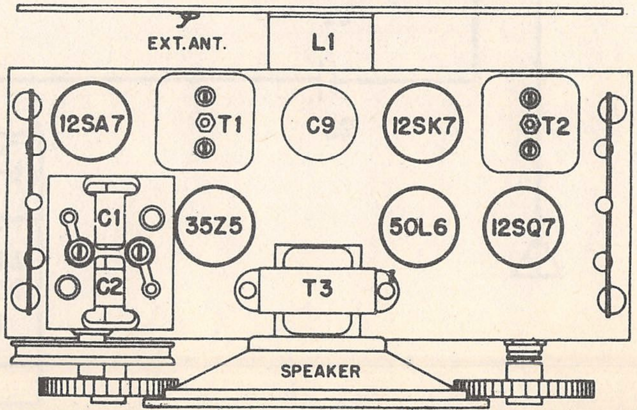
R 1 - 25M OHMS 1/3 WATT RESISTOR
R 2 - 5MEG " " " "
R 3 - 500M " POT. WITH SWITCH
R 4 - 5MEG " 1/3 WATT RESISTOR
R 5 - 200M " " " "
R 6 - 1200 " 1/2 " "
R 7 - 150 " " " "
R 8 - 500M " 1/3 " "

C 1 - ANT. SECTION GANG CONDENSER
C 2 - OSC. " " "
C 3 - .05 MFD. 200 V. CONDENSER
C 4 - .00025 MFD. 500 V. CONDENSER
C 5 - .006 MFD. 500 V. CONDENSER
C 6 - .01 " 400 V. "
C 7 - .02 " " "
C 8 - .05 " " "

C 9 - 50-50 MFD. 150 V. CONDENSER
L 1 - LOOP ANTENNA
L 2 - OSC. COIL
T 1 - 465 KC. I.F. TRANSFORMER
T 2 - " " " "
T 3 - OUTPUT TRANSFORMER
PL1 - NO. 44 PILOT LIGHT
SP1 - 5" P.M. SPEAKER

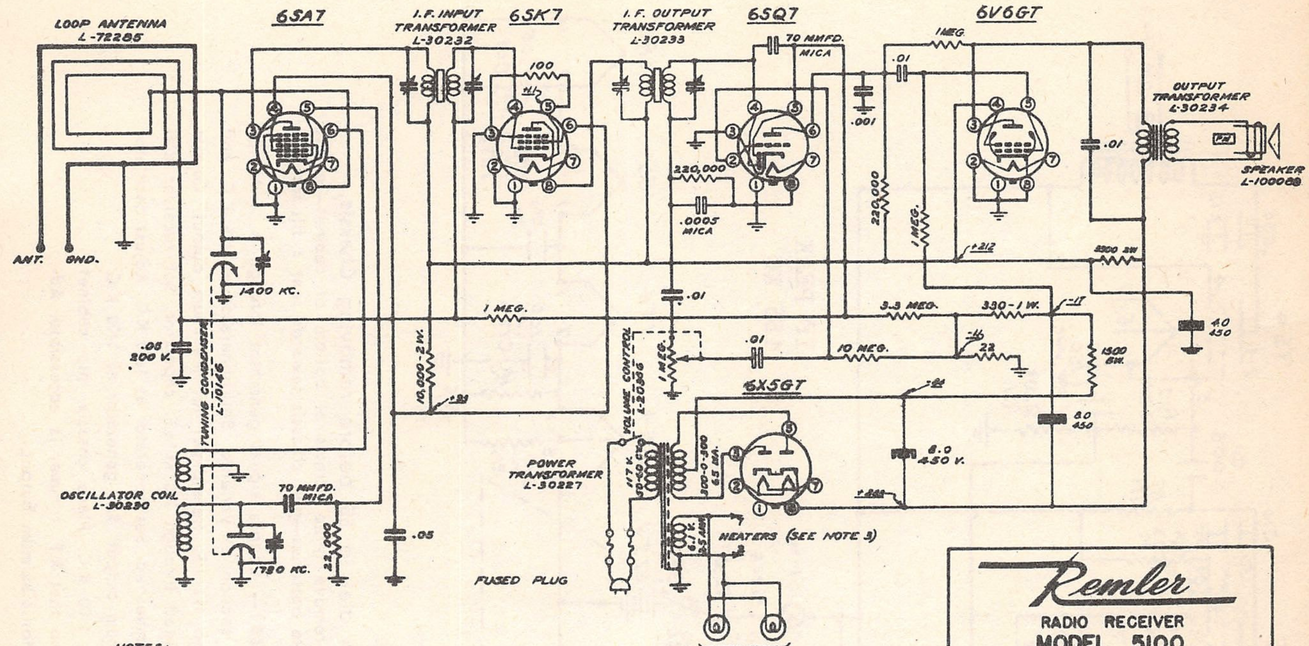


IF PEAK 465 KC


EXT. ANT.
L1
12SA7
T1
C9
12SK7
T2
C1
C2
35Z5
50L6
12SQ7
T3
SPEAKER

# REMLER CO. LTD.

**MODEL 5100**



*Remler*

RADIO RECEIVER
**MODEL 5100**
110-120 VOLTS 50-60 CYCLES
50 WATTS

NOTES:
1. RESISTORS ¼ WATT UNLESS OTHERWISE NOTED.
2. CONDENSERS 600 VOLT UNLESS OTHERWISE NOTED.
3. HEATER CONNECTIONS OF TUBE 6SQ7 ARE 8 AND 7.

INSTALLATION

RECEPTION OF LOCAL STATIONS IN THE MAJORITY OF LOCATIONS WILL BE ENTIRELY SATISFACTORY WITH THE BUILT-IN ANTENNA. WHERE GREATER DISTANCE IS REQUIRED OR WHERE RECEIVING CONDITIONS ARE NOT SATISFACTORY WITH THE BUILT-IN ANTENNA, AN OUTSIDE ANTENNA MAY BE USED. THIS OUTSIDE ANTENNA SHOULD BE FROM 50 TO 100 FEET IN LENGTH AND SHOULD BE CONNECTED TO THE TERMINAL MARKED "A", WHICH IS INSIDE OF THE BACK COVER. THIS ANTENNA SHOULD BE RUN IN AS STRAIGHT A LINE AS POSSIBLE AND BE KEPT CLEAR OF WIRE AND OTHER METAL OBJECTS. A GOOD GROUND CONNECTION TO A WATER PIPE IS ESSENTIAL FOR THE CLEAREST RECEPTION. THE GROUND WIRE SHOULD BE CONNECTED TO THE TERMINAL MARKED "G", WHICH IS ALSO INSIDE OF THE BACK COVER. THE BACK COVER MAY BE TAKEN OFF AFTER THE FOUR SCREWS IN THE CORNERS HAVE BEEN REMOVED.

CONTROLS

THE CONTROL ON THE LEFT SIDE OF THE CABINET IS THE VOLUME CONTROL AND ON-OFF SWITCH WHEN IN THE EXTREME LEFT POSITION. THE RIGHT HAND CONTROL IS THE STATION SELECTOR.

OPERATION

WITH THE LINE CORD CONNECTED, TURN THE VOLUME CONTROL ABOUT ONE-QUARTER TURN TO THE RIGHT AND ALLOW ONE-HALF MINUTE FOR THE TUBES TO PROPERLY HEAT. SELECT THE DESIRED STATION WITH THE TUNING CONTROL. FOR THE BEST REPRODUCTION, THE STATION SELECTOR MUST BE ADJUSTED TO THE CENTER OF THE RANGE ON THE DIAL WITHIN WHICH THE STATION IS HEARD AND THE VOLUME ADJUSTED WITH THE VOLUME CONTROL ONLY.

SERVICE DATA

UNDERSCORED FIGURES ON THE DIAGRAM ARE AVERAGE VOLTAGES FROM THAT PARTICULAR POINT OF THE CIRCUIT TO THE CHASSIS. THESE VOLTAGES ARE FOR A 117 VOLT LINE, AND WITH THE SET TUNED TO NO STATION.

THE INTERMEDIATE FREQUENCY IS 450 K.C. OTHER ALIGNMENT FREQUENCIES ARE INDICATED ON THE DIAGRAM. THE FREQUENCY RANGE OF THE RADIO IS 540-1730 KILOCYCLES.

A FUSED PLUG IS ATTACHED TO THE POWER CORD.

FUSES MAY BE REMOVED BY INSERTING A SMALL DIAMETER INSTRUMENT (PENCIL, STIFF WIRE, ETC.) IN THE PRONG END OF THE PLUG. IN NO CASE SHOULD A FUSE OF GREATER CAPACITY THAN 3 AMPERE BE USED. LOWER CAPACITY FUSES SUCH AS 1 AMPERE MAY BE USED, BUT LOWER CAPACITY TYPES MAY BURN OUT MORE FREQUENTLY ON CURRENT SURGES NORMALLY ENCOUNTERED WHEN THE SET IS TURNED ON.

THE CHASSIS IS SECURED BY THE FOUR SCREWS WHICH ARE A PART OF THE FELT FEET. THE CHASSIS MAY BE REMOVED AFTER FIRST TAKING OFF THE BACK AND KNOBS. THE CARRYING HANDLE MUST BE RAISED AS FAR AS POSSIBLE IN ORDER THAT IT WILL CLEAR THE CHASSIS WHILE THE LATTER IS BEING REMOVED.

1. If a hum becomes evident after the radio has been operating about 30 minutes, and is more noticeable at low set volumes, it is probably due to loose laminations in the transformer.

To correct, allow the set to warm up for at least one hour, and then tighten the two screws which hold the laminations between the power transformer end-caps.

2. The 4.0 mfd 450 v electrolytic condenser shown in the circuit diagram has been omitted in some sets. It should be added in all cases.

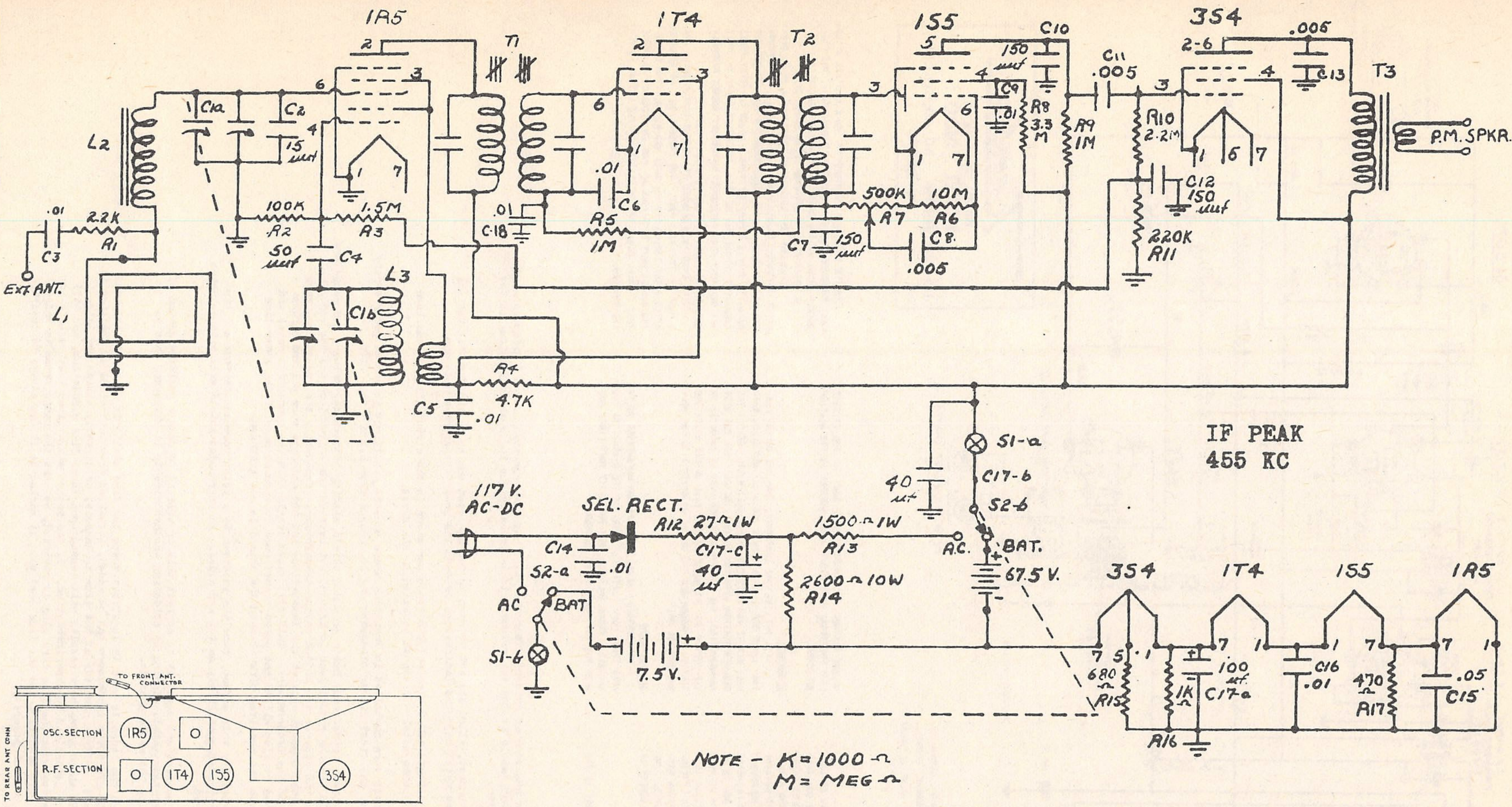
3. In receivers installed in locations where unusual conditions in the ac power supply cause hum, the first filter condenser can be changed from 8.0 mfd to 16 mfd.

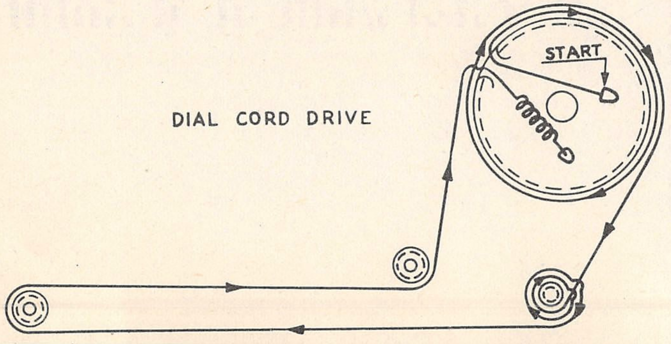
4. The power transformer has a grounded shield winding between the primary and secondary. The shield winding ground lead is brought out between the laminations and the end-cap, either at the side or the bottom of the transformer. Frequently the ground lead does not make good contact because the laminations and the end-caps were painted before assembly of the transformers. This will cause static when the connection makes and breaks, and it also allows the power transformer to conduct more of the power-line static into the receiver circuit when the shield is not grounded.

To identify this defect, tune the receiver to a point between stations and tap the power transformer firmly on top and sides. An ungrounded shield will produce noise when jarred.

The easiest and best way to correct this trouble is to make a positive ground of the transformer shield winding by soldering another wire to it which may then be soldered to the radio chassis.

5. Where the radio is used in locations where the line static is unusually bad, one or two .05 mfd 600 v condensers can be added, installed from both sides of the line to the chassis, or from one side of the line to chassis, or directly across the line. The method which gives best results will depend upon local line conditions, and will have to be determined by experimentation. If the method which gives best results is not effective when the line cord plug is reversed, be sure the radio owner is made aware of this condition and the line cord plug is marked so it can always be inserted with the correct polarity.


1R5
1T4
1S5
3S4
T1
T2
T3
P.M. SPKR.
L1
L2
L3
EXT. ANT.
C3 .01
2.2K R1
C1a
C1b
C2 15 μμf
100K R2
1.5M R3
50 μμf C4
R4 4.7K
C5 .01
.01 C18
.01 C6
R5 1M
C7 150 μμf
500K R7
10M R6
C8 .005
C10 150 μμf
C9 .01
R8 3.3 M
R9 1M
C11 .005
R10 2.2M
C12 150 μμf
220K R11
.005 C13
IF PEAK
455 KC
S1-a
C17-b
40 μf
S2-b
BAT.
A.C.
67.5 V.
117 V. AC-DC
SEL. RECT.
C14 .01
S2-a
AC
BAT
S1-b
R12 27Ω 1W
C17-c 40 μf
1500Ω 1W R13
2600Ω 10W R14
7.5 V.
680Ω R15
1K Ω R16
100 μf C17-a
C16 .01
470 Ω R17
.05 C15
NOTE - K=1000Ω
M=MEGΩ
TO FRONT ANT. CONNECTOR
TO REAR ANT CONN
OSC. SECTION
R.F. SECTION
1R5
1T4
1S5
3S4



DIAL CORD DRIVE

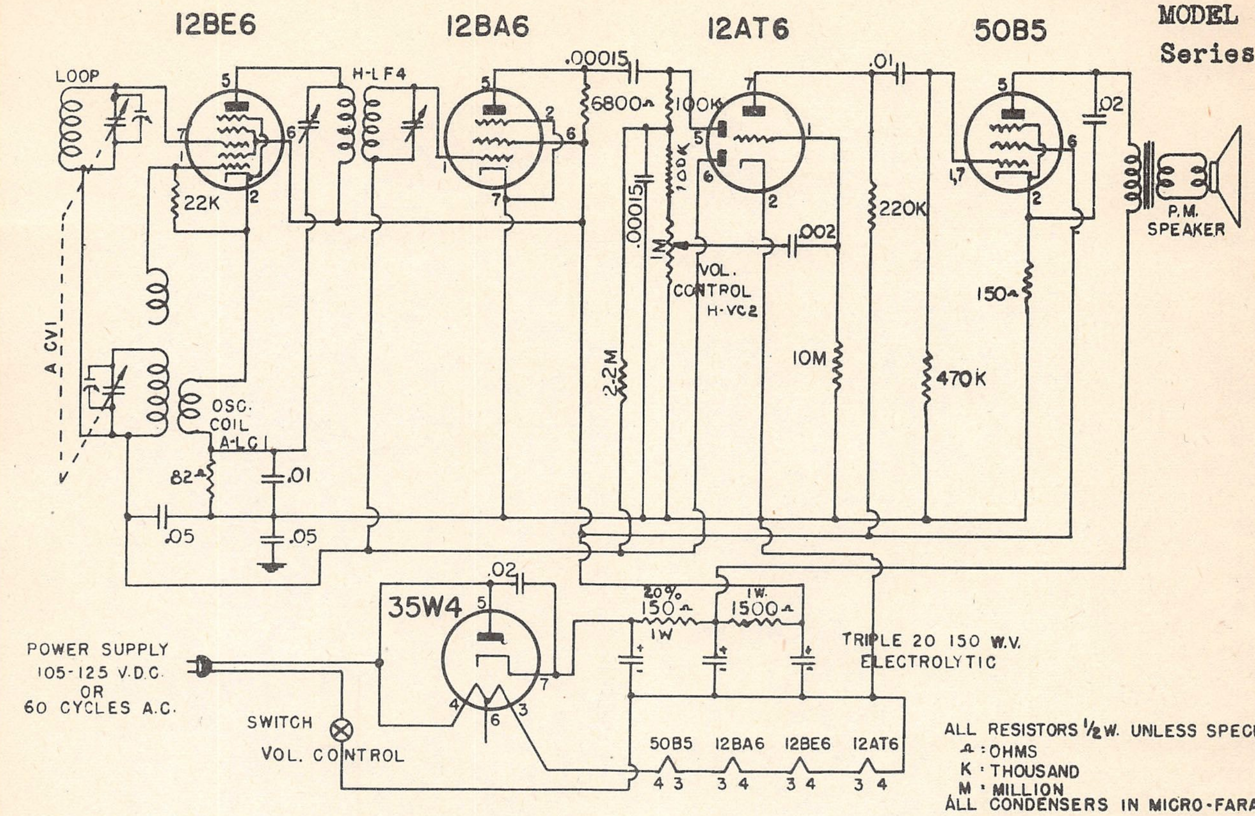
**WARNING:**— Turn dial to 55 before removing Chassis.

**NOTE:**— To remove chassis—remove three screws at bottom of cabinet—remove battery & antenna plugs—remove batteries—pull chassis towards rear & tilt forward.

**ALIGNMENT INSTRUCTIONS:**— Couple signal generator through a .1 M.F.D. capacitor to high side of R.F. section of variable Set generator at 455 K.C. and adjust 2nd I.F. transformer, then 1st I.F. transformer for maximum output. Couple generator to external antenna lead through 200 M.M.F. capacitor. Set receiver dial so that variable is completely unmeshed. Set generator at 1620 K.C. Adjust oscillator trimmer for maximum output. Set generator at 1400 K.C. Tune Receiver to 1400 K.C. Place chassis into cabinet and tip forward so that R.F. trimmer is accessible. Adjust R.F. trimmer for maximum output.

# TELETONE RADIO CORP.

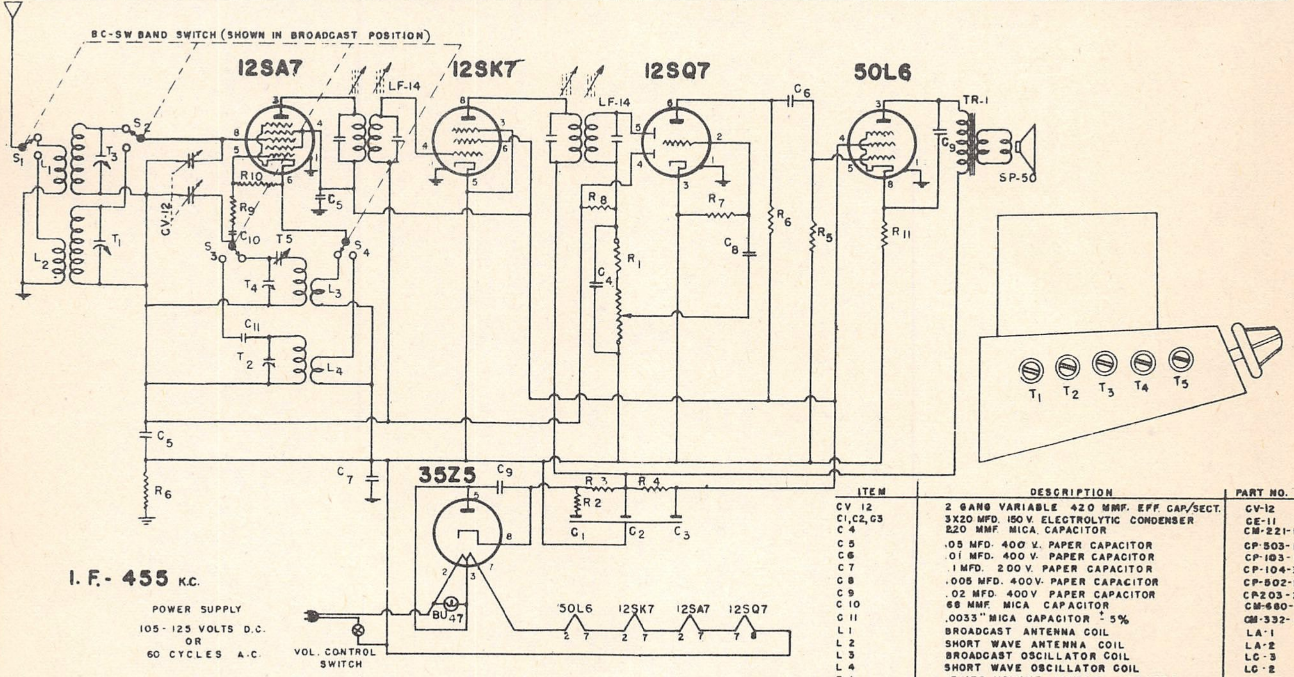
**MODEL 135, Dynamite**
**Series H**
**MODEL 138**
**Series N**


12BE6
12BA6
12AT6
50B5
LOOP
H-LF4
.00015
6800Ω
100K
.01
.02
22K
.00015
100K
1M
.002
VOL. CONTROL H-VC2
220K
P.M. SPEAKER
150Ω
A CV1
10M
470K
2.2M
OSC. COIL A-LC1
82Ω
.01
.05
.05
.02
35W4
20% 150Ω 1W
1W 1500Ω
TRIPLE 20 150 W.V. ELECTROLYTIC
POWER SUPPLY 105-125 V.D.C. OR 60 CYCLES A.C.
SWITCH VOL. CONTROL
50B5
12BA6
12BE6
12AT6
4 3
3 4
3 4
3 4

ALL RESISTORS 1/2W. UNLESS SPECIFIED
Ω : OHMS
K : THOUSAND
M : MILLION
ALL CONDENSERS IN MICRO-FARAD

## MODEL 135 "DYNAMITE" CHASSIS SERIES "H"

I.F. - 455 K.C.
FREQ. RANGE - 530-1700 K.C.
ALIGN AT - 1500 K.C.
TRACK AT - 600 K.C.


BC-SW BAND SWITCH (SHOWN IN BROADCAST POSITION)
12SA7
12SK7
12SQ7
50L6
LF-14
LF-14
C6
TR-1
SP-50
S1
L1
T3
S2
L2
T1
CV-12
R10
R9
C5
C10
T5
S3
S4
T4
L3
C11
T2
L4
R8
R1
C4
R7
C8
R6
R5
R11
G9
C5
R6
C7
35Z5
C9
R3
R4
R2
C1
C2
C3
I.F. - 455 K.C.
POWER SUPPLY 105-125 VOLTS D.C. OR 60 CYCLES A.C.
VOL. CONTROL SWITCH
BU47
50L6
12SK7
12SA7
12SQ7
2 7
2 7
2 7
7 8
T1
T2
T3
T4
T5

| ITEM | DESCRIPTION | PART NO. |
|---|---|---|
| CV 12 | 2 GANG VARIABLE 420 MMF. EFF. CAP/SECT. | CV-12 |
| C1, C2, C3 | 3X20 MFD. 150 V. ELECTROLYTIC CONDENSER | CE-11 |
| C 4 | 220 MMF. MICA CAPACITOR | CM-221-1 |
| C 5 | .05 MFD. 400 V. PAPER CAPACITOR | CP-503-1 |
| C 6 | .01 MFD. 400 V. PAPER CAPACITOR | CP-103-1 |
| C 7 | .1 MFD. 200 V. PAPER CAPACITOR | CP-104-3 |
| C 8 | .005 MFD. 400V. PAPER CAPACITOR | CP-502-1 |
| C 9 | .02 MFD. 400V PAPER CAPACITOR | CP-203-3 |
| C 10 | 68 MMF. MICA CAPACITOR | CM-680-1 |
| C 11 | .0033" MICA CAPACITOR ± 5% | CM-332-1 |
| L 1 | BROADCAST ANTENNA COIL | LA-1 |
| L 2 | SHORT WAVE ANTENNA COIL | LA-2 |
| L 3 | BROADCAST OSCILLATOR COIL | LC-3 |
| L 4 | SHORT WAVE OSCILLATOR COIL | LC-2 |
| R 1 | .5 MEG. VOLUME CONTROL 47K STOP | VC-3 |
| R 2 | 18 OHM 1/2 W RESISTOR | RC-180-1 |
| R 3 | 150 OHM 1W RESISTOR | RC-151-5 |
| R 4 | 1500 OHM 1/2 W RESISTOR | RC-152-1 |
| R 5 | 470,000 OHM 1/2 W RESISTOR | RC-474-1 |
| R 6 | 220,000 OHM 1/2 W RESISTOR | RC-224-1 |
| R 7 | 10 MEG. 1/2 W RESISTOR | RC-106-1 |
| R 8 | 2.2 MEG. 1/2 W RESISTOR | RC-225-1 |
| R 9 | 47 OHM 1/2 W RESISTOR | RC-470-2 |
| R 10 | 22,000 OHM 1/2 W RESISTOR | RC-223-1 |
| R 11 | 150 OHM 1/2 W RESISTOR | RC-151-1 |
| T1, 2, 3, 4, 5 | TRIMMER ASSEMBLY | TA-1 |
| S1, 2, 3, 4 | WAFER SWITCH | SW-2 |
| TR 1 | OUTPUT TRANSFORMER | TR-1 |
| SP 50 | SPEAKER (5" ALNICO V MAGNET) | SP-50 |
| LF 14 | I.F. TRANSFORMER | LF-14 |
| BU 47 | #47 PILOT LAMP | BU-47 |

BROADCAST BAND
RANGE 530-1700 KC (568-178 METERS)
ALIGNMENT: PEAK $T_4$ AT 1700 KC
$T_3$ AT 1600 KC
$T_5$ AT 600 KC

## CHASSIS SERIES "N"

MODEL 138

SHORT WAVE BAND
RANGE 5-18 MC (60-16.5 METERS)
ALIGNMENT PEAK $T_2$ AT 18 MC
$T_1$ AT 15 MC

# OPERATING INSTRUCTIONS

### 1. SETTING FOR SIZE OF RECORD

The size of record for which the record changer is set to play is indicated by the position of the size-change knob (96). The record size is stamped on the housing (94) of the head assembly.

To change the setting, slide the size-change knob backward or forward to the numeral corresponding to the size of records to be played. Slide the knob to "M" for manual play.

If the size-change knob does not slide back freely, the setting may be changed by pushing against the front of the record clip (83) when it is in the downward position as shown in Figure 1.

### 2. STARTING THE RECORD CHANGER

To load the Record Changer, lift the record clip (83) to its upright position and place the records on the center post (27). The bottom record is supported by the shoulder of the center post and the push plate (79A).

**Lower the record clip gently, using care not to let it snap onto the records or damage may result.**

Turn the Phono-Motor switch (33) to the ON position. Move the switch button to the left (REJECT) momentarily and release. The bottom record will drop to the turntable and the Record Changer will play the entire stack of records automatically.

### 3. REJECTING A RECORD

To reject a record at any time, move the Phono-Motor switch button (33) to the left (REJECT).

### 4. STOPPING AND UNLOADING

It is advisable to stop the Record Changer when the Changer mechanism is out of cycle (playing a record). To remove the records, lift the record clip to its upright position and move the pickup arm to the right so that it clears the records. Lift the records straight up by supporting the bottom one. Do not tilt or squeeze the records when lifting.

### 5. REPLACING CARTRIDGE AND NEEDLE

Before replacing, see cartridge service data on page 5.

Remove the old cartridge (3) by getting your finger nails or a small screwdriver under it as shown in Figure 2 and pull down on **the back edge.** Press new cartridge into place again, making sure to push near its back edge where its pins go into the socket.

# THE CHANGE CYCLE

### 6. DESCRIPTION OF CHANGE CYCLE (See Figures 7 and 8)

If at all possible, we recommend that you carefully observe the operation of a changer that is in normal operating condition. It is a good idea to rotate the turntable by hand and repeat the changing cycle until you understand the function of each part.

The changer operates as follows: The changer mechanism is driven during its change cycle by the knurled hub of the turntable rotating the rubber-tired drive wheel (28). During normal playing, the drive wheel is held in a neutral position as illustrated in Fig. 8 so that the indentation prevents the tire from contacting the knurled hub. The drive wheel (28) is held in this position by the trip lever (63) and the stop stud (65) on the main cam (66).

When a record has finished playing and the needle has reached the trip point, the arm control lever roller (48C, Fig. 7) makes contact with reject link (43A), moving the trip arm (43) which releases trip lever (63). The trip lever spring (62) moves trip lever (63) freeing cam stop stud (65) and allows spring (69) to pull the main cam clockwise (bottom view). Since the main cam (66) and the drive wheel (28, Fig. 8) are on the same shaft, the drive wheel is thus turned so its rubber tire is against the knurled hub of the turntable. The turntable now rotates the drive wheel (28) which in turn rotates the main cam (66). Roller (68), Fig. 7) riding on the main cam, moves arm control slide (52), and the raised portion (52A) of this slide raises arm lift shaft (This shaft is 19 on the RC170 and 103 on the RC170A.) which lifts pickup arm from the record. Stud (52C) moving with slide (52) pushes arm control lever (48A) causing the pickup arm to move to the right, clearing the record. The movement of roller (68) also causes trip lever (63) to re-engage in the recess of trip arm (43). Trip spring (61) holds the trip arm (43) and trip lever (63) together.

Roller (70), also riding against main cam (66), moves push-off arm (71). This movement is transmitted through the linkage of 79F, 79D (Fig. 7) to the push-off plate 79A, Fig. 8. (Note that the record stack rests on plate 79A.) The shape of the main cam (66) is such that the push-off plate (79A) first moves back, allowing the bottom record to drop onto the record support plate (79B). Then the push-off plate (79A) slides forward and drops the next record to be played but only after the pickup arm has cleared the record stack. The little slide in the top end of the center post holds back all records other than the bottom one.

As the main cam continues its rotation, the arm control slide (52) moves back following the cam since it is kept in contact with it by slide spring (76). Stud (52C) moving with the arm control slide (52) allows arm control lever (48A) to move back. The tension of the set-down spring (55) moves the arm control lever through set-down lever (54B) and roller (48D). This moves the pickup arm to the set-down point for the record to be played. This set-down point is governed by the set-down adjustment screw (25) for 12-inch records and screw (26) for 10-inch records.

When the record changer is set to play 10-inch records, the arm control lever roller (48D) moving along the edge of the set-down lever (54B) and on reaching the shoulder of the set-down lever, moves this lever and the set-down arm (54) until they are stopped by the set-down adjustment screw (26) making contact with the rear flange of the record changer pan (24). At this point the pick-up arm is above the starting groove and is lowered by the action of the arm control slide as explained above.

When the record changer is set to play 12-inch records, the size change link (75) removes the tension from the change link spring (74) allowing the set-down arm (54) to move so that the set-down adjustment screw (25) makes contact with the rear flange, instead of screw (26). This movement of the set-down arm is caused by spring (55) when the arm is in its change cycle. This changes the set-down of the pick-up arm for 12-inch records.

While the needle is held in position above the starting groove, the safety arm (52B) pushes stud (54A)

# ADMIRAL CORPORATION

## IMPORTANT

These two models are very similar. The differences are illustrated in Figures 3 and 4 To be certain which model changer you are servicing, look for the changer model number which appears on the underside of the changer mechanism.

**Figures 3 and 4 show major differences between models RC170 and RC170A. In addition, differences occur in parts carrying reference numbers 49, 50 and 52 (see parts list).**

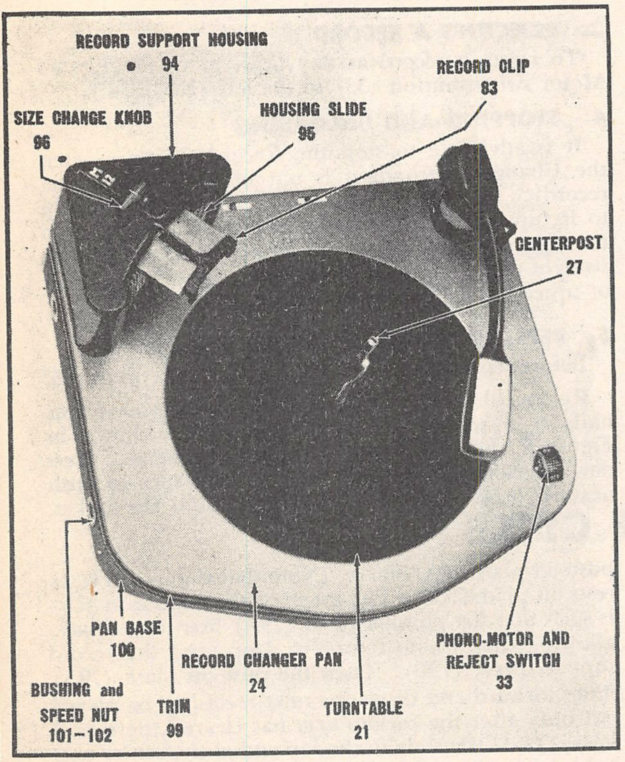

RECORD SUPPORT HOUSING
94
RECORD CLIP
83
SIZE CHANGE KNOB
96
HOUSING SLIDE
95
CENTERPOST
27
PAN BASE
100
RECORD CHANGER PAN
24
PHONO-MOTOR AND
REJECT SWITCH
33
BUSHING and
SPEED NUT
101-102
TRIM
99
TURNTABLE
21

Figure 1. Record Changer, Top View

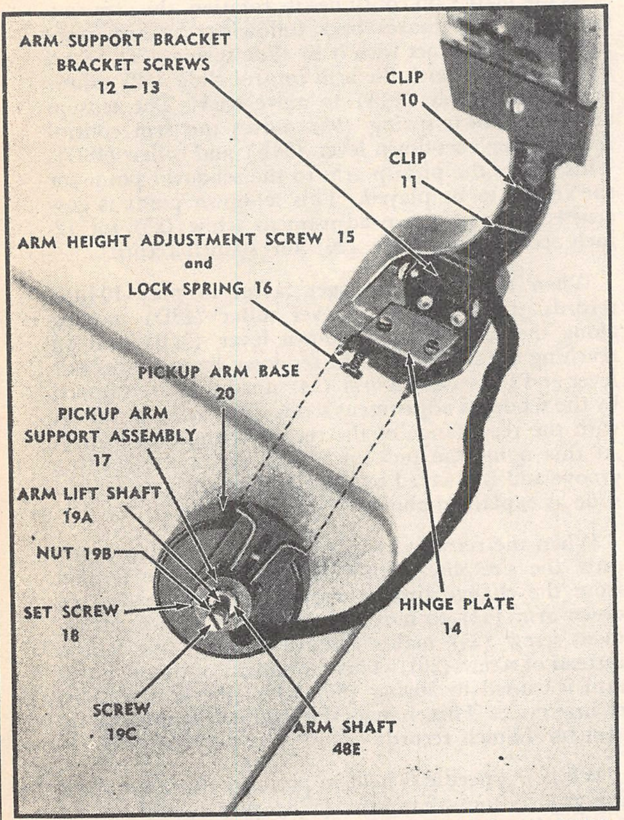

ARM SUPPORT BRACKET
BRACKET SCREWS
12 — 13
CLIP
10
CLIP
11
ARM HEIGHT ADJUSTMENT SCREW 15
and
LOCK SPRING 16
PICKUP ARM BASE
20
PICKUP ARM
SUPPORT ASSEMBLY
17
ARM LIFT SHAFT
19A
NUT 19B
SET SCREW
18
HINGE PLATE
14
SCREW
19C
ARM SHAFT
48E

Figure 3. Pickup Arm Hinge Assembly for RC170

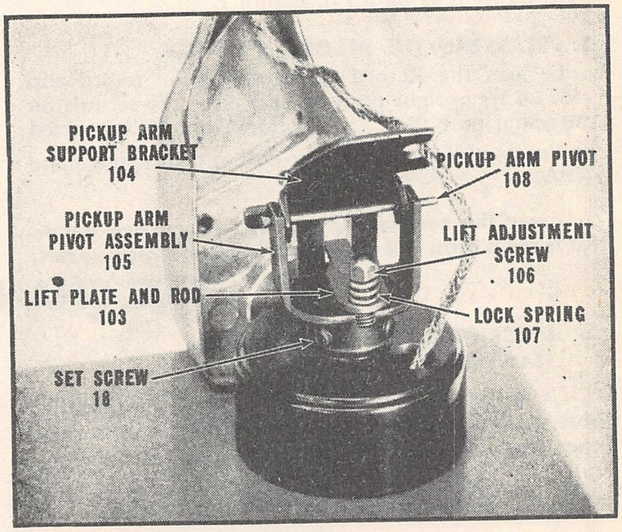

PICKUP ARM
SUPPORT BRACKET
104
PICKUP ARM PIVOT
108
PICKUP ARM
PIVOT ASSEMBLY
105
LIFT ADJUSTMENT
SCREW
106
LIFT PLATE AND ROD
103
LOCK SPRING
107
SET SCREW
18

Figure 4. Pickup Arm Hinge Assembly for RC170A

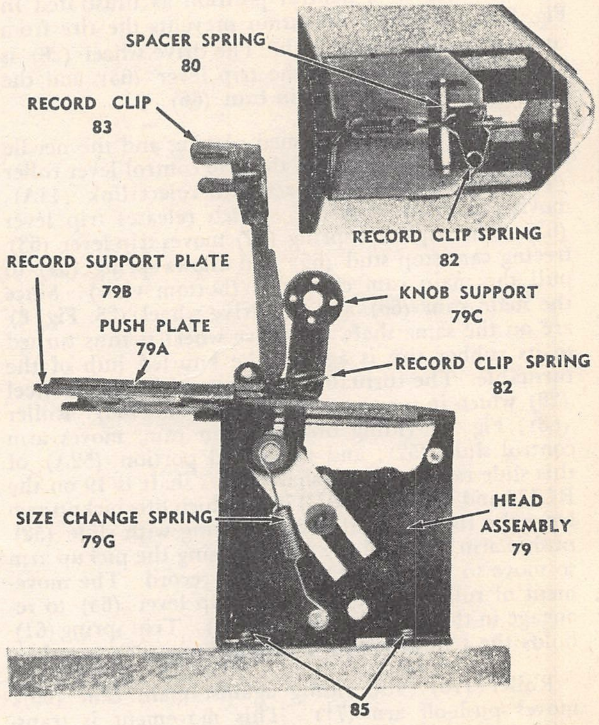

SPACER SPRING
80
RECORD CLIP
83
RECORD CLIP SPRING
82
RECORD SUPPORT PLATE
79B
KNOB SUPPORT
79C
PUSH PLATE
79A
RECORD CLIP SPRING
82
SIZE CHANGE SPRING
79G
HEAD
ASSEMBLY
79
85

Figure 5. Head Assembly

releasing the pickup arm so that it has a free sideward movement to follow the record groove. About one revolution of the turntable after the releasing of the pickup arm, the arm is lowered by the downward movement of arm lift shaft (19).

When the reject is used, the movement of the reject knob (33) forces stud (39A) against the reject link (43A) moving trip arm (43) which releases trip lever (63) and the cycle of record change proceeds in the same manner as for automatic changing.

# ADJUSTMENTS

***TOOLS REQUIRED*** {***No. 8 Allen Set Screw Wrench (Part No. P-5825. List price $0.10)***
***3/16 inch Open End Wrench (Part No. P-5807. Net price $0.39)***

### 7. ADJUSTMENT OF SET-DOWN POINT (See Figures 1 and 8)

Adjustments for 10-inch records are made by the screw (26) which can be seen through the right hand slot at the top rear of the record changer. Turning this screw in moves the set-down point of the pickup arm closer to the center post and turning the screw out moves it further away. The proper set-down point is between $4\frac{5}{8}''$ and $4\frac{11}{16}''$ from the needle to the near side of the center post.

Adjust the 12-inch set-down with screw (25), Fig. 8. Turning screw (25) in (as seen through the left hand slot) moves the set-down point for 12-inch records further from the center post and turning the screw out moves it closer to the center post. The proper set-down point is between $5\frac{5}{8}''$ and $5\frac{11}{16}''$ from the needle to the near side of the center post.

If either adjusting screw has reached the end of its travel so that it is not possible to get a proper setdown, it will be necessary to re-set the assembly (17) or (105) as follows:

### 7A. SETTING PICKUP ARM SUPPORT ASSEMBLY (17) IN RC170 OR (105) IN RC170A

(a) Set adjusting screws (25) and (26) half-way in.

(b) With the set screws (18) loose, move the pickup arm so that the pickup arm cap (2) rests against the top portion (above the shelf) of center post.

(c) Holding the pickup arm in this position, move the arm control lever (48B) so that it is $\frac{3}{64}''$ from the rear flange of the pan (24); always keep this spacing less than $\frac{1}{16}''$ but more than $\frac{1}{32}''$ (between .04 and .06″ is correct).

(d) Press the arm control lever assembly (48) up into the pickup arm base (20). Press the pickup arm support assembly (17) or (105) down against the pickup arm base (20), leaving a .006 to .008 inch clearance between them. This clearance is necessary to prevent binding. The spring washer (part number 405A27) should be slightly compressed between the top of the pickup arm base and the bottom of the collar.

(e) Tighten the two set screws (18).

(f) Make final set-down adjustments with adjustment screws (25) and (26). (See page 2)

### 8. ADJUSTMENT OF PICKUP POINT (See Fig. 7)

The pick-up or tripping point adjustment is made by screw (45). Turning the screw in brings the pick-up point closer to the center post and turning the screw out moves it further away. The proper pick-up point is between $1\frac{11}{16}''$ and $1\frac{3}{4}''$ from the needle to the near edge of the center post.

On the late production of the record changer used with the console radios, a hole has been made in the bottom cover so that this adjustment can be made without removing the bottom cover from the changer. As the table models do not use the bottom cover, this adjustment is easily made.

In adjusting the pick-up point it will be found that an occasional record does not have the groove run in far enough so that the pick-up arm will be carried close enough to the center post to actuate the reject link. If adjustments are made to accommodate these few records, it will be found that the changer starts its change cycle with some normal records before they are finished playing. In adjusting for this type complaint, it is wise to let the customer decide for which side the adjustment should be made.

### 9. ADJUSTMENT OF PICKUP ARM HEIGHT (See Figures 3 and 4)

Before adjusting arm height, be sure needle is properly adjusted (see paragraph 18).

With the record changer out of cycle and the pick-up arm clear of the turntable, adjust screw (This adjustment screw is 15 on the RC170 and 106 on the RC170A.) so that the tone arm needle is approximately $\frac{1}{8}''$ above the top of the pan. Turning the screw in raises the arm and turning it out lowers the arm.

The model RC170 also has an adjustment screw (19C) to adjust the maximum height that the pickup arm should reach. The maximum height of the pick-up arm during the change cycle should be from $1\frac{3}{8}''$ and $1\frac{1}{2}''$ between the needle and turntable. After making this adjustment tighten locking nut (19B) and again check the adjustment.

### 10. ADJUSTING DISTANCE BETWEEN HEAD ASSEMBLY (79) AND CENTERPOST (See Figs. 7, 8)

Do not bend the centerpost to make this adjustment; adjust as described below.

The adjustment of the head assembly (79) is made by loosening the three screws. 85 (underneath the changer) and moving the assembly closer or further away from the center post as the case may be. The head assembly is in proper relationship to the center post when it is set with a dimension of $4\frac{7}{8}''$ from the front edge of the record support plate (79B, Fig. 8) to the rear of the center post (side nearest the record support plate) and at a point on the center post of the same height as the record support plate. This dimension is taken with the changer set to play 10-inch records.

After adjusting, check as follows:

(a) Place a 10-inch record (with a true center hole) on the centerpost to a point in line with the record support plate (79B). Holding the record horizontal and exerting force on it toward the head assembly, the record should just clear the record support plate (79B). Exerting force away from the head assembly should give a small gap between the record support plate (79B) and the record. **Repeat with a 12-inch record.**

(b) Load the changer with a stack of records; push record stack toward head assembly. Start the changer mechanism, and check push-off for several 10-inch records. **Repeat for 12-inch records.**

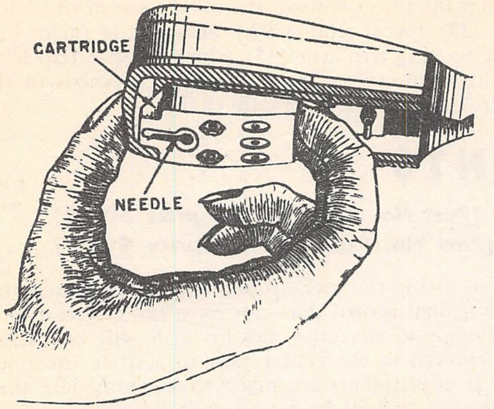

CARTRIDGE
NEEDLE

Figure 2: Removing Cartridge by Pulling Down on Back Edge

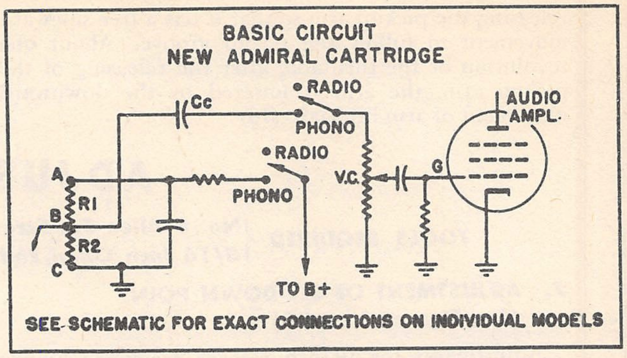

BASIC CIRCUIT
NEW ADMIRAL CARTRIDGE
Cc
RADIO
PHONO
RADIO
PHONO
AUDIO AMPL.
V.C.
G
A
B
C
R1
R2
TO B+
SEE SCHEMATIC FOR EXACT CONNECTIONS ON INDIVIDUAL MODELS

Figure 6. Basic Circuit for New Admiral Cartridge

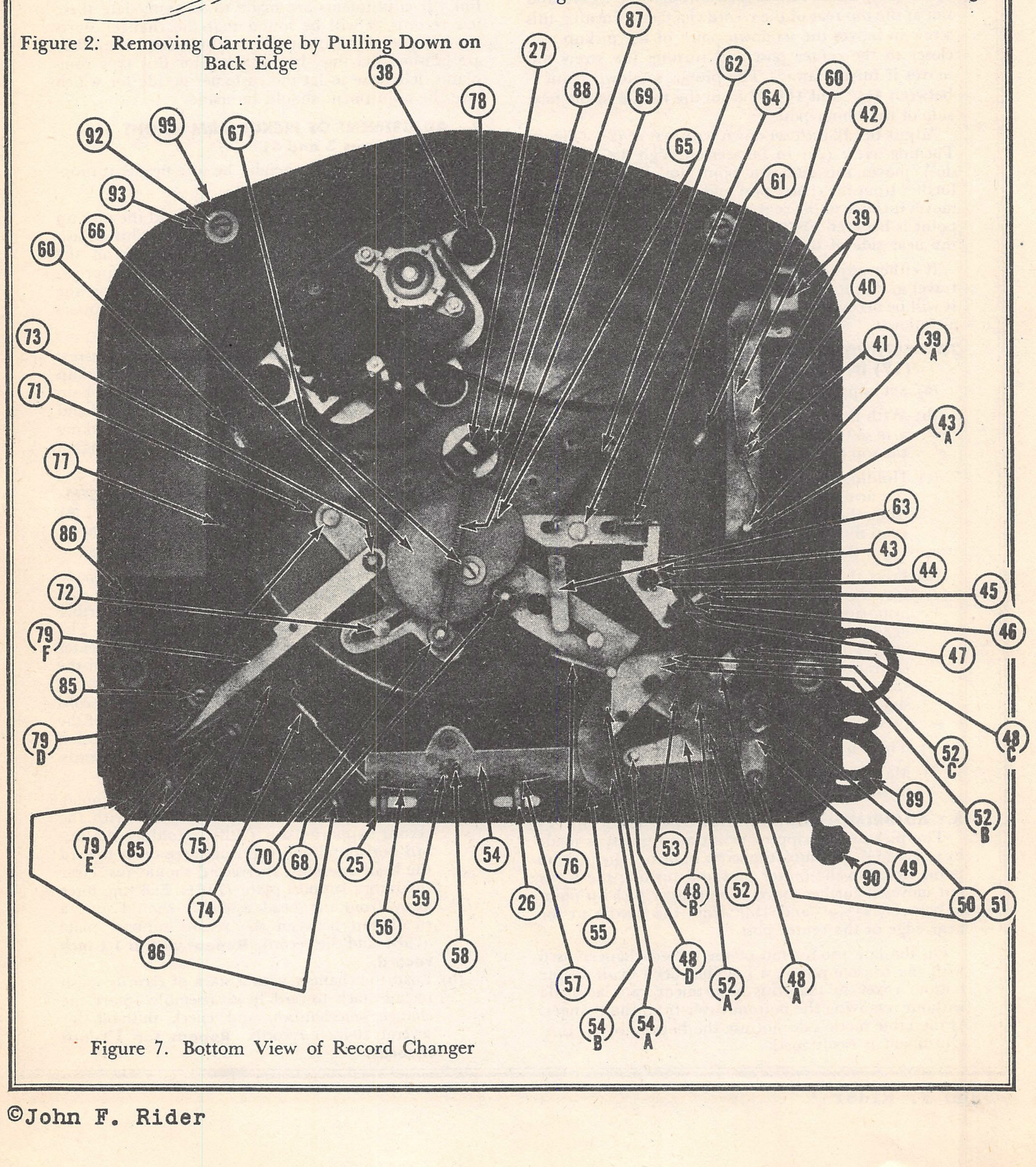

87
27
38
78
88
69
62
64
60
42
92
99
67
65
61
93
39
66
60
40
73
41
39 A
71
43 A
77
63
86
43
44
72
45
46
79 F
47
85
48 C
52 C
79 D
89
52 B
79 E
85
75
70
68
25
54
76
53
90
49
48 B
52
50
51
74
59
26
56
55
58
86
48 D
57
52 A
48 A
54 B
54 A

Figure 7. Bottom View of Record Changer

**Reference numbers 12, 14, 17, and 19 apply to RC 170 only; see Figs. 3 and 4 and note marked † in parts list.**

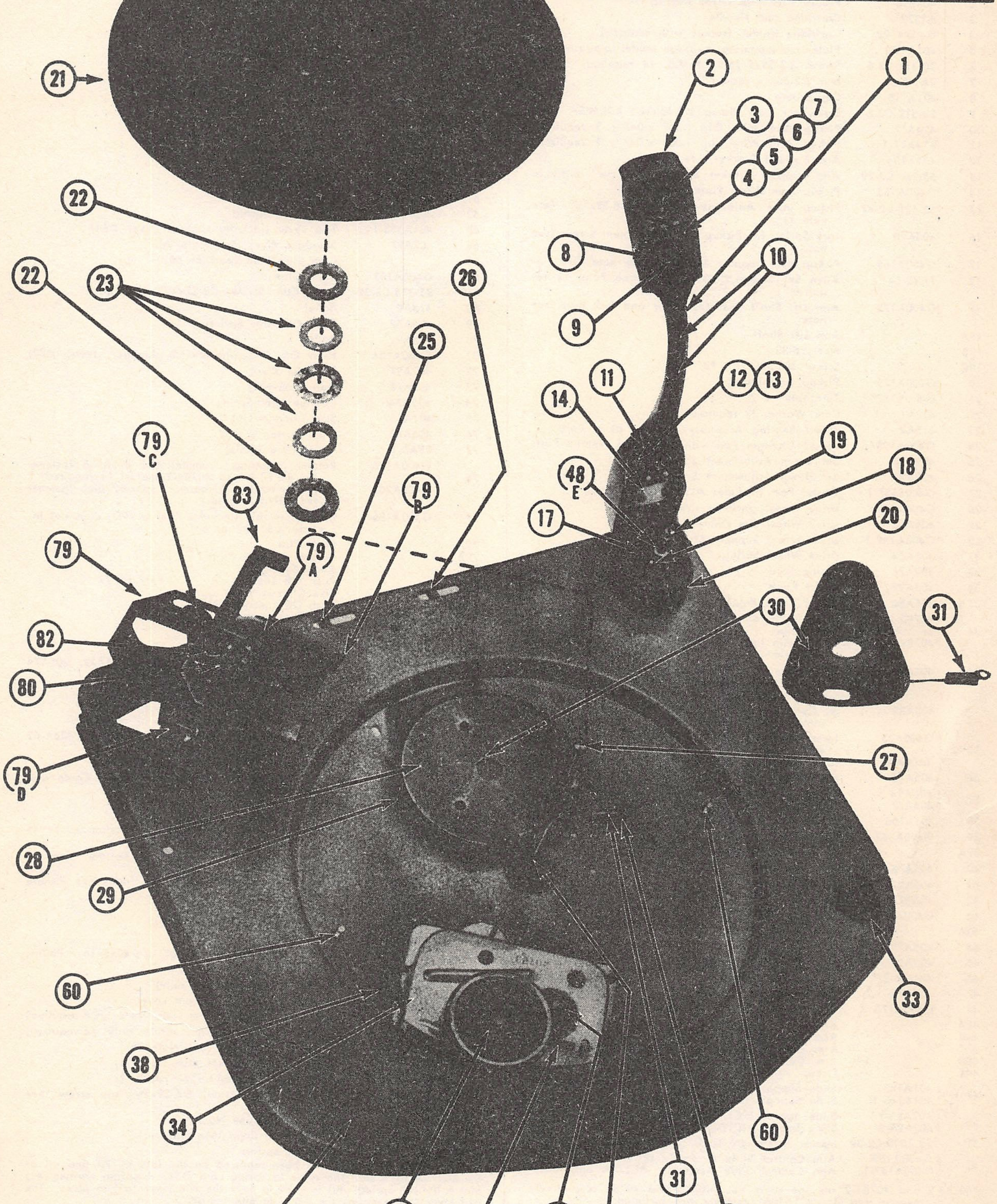

21
2
1
3
7
6
5
4
8
22
22
23
26
10
9
25
11
12
13
14
79
C
83
79
B
48
E
19
18
17
20
79
79
A
30
31
82
80
27
79
D
28
29
33
60
38
34
60
31
24
35
36
37
34
A
87
A
32

Figure 8. Top View of Record Changer

# SERVICE PARTS LIST FOR RC170 & 170A RECORD CHANGER

| Ref. No. | Part Number | Description | |
|---|---|---|---|
| 1 | G400A177 | Pickup Arm Casting Only (painted) | |
| 2 | 403B16-1 | Pickup Arm Cap (clear plastic) | |
| 3 | A1372 | Cartridge and Needle | |
| 4 | G400A198 | Cartridge Holder (socket with contacts) | |
| 5 | 401A152 | Plate (For mounting cartridge holder to pickup arm) | |
| 6 | 20-312-C2-6 | Screw #2-56x5/16″ R.H.M.S. (4 required) | |
| 7 | 2A1-1-6 | Nut #2-56 (4 required) | |
| 8 | 401A115 | Cap Clamp | |
| 9 | 20-312-C2-6 | Screw for Cap Clamp #2-56x3/8″ R.H.M.S. | |
| 10 | 414A17 | Pickup Arm Wire Clip (.359″x.047″; 3 required) | |
| 11 | 414A17-1 | Pickup Arm Wire Clip (.506″x.047″; 1 required) | |
| 12 | †401A134 | Arm Support Bracket (see note †) | |
| 13 | 65-250-C2-39 | Arm Support Bracket Screw #6-32x1/4″ B.H.M.S. | |
| 14 | †G400A165 | Pickup Arm Hinge Plate (see note †) | |
| 15 | †65-625-C2-47 | Pickup Arm Adjustment Screw #6-32x5/8″ (see note †) | |
| 16 | †405A70 | Lock Spring for Pickup Arm Adjustment Screw (see note †) | |
| 17 | †G400A168 | Pickup Arm Support Assembly (see note †) | |
| 18 | 1A43-14 | Allen Set Screw #8-32x3/16″ Cone Point (2 required) | |
| 19 | †G400A172 | Arm Lift Shaft (includes screw and lock nut) (see note †) | |
| 19A | | Arm Lift Shaft | |
| 19B | | Nut #6-32 | |
| 19C | | Screw #6-32x3/8″ Fil. H.M.S. | |
| 20 | G400A173 | Pickup Arm Base | |
| 21 | G400A167 | Turntable | |
| 22 | 412A1 | Cork Washer (2 required) | |
| 23 | 415A2 | Thrust Bearing Assembly (replace as a unit) | |
| 24 | G400A195 | Record Changer Pan with Studs and Welded Parts | |
| 25 | 402A87 | Set Down Adjustment Screw | |
| 26 | 402A87 | Set Down Adjustment Screw | |
| 27 | G400B137-1 | Center Post (includes 405A62 speed nut) | |
| 28 | G400A179 | Drive Wheel (includes tire) | |
| 29 | 406A13 | Drive Wheel Tire Only | |
| 30 | G400A149-1 | Drive Wheel Support Assembly | |
| 31 | 405A54 | Drive Wheel Spring | |
| 32 | 402A76 | Spring Stud | |
| 33 | 403A23 | Reject Knob | |
| 33A | 405A80 | Reject Knob Retaining Spring | |
| 34 | *407B3-2<br>or **407B1-2 | Motor with Idler Wheel and fasteners; 105-125 V, 60 Cycle | |
| | *407B4-2 | Motor with Idler Wheel and fasteners; 105-125 V, 50 Cycle | |
| 34A | 401A48 | Drive Pulley (Part of 34. For motors 407B3, 407B4. In addition, motor 407B4 includes a coil spring, part number 405A32.) | |
| | 405A32 | 50 Cycle Conversion Spring (this spring used to convert 407B3 motor) | |
| 35 | G400A23 | Idler Wheel Assembly (used with either 407B3 or 407B4 motor) | |
| | G400A57 | Idler Wheel Assembly (for 407B1 motor) | |
| 36 | 405A15 | Hairpin Spring for Idler Wheel | |
| 37 | 405A14 | Spring, Idler Wheel (for 407B3 or 407B4 motor) | |
| | 405A67 | Spring, Idler Wheel (for 407B1 motor) | |
| 38 | 401A106 | Shakeproof Motor Fastener | |
| 39 | G400A162 | Switch and Lever (ON-OFF-REJECT) | |
| 39A | | Spring Stud (Part of 39) | |
| 40 | 405A78 | Hairpin Spring | |
| 41 | 405A22 | Spring Washer | |
| 42 | 405A77 | Switch Lever Spring | |
| 43 | G400A181 | Trip Arm Assembly | |
| 43A | | Reject Link (part of 43) | |
| 44 | 405A78 | Hairpin Spring | |
| 45 | 402A96 | Trip Adjustment Screw | |
| 46 | 4B1-34-37 | Washer (2 required) | |
| 47 | 405A76 | Adjustment Lock Spring | |
| 48 | G400A175 | Arm Control Lever Assembly | |
| 48A | | Arm Control Lever | Part of 48 |
| 48B | | Arm Control Lever | |
| 48C | | Arm Control Lever Roller | |
| 48D | | Arm Control Lever Roller | |
| 48E | | Pickup Arm Shaft | |
| 49 | 401A143 | Slide Support (RC170 only) | |
| | 401A143-1 | Slide Support (RC170A only) | |
| 50 | 402A85-1 | Slide Spacer (RC170 only; See Note C) | |
| | 402A85-2 | Slide Spacer (RC170A only) | |
| 51 | C2-1000-C2-39 | Spacer Screw #6-32x1″ Fil. H.M.S. (2 required) | |
| 52 | G400A159 | Arm Control Slide Assembly (RC170 only) | |
| | G400A159-1 | Arm Control Slide Assembly (RC170A only) | |
| 52A | | Inclined (raised) Portion of Arm Control Slide (part of 52) | |
| 52B | | Safety Arm (part of 52) | |
| 52C | | Stud (part of 52) | |
| 53 | 405A58 | Relief Spring | |
| 54 | G400A152 | Set Down Arm Assembly | |
| 54A | | Stud (part of 54) | |
| 54B | | Set Down Lever (part of 54) | |
| 55 | 405A56 | Set Down Spring | |
| 56 | 405A44 | Lock Spring | |
| 57 | 405A44 | Lock Spring | |
| 58 | 405A22 | Spring Washer | |
| 59 | 405A78 | Hairpin Spring | |
| 60 | 1A80-5 | Mounting Screws | |
| 61 | 405A68 | Trip Spring | |
| 62 | 405A75 | Trip Lever Spring | |
| 63 | 401A153-1 | Trip Lever (includes shoulder rivet #64) | |
| 64 | 402A97 | Shoulder Rivet (See Note A) | |
| 65 | | Cam Stop Stud (part of 66) | |
| 66 | G400A163 | Main Cam | |
| 67 | 85-375-C2-39 | Main Cam Screw #8-32x3/8″ B.H.M.S. | |
| 68 | 415A9 | Roller | |
| 69 | 405A79 | Push Off Arm Spring | |
| 70 | 415A9 | Roller | |
| 71 | G400A154-1 | Push Off Arm (includes 2 shoulder rivets, #72) | |
| 72 | 402A97 | Shoulder Rivet | |
| 73 | 405A78 | Hairpin Spring | |
| 74 | 405A54 | Change Link Spring | |
| 75 | 401A159 | Size Change Link | |
| 76 | 405A60 | Slide Spring | |
| 77 | 88A8-1 | Motor Plug (male) | |
| 78 | G400A196 | Rubber Mounting Grommet and 401A106 fastener (for 407B3-2 and 407B4-2 motor) (3 required) | |
| | G400A203 | Rubber Mounting Grommet, spacer, and fastener (for 407B1-2 motor) | |
| 79 | G400A186-1 | Head Assembly (includes 79A to 79G; does not include #80, 82 or 83) | |
| 79A | | Push Plate | Part of 79 |
| 79B | | Record Support Plate | |
| 79C | | Knob Support | |
| 79D | | Push Off Lever | |
| 79E | 405A69 | Size Change Lever Spring | |
| 79F | | Push Off Link (See Note B | |
| 79G | 405A57 | Size Change Spring | |
| 80 | 405A74 | Spacer Spring | |
| 82 | 405A73 | Record Clip Spring | |
| 83 | G400A190 | Record Clip (does not include #405A73, 405A74 springs or 406A16 rubber bumpers) | |
| 84 | 406A16 | Rubber Bumpers for Record Clip | |
| 85 | 62-375-C2-39 | Screw #6-32x3/8″ Fil. H.M.S. (3 required) | |
| 86 | 62-375-C2-39 | Screw #6-32x3/8″ Fil. H.M.S. (3 required) | |
| 87 | G400A146-1 | Center Post Bracket Assembly (includes 1-#405A-62 speed nut) | |
| 88 | 405A62 | Speed Nut for Fastening Center Post | |
| 89 | | See Radio Service Manual for Proper Cable and Part Number | |
| 90 | 98A19 | Plug, 3 contact | |
| | 88A8-5 | Plug, 4 contact | |
| 92 | G400A197 | Mounting Screw (for mounting bottom cover to pan) | |
| 93 | 19A10-3 | Mounting Spring (for mounting bottom cover to pan) | |
| 94 | 403C14 | Record Support Housing Plastic (does not include #95) | |
| 95 | 403B15 | Housing Slide, Plastic | |
| 96 | 403A20 | Size Change Knob (2 required) | |
| 97 | 402A81 | Knob Spacer | |
| 98 | 443-312-C2-34 | Screw (size change knob) #4-40x5/16″ Philips | |
| 99 | 403A24 | Trim | |
| 100 | G400A143 | Bottom Cover (consoles only) | |
| 100A | 413A7 | Grommet (1″) for bottom cover | |
| 101 | 27A24 | Bushing in Bottom Cover (consoles only; 4 required) | |
| 102 | 2A10-10-59 | Speed Nut for Bushing (consoles only) (4 required) | |
| 103 | ††G400A201 | Lift Plate and Rod (See Note ††) | |
| 104 | ††401A162 | Arm Support Bracket (See Note ††) | |
| 105 | ††G400A200 | Arm Pivot Assembly (See Note ††) | |
| 106 | ††402A104 | Lift Adjusting Screw, #6-32x3/8″ cap screw (See Note ††) | |
| 107 | ††405A81 | Lock Spring (See Note ††) | |
| 108 | ††414A18 | Pickup Arm Pivot (See Note ††) | |
| 109 | 405A27 | Washer, spring | |

*407B3-2 and 407B4-2 are the same as #407B3 and 407B4 respectively except that 3 #401A106 fasteners are included.

**407B1-2 is the same as #407B1 except that three spacer washers and three #401A106 fasteners are included.

† Parts marked † are used in the RC170 only. See Figure 3. See Ref. numbers 103, 104, 105, 106, 107, 108 for RC170A parts.

†† Parts marked †† are used in the RC170A only. See Figure 4. See Ref. numbers 12, 14, 15, 16, 17, 19 for RC170 parts.

**NOTE A:** The rivet (64) has been replaced on the late RC170 and all of the RC170A by a stud the same as spring stud #32. A spring washer (41) and a hairpin spring (40) is used to hold the trip lever (63) in place. The trip lever (63) remains the same in either case.

**NOTE B:** Three different type push off links (79F) have been used. The one shown in figure 7 is the latest but is now installed with its offset to the rear of the changer. In other words it is turned over on its axis 180°. This latest type can be used on all earlier changers.

**NOTE C:** The model RC170 uses two different type spacers (50). However, 402A85-1 can be used to replace either type. In re-assembling be sure that the spacer with the cut down section is used near the spring mounting bushing (front).

If the setting of the head assembly does not give proper push-off for both 10-inch and 12-inch records, vary the spacing slightly and re-check.

It should be noted that the records do not rest on the record support plate (79B) during normal playing of the changer; but rest on top of the push off plate (79A). During record change the push off moves back and allows the records to drop to the record support plate (79B). The push off plate now moves forward pushing the bottom record off. The remaining records are being supported by the push off plate itself. This is done to reduce any tendency for two records to drop to the turntable at the same time.

## SERVICE AND REPAIR

### CAUTION

**See that the rubber tires on both the drive wheel (28) and the idler wheel (35) are kept clean and free from oil, grease, dirt, or any foreign material. Carbona or carbon tetrachloride may be used for cleaning these parts.**

### 11. REMOVING PLASTIC HOUSING FROM HEAD ASSEMBLY (See Figures 1 and 7)

The housing (94) of the head assembly can be taken off by removing the two size change knobs (96) and the three screws (86). With the record clip (83) in the down position, the housing can be lifted from the assembly. The housing slide (95) will drop out as the housing is removed.

### 12. REPLACING A PICKUP ARM BASE (See Figures 3, 4 and 7)

When installing a pick-up arm base (20) and before tightening the two screws (51), exert pressure on the base towards the front of the changer and at the same time rotate it in a clockwise (bottom view) direction. Tighten the screws while holding the base in this position. If this is not done properly, the arm control slide (52) may bind between the two slide spacers (50).

After replacing the pickup arm base, re-set the pickup arm support assembly as in paragraph 7A.

### 13. REPLACING SIZE CHANGE SPRING (See Figure 5)

Whenever it is necessary to remove or replace the size change spring (79G) care must be taken to re-install it in its proper position. See Figure 5 for its mounting position.

### 14. REPLACING HEAD ASSEMBLY

Remove the assembly housing as explained in No. 11. Release the push-off link (79F) from the push-off arm (71) by removing the hairpin clip (73) and washer. Remove three screws and washers (85) and the assembly is free from the pan.

When re-installing the head assembly, replace the three screws and washers but do not tighten them. Reconnect the push-off link and arm. Adjust the head assembly as explained in paragraph 10.

### 15. REMOVING TURNTABLE AND BEARING ASSEMBLY

To remove the turntable it is only necessary to grasp the table by its edges and lift up. **Before replacing the turntable, make sure that the recessed part of the drive wheel (28) is towards the centerpost. If necessary, turn drive wheel counter clockwise about a turn so it locks in this position.** The pickup arm should be positioned away from the turntable to avoid the possibility of accidentally tripping the changer mechanism. In replacing the turntable **force is not needed** to seat it. Make sure, however, that the drive wheel of the motor has been pushed in towards the centerpost and that the wheel is making contact with the inner side of the turntable flange. In some cases it may be found that the two cork washers, after considerable use, are compressed so the turntable will rub. To build the stack up, an extra cork washer should be used. This third cork washer may be placed at the top or bottom of the stack.

The washers (22) and thrust bearing assembly (23) are removed by sliding them off of the centerpost. In replacing, have them in the order shown in Figure 8.

### 16. REMOVING BOTTOM COVER (100)

To remove the bottom cover (100) from the record changer, remove the two rear screws (92) through the bottom. Then press on the front edge of the bottom cover; this frees the changer from the slotted mounting brackets at the front of the bottom cover. To replace bottom cover, reverse above operations.

The changer must float on the springs (93) to prevent microphonic feedback, thus the springs (93) must be re-installed properly. The wider end fits around and hugs the extrusion in the mounting brackets in the bottom cover. The narrow end of the spring fits over the threaded bushing on the changer pan (24). In some changers it has been necessary to add spacer washers beneath the narrow portion of the spring (93) to assure "free floating" of the changer.

### 17. MOUNTING 407B1 MOTOR TO CHANGER

The model 407B1 motor may be used with this record changer but it is necessary that a fibre or felt washer be used as a spacer between the motor mounting grommet and the changer pan. The No. 401A106 shakeproof motor fastener can be used to then mount the motor.

### 18. CARTRIDGE (See Figure 6)

The new Admiral pick-up cartridge uses an entirely new principle since it is not a crystal, magnetic, or capacitive device. The pick-up element is made of special rubber which is a high resistance electrical conductor (R-1 & R-2). The resistance varies as the length of the rubber is changed. A Monel metal needle, osmium tipped, is clamped to the center of the resistive rubber as shown at B. As the needle moves back and forth in the record groove, it alternately lengthens the rubber on one side and shortens the rubber on the other side.

A DC voltage is applied at A. The voltage drop from B to C varies as the resistance changes due to the "back and forth" movement of the needle. The varying voltage drop is in reality an alternating voltage of audio frequency. This voltage is applied through the coupling condenser (Cc) to the grid (G) of the audio amplifier tube.

**Trouble Shooting:** If you suspect the cartridge or needle and have a replacement cartridge available, the quickest test is to try the other cartridge. This is very simple since the Admiral cartridge plugs in. Remove the old cartridge as described on page 1 and plug in the replacement cartridge. If replacing cartridge does not correct the trouble or if no replacement is available, proceed as follows:

1. Make sure radio operates satisfactorily on radio stations.
2. Turn switch to Phono and turn volume control up high. Touch the needle with finger. If a loud hum is heard, circuit from B to G is not open or shorted. If hum is not heard, check circuit from B to G.
3. If hum is heard, check voltage across outer terminals on bottom of cartridge. Generally it should measure from 80 to 100 volts DC. See circuit diagram for individual chassis. If voltage is correct, cartridge should be replaced.
4. If voltage is not correct, check circuit for fault. In case of distortion, check coupling condensers.
5. If the needle is bent, it can be straightened by bending it down so that it projects 1/16" from cartridge. It should then be pressed back several times with a flat object.

Do not attempt to repair cartridges or remove the cap on the cartridge assembly as this will void the warranty.

**19. LUBRICATION**

Under normal operating conditions, the motor should never require oiling. The rest of the changer, however, should be lubricated with grease whenever it comes into the shop for repairs or adjustment. A good grade automobile chassis grease may be used for this purpose.

The oilite bearings, used in the turntable hub and pick-up arm base, may be lubricated with SAE No. 20 motor oil.

Care should be taken to prevent any of the lubricant from coming into contact with the drive or idler wheel tires. Also be careful, when using oil, that an excess does not seep into the felt of the turntable.

**Use grease sparingly on stud (64) of trip lever (63); excessive lubricant may cause suction binding and subsequent failure of the trip mechanism.**

**20. REPLACEMENT PARTS**

In some cases replacement parts from the factory may be a different type than those being replaced. These parts will be of a later production but may be used as replacement parts. In cases where rivets or adapting parts are needed, they will be included with the replacement part.

Note that when replacements involve loosening or removing set screws (18) in assemblies (17) or (105), it will be necessary to re-set the assembly as described in paragraph 7A.

# OPERATING AND SERVICE INSTRUCTIONS FOR
# RECORD CHANGER
## MODEL 46-A

### General Specifications

MOTOR VOLTAGE—115 Volts—60-cycles A.C. **(DO NOT USE D.C.)**
MAXIMUM NUMBER OF RECORDS PLAYED AUTOMATICALLY:
Fourteen (14) 10" records
Twelve (12) 12" records
TURNTABLE SPEED - - - 78 to 80 R.P.M.

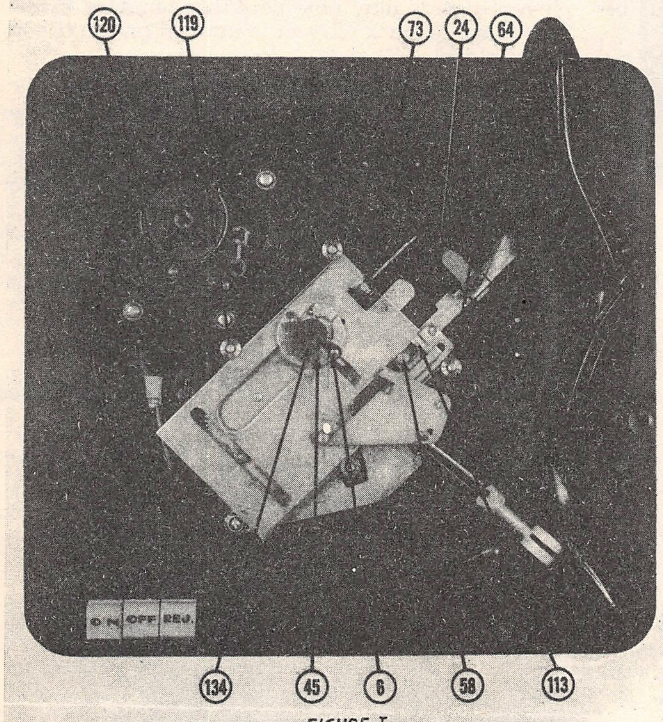


FIGURE I

### CAUTION

Twelve only 12" or fourteen 10" records may be played, DO NOT INTERMIX 12" and 10" records.

DO NOT CHANGE CAP playing position unless Changer is out of cycle.

DO NOT USE FORCE at any time to either start or stop the Changer mechanism.

DO NOT LEAVE RECORDS ON SUPPORTS when Changer is not in use as this will cause the records to warp and hinder the efficiency of the Changer.

For more enjoyable listening and operating performance, always keep records in albums.

The last record in the stack will keep repeating until the Changer is stopped.

**DO NOT OPERATE** the Changer on **D.C. Current.**

Make certain that the center post slide cap is down before loading.

If a record does not have the eccentric inside groove, it will be necessary to use the REJECT PUSH BUTTON to play the next record.

With normal use, the needle should not require replacement. **DO NOT DROP** the needle or damage its precision point. DO NOT REMOVE and then replace the same needle. Make certain that the needle is securely held in cartridge case.

### LOADING

The plastic cap can be moved either forward or backward, from the 10-inch to 12-inch position, or from the 12-inch to the 10-inch position.

The records are placed over the center post, resting on the ledge in the center and on the cap ledge on the outside edge.

Snap pressure clamp down on top record stack.

To place Changer in either 10" or 12" playing position, use the following procedures:

For 10" playing position, lift up the cap at an angle and push the cap forward until the maximum forward motion is reached, then release cap to allow it to fall into place. The Changer is now ready to play 10" records.

For 12" playing position, lift up the cap at an angle and pull backwards until the maximum backward position is reached, then release cap to allow it to fall into place. The Changer is now ready to play 12" records.

**NOTE:** The 10" cap position is always in the maximum FORWARD position, and the 12" cap position is always in the maximum BACKWARD position.

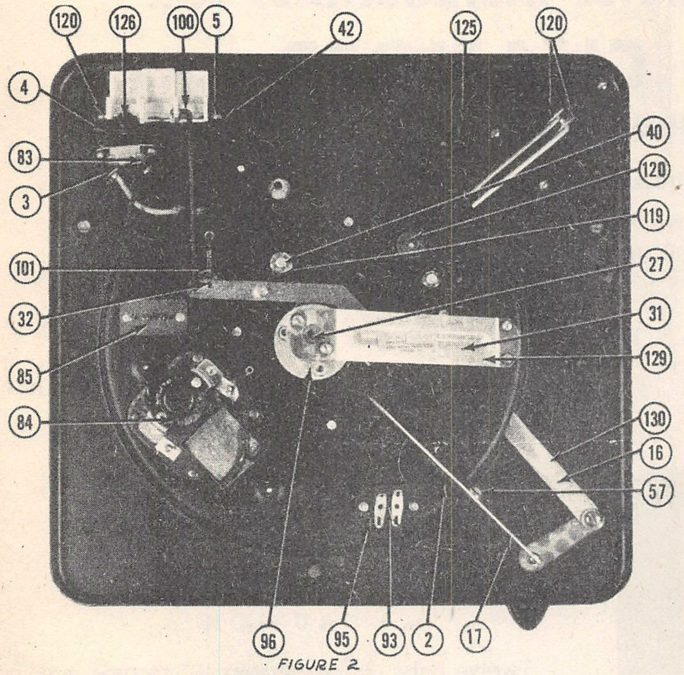


FIGURE 2

### STARTING

Press down on the push button marked "ON." After the turntable has attained speed, press down on the push button marked "REJ." Hold finger pressure for a few seconds and then release.

The bottom record will fall on the turntable and the Changer will automatically play through the entire stack of records.

### REJECTING

Press down on the push button marked "REJ." Hold finger pressure for a few seconds and release. A record may be rejected at any time during playing by this simple operation.

### UNLOADING

Press down on the push button marked "OFF." Set the tone arm on the tone arm rest post. Set the record pressure clamp in an upright position. The played records may now be easily removed by lifting the entire stack of records upward and in a horizontal plane.

### OPERATING CYCLE

1—Records are placed on offset portion of center post. Tone arm plays through the first record and follows on to the eccentric groove. When needle feeds into a position of $1\frac{15}{16}$ inches away from center post, the trip which is attached to tone arm link (16) engages and moves pawl lever (23). Clutch arm which is attached to pinion gear is now released thus engaging turntable clutch. Changing mechanism is now powered.

2—Lift lever roller (73) travels over lift lever (17) raising tone arm off record.

3—End of elongated slot in main slide (21) engages stud (58) on tone arm link (16). The backward motion causes the tone arm to swing clear, allowing record to drop.

4—Push-off stud (68) on slide plate (10) engages push-off arm (10) which in turn retards record cap (89). Record drops from upper shelf to lower shelf. At this point the slide reverses its motion.

5—Stud (68) on slide plate (10) reverses its motion thereby causing record cap to advance. This action pushes the record forward, allowing it to drop off spindle shelf.

6—Spring on return slide (113) engages stud (58) on tone arm link (16). It then moves forward until the stud engages position stop (8) in either 10" or 12" position.

7—Tone arm is now in set down position and is allowed to rest on record when lift lever roller (73) is disengaged from lift lever (17).

8—Tone arm is now resting on record and remains locked for the next half turn.

9—Roller (70) on bottom of large gear (18) pushes position stop (8) until it is clear of stud (58) on tone arm link (16).

10—Pawl lever (23) engages clutch arm thus cutting off power for changing mechanism. Changer will now proceed through playing cycle.

### OPERATION OF PUSH-OFF HEAD

When record cap (89) is in 12" position the push-off lever (9) is in the forward hole. The 12"-10" lever (11) is free. When record cap (89) is in 10" position the push-off lever (9) is in the rear hole and the 12"-10" lever (11) is pushed forward. This in turn pulls

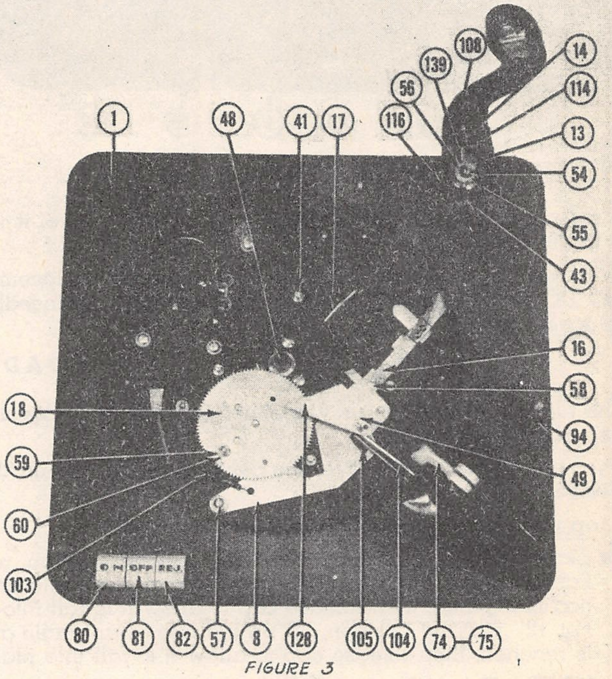
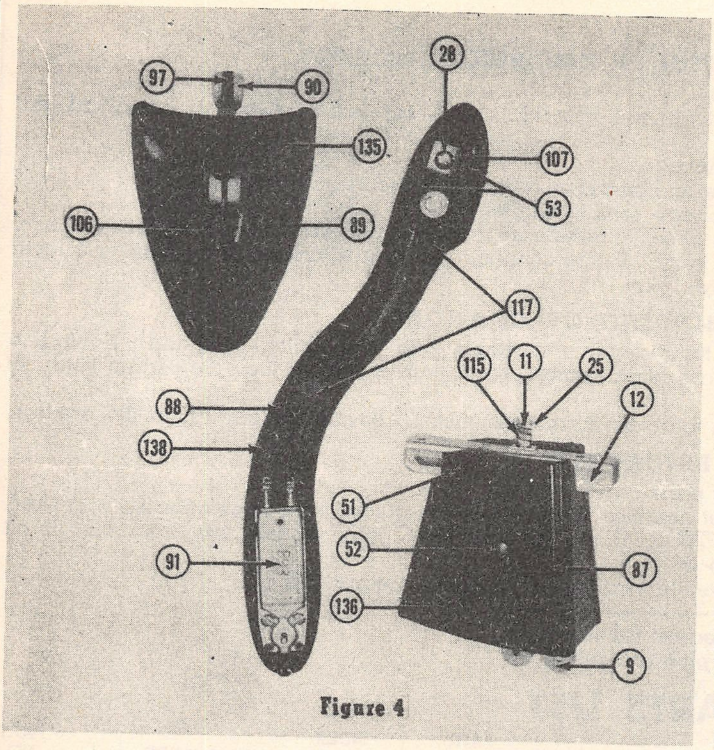


FIGURE 3


97
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136
9

Figure 4

the position stop (8) into the 10" position through the action of the connecting link (16).

### OPERATION OF REJECT LEVER

When reject button (82) is pushed down it moves reject arm (32) through the action of connecting link (100). The reject arm (32) engages tab on bottom of pawl lever ((23) thereby engaging the clutch.

### TONE ARM ADJUSTMENT

(Vertical)

Tighten screw (77) clockwise to raise tone arm. Counter-clockwise to lower.

(Horizontal)

Operate mechanism by hand, through change cycle, until tone arm rests on turntable. For slight adjustment—turn screw in hole in rear of tone arm clockwise for outward adjustment, counter-clockwise for inward adjustment. For greater adjustment turn hexagon head screw. Place in proper position for set down and tighten screw.

### ADJUSTMENT OF PUSH-OFF HEAD

Be sure center post (45) has not been bent. It should be at right angles to turntable before proceeding with adjustment. To adjust, loosen three screws holding base (87) to base plate (11). Place 10" record on center post (45) so that it rests on shoulder of record cap (89). Be sure the hole in record is directly on top of center post (45). With edge of record resting on top shelf, move base (87) back or forward until edge of record has 1/32" clearance from back edge of top step. When proper adjustment is made tighten screws in base (87), being certain position is not changed.

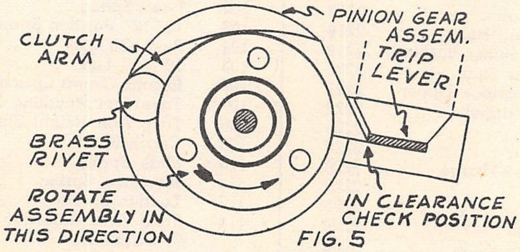

CLUTCH ARM
PINION GEAR ASSEM.
TRIP LEVER
BRASS RIVET
ROTATE ASSEMBLY IN THIS DIRECTION
IN CLEARANCE CHECK POSITION

FIG. 5

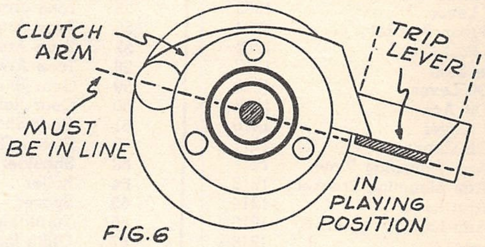

CLUTCH ARM
TRIP LEVER
MUST BE IN LINE
IN PLAYING POSITION

FIG. 6

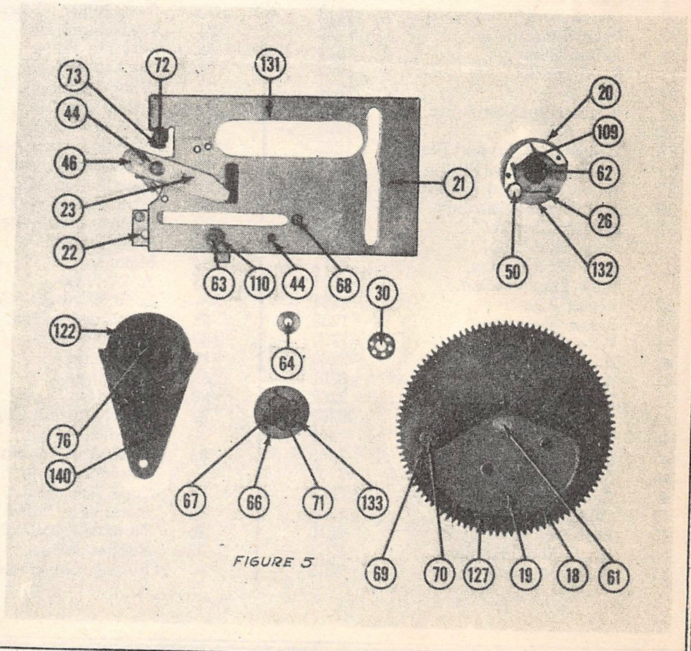
### TIMING OF GEARS AND CLUTCH ADJUSTMENT TO ADJUST REMOVE TURNTABLE

1—Normal position of large gear, while in playing cycle should be with roller (60) centered in slot at end of slide plate (21). In this position the gear will snap into the index position. (As shown in Figure 1), and clutch will be disengaged.

2—The small pinion gear is indexed correctly when the turntable shaft and clutch assembly is rotated in a counter clockwise direction, with clutch engaged. The end of the clutch arm will be in line with the edge of the trip lever as shown in Figure 5.

3—If pinion gear has been removed from changer proceed as follows. Place large gear in index position. Insert pinion gear with brass rivet opposite trip lever as shown in Figure 6. Clutch arm will be resting on trip lever. If properly timed you will be able to spin turntable and clutch assembly freely. If motion is not free remove assembly and rotate pinion gear one tooth (clockwise direction).

4—For a finer adjustment bend end of trip lever forward or backward. Clutch arm should have smallest clearance possible between turntable and clutch assembly.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71
133
69
70
127
19
18
61

FIGURE 5

# AERO-METAL PRODUCTS

## IF CHANGER FAILS TO REJECT OR PUSH RECORD PROPERLY

1—Be sure tone arm shaft has .005 to .010 end play.

2—Be certain trip lever is properly adjusted on tone arm link (16). Move trip lever forward or backward and tighten locking screws.

3—See that there is no excess play in tone arm linkage.

Also be sure needle is fastened securely in cartridge and cartridge is fastened securely to tone arm.

If tone arm sets down in 12" position regardless of cap setting, shorten 10"-12" link (105) by bending.

If tone arm has erratic motion when setting down check to determine if tone arm bracket is free from index washer (33) and that it returns to normal position without end play. If this condition exists free bracket from tone arm lever (34). USE FINE OIL and adjust spring to take out side play.

## TO PREVENT BINDING OF CHANGER

Remove turntable by removing three screws on top. Revolve turntable hub and clutch by hand. If binding occurs look for bent parts or heavy burrs. If burrs are found remove them with a smooth file. Be certain stud (58) has 1/32" to 1/16" clearance from push-off arm (10).

If it does not have this clearance bend backward to obtain correct dimension. Be sure the four rollers (64) are free.

## LUBRICATION

Use fine oil sparingly on rollers and other moving parts.

Use light cup grease on bottom of turn table thrust bearing. Remove excess grease from large gear (on cam side).

DO NOT UNDER ANY CIRCUMSTANCES OIL MOTOR. Keep turntable and idler wheels free from oil. If oil should get on any of these parts be sure to remove it.

The turntable bearing and center shaft hub are self-lubricating and therefore require no oil.

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Grounded side of pick up cartridge is terminal nearest the tone arm.

A.C. connections (85) will fit Allen-502 or EBY-624 plug or equivalent.

## PARTS LIST

| INDEX NO. | DESCRIPTION | PART NO. |
|---|---|---|
| 1 | Base | 1200 |
| 2 | Lift Pivot Bracket | 1201 |
| 3 | Switch Mounting Bracket | 1202 |
| 4 | Switch Lever | 1203 |
| 5 | Push Button Bracket | 1204 |
| 6 | Center Post Cap | 1205 |
| 8 | Position Stop | 1207 |
| 9 | Push Off Lever | 1208 |
| 10 | Push Off Arm | 1209 |
| 11 | 12"-10" Lever | 1210 |
| 12 | Push Off Channel | 1211 |
| 13 | Tone Arm Adjusting Plate | 1212 |
| 14 | Tone Arm Mounting Bracket | 1213 |
| 15 | Tone Arm Lever | 1214 |
| 16 | Tone Arm Link | 1215 |
| 17 | Lift Lever | 1216 |
| 18 | 100-tooth Gear | 1217 |
| 19 | Cam Plate | 1218 |
| 20 | Clutch Arm | 1219 |
| 21 | Main Slide | 1220 |
| 22 | Return Slide | 1221 |
| 23 | Pawl Lever | 1222 |
| 24 | Trip | 1238 |
| 25 | Washer Push-off Arms | 1224 |
| 26 | Gear Cam | 1225 |
| 27 | Center Post Support Plate | 1226 |
| 28 | Square Washer Pickup | 1227 |
| 29 | A.C. Cover and Insulator | 1228 |
| 30 | Ball Bearing Retainer | 1229 |
| 31 | Bearing Bracket | 1230 |
|  | Base Skirt Side | 1231 |
|  | Base Skirt Corner | 1232 |
|  | Base Skirt Bracket | 1233 |
| 32 | Reject Arm | 1234 |
| 33 | Index Washer | 1235 |
| 34 | Tone Arm Lever | 1236 |
| 40 | Hub Push-Off | 2200 |
| 41 | Roller Stud | 2201 |
| 42 | Push Button Shaft | 2202 |
| 43 | Tone Arm Bearing | 2203 |
| 44 | Shoulder Rivets | 2204 |
| 45 | Center Post | 2205 |
| 46 | Shoulder Rivet | 2207 |
| 47 | Center Post Shaft | 2208 |
| 48 | Oilite Bearing—T. T. | 2209 |
| 49 | Push Off Plate Shaft | 2210 |
| 50 | Large Shoulder Rivet | 2211 |
| 51 | Push Off Slide Rod | 2212 |
| 52 | Push Off Lever Rod | 2213 |
| 53 | Pick Up Pivot Stud | 2215 |
| 54 | Lift Rod | 2216 |
| 55 | Tone Arm Shaft | 2217 |
| 56 | Tone Arm Shaft Hub | 2218 |
| 57 | Tone Arm Shoulder Bushing | 2219 |
| 58 | Tone Arm Link Stud | 2220 |
| 59 | Gear Stud Bearing—Upper | 2221 |
| 60 | Gear Roller—Upper | 2222 |
| 61 | Gear Shaft | 2223 |
| 62 | Pinion Gear | 2224 |
| 63 | Shoulder Rivet—Large | 2226 |
| 64 | Roller | 2227 |
| 65 | Spacer | 2228 |
| 66 | Turntable Hub | 2229 |
| 67 | Oilite Bearing—C. S. | 2230 |
| 68 | Push Off Stud | 2231 |
| 69 | Gear Stud Bearing—Lower | 2232 |
| 70 | Gear Roller—Lower | 2233 |
| 71 | Turntable Shaft | 2235 |
| 72 | Stud Lift Roller | 2236 |
| 73 | Lift Lever Roller | 2237 |
| 74 | Wheel Shaft | 2239 |
| 75 | Wheel Bushing | 2240 |
|  | Contact Pins | 2241-A |
| 76 | Bushing—Tone Arm |  |
| 77 | Screw-Height Adj. (Gulmite Head) |  |
| 80 | Push Button—On | 3200 |
| 81 | Push Button—Off | 3201 |
| 82 | Push Button—Reject | 3202 |
| 83 | Slide Switch | 3203 |
| 84 | Motor | 3204 |
| 85 | A. C. Plug | 3205 |
|  | Lead Wire Set—A. C. | 3206 |
| 86 | ⅛" Ball Bearing | 3207 |
| 87 | Record Post | 3208 |
| 88 | Tone Arm | 3209 |
| 89 | Cap Record | 3210 |
| 90 | Clamp | 3211 |
| 91 | Cartridge and Clips | 3212 |
|  | Needle | 3213 |
| 93 | Tone Arm Terminal | 3214 |
|  | Shielded Cable | 3215 |
| 94 | Tone Arm Rest | 3216 |
| 95 | Instrument Panel Spacer | 3217 |
| 96 | Turntable Main Bearing | 3218 |
| 97 | Rubber Wheel | 3219 |
|  | Rubber Grommets | 3220 |
|  | Turntable (only) | 3224 |
| 100 | Link—Reject | 4201 |
| 101 | Reject Spring | 4202 |
| 102 | Pawl Spring | 4203 |
| 103 | 10"-12" Position Spring | 4204 |
| 104 | Push Off Link | 4205 |
| 105 | 10"-12" Link | 4206 |
| 106 | Record Clamp Spring | 4207 |
| 107 | Tone Arm Mounting Spring | 4208 |
| 108 | Tone Arm Height Spring | 4209 |
| 109 | Clutch Spring | 4210 |
| 110 | Slide Spring | 4211 |
|  | Mounting Spring | 4213 |
| 113 | Lead-in Spring | 4214 |
| 114 | Tone Arm Adjusting Screw Spring | 4215 |
| 115 | Channel Spring | 4216 |
| 116 | Spring Washer | 4217 |
| 117 | Lead Clip Spring | 4218 |
| 118 | ¼" Spring Clip | 4219 |
| 119 | 3/16" Spring Clip | 4220 |
| 120 | ⅛" Spring Clip | 4221 |
|  | Center Post Retainer Spring | 4222 |
| 121 | Spring—Push Down | 4223 |
| 122 | Index—Tone Arm Spring |  |

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**Parts Listed Below are Sub-Assemblies**

| INDEX NO. | DESCRIPTION | PART NO. |
|---|---|---|
| 125 | Base Spotweld Assembly | 9201 |
| 126 | Switch Mounting Assembly | 9202 |
| 127 | Drive Gear Assembly | 9203 |
| 128 | Push Off Lever Assembly | 9204 |
| 129 | Turntable Bearing Assembly | 9205 |
| 130 | Tone Arm Link Assembly | 9206 |
| 131 | Main Slide Assembly | 9207 |
| 132 | Pinion Gear and Cam Assembly | 9210 |
| 133 | Turntable Shaft and Clutch Assembly | 9212 |
| 134 | Center Post Assembly | 9213 |
| 135 | Record Post and Cap Assembly | 9214 |
| 136 | Record Post Assembly | 9215 |
| 137 | Tone Arm Shaft Assembly | 9217 |
| 138 | Tone Arm Assembly Complete | 9218 |
| 139 | Tone Arm Mounting Assembly | 9219 |
| 140 | Tone Arm Shaft Assembly—New | 9226 |